

Competent Children at 12

Cathy Wylie, Jean Thompson, Edith Hodgen, Hilary Ferral, Cathy Lythe, and
Tineke Fijn



NEW ZEALAND COUNCIL FOR EDUCATIONAL RESEARCH
TE RŪNANGA O AOTEAROA MŌ TE RANGAHAU I TE MĀTAURANGA

WELLINGTON

2004

© Crown copyright, 2004

ISBN 1-877293-39-3

Distributed by NZCER Distribution Services

P O Box 3237

Wellington

New Zealand

Acknowledgments

First and foremost, our thanks to the participants in the study: the children (now young people), their parents, and their teachers, who continue to give their time and interest, and so ensure that their cumulative story can be told. The funding and interest of the Ministry of Education has also been essential to the study, and we are most grateful for it.

We are most appreciative of the assistance given us by the principals and office staff of the many schools attended by the study children when they were aged-12. Three schools helped us in the development of our interview questions for this phase through focus group discussions among students, parents, and teachers, and through teachers trialling draft questions, and our thanks go to those involved at Evan's Bay Intermediate school, Clyde Quay school, and Te Aro school.

Our thanks too to the project team. Cathy Lythe and Tineke Fijn organised the fieldwork. Once again we were fortunate to retain most of our highly competent fieldwork team: Anna Wildey, Betty Irons, Tricia Meagher-Lundberg, Janet Meehan, Patricia Bullock, Wendel Richardson, Elizabeth Wagner, Marion Bayne, Marilyn Weir and Brigid Wilkinson. They were joined by Miranda Duurloo, and Robyn Scott. The team's background and understanding of the project proved to be a great asset. Our thanks to Betty Irons, Miranda Duurloo, Elizabeth Wagner and Tricia Meagher-Lundberg for their willingness to travel some distance to locations around New Zealand to assist with the out-of-Wellington fieldwork and to Cristina Smits at NZCER who also lent a hand. Rae Julian assisted with interviewing parents for whom English was a second language. Many team members also assisted with information checking and recording. In this respect we thank particularly Janet Meehan who acted as coordinator when a staff member was on leave and who, together with Elizabeth Wagner and Patricia Bullock, assisted with the assessment of children's tasks. For their help in the development of our competency measures we thank Cedric Croft, Neil Reid, Sally Boyd and Sue McDowall.

The initial data management and analysis was provided by Barb Bishop and Leonid Grebennikov, and secretarial support has been provided by Roberta Tiatia, Christine Williams, Carlene Grigg, Lorraine Thompson, and Suzanne Hay. Shelley Carlyle undertook the copy-editing of the final report.

Our advisory group has given us most useful advice and review. Our thanks go to Sandie Aikin, Jude Allison, Robyn Baker, Jacky Burgon, Clive McGee, Dick Harker, Anne Meade, Christian Monseur, and Lynne Whitney.

Table of Contents

| | |
|--|------------|
| Acknowledgments | i |
| Executive Summary | xix |
| The Competent Children Project | xix |
| This stage of the project | xx |
| The children's competencies at age 12 | xxi |
| <i>Teacher-rated competencies</i> | xxi |
| <i>Task-assessed competencies</i> | xxvi |
| Children's performance across time | xxxii |
| <i>Key findings</i> | xxxii |
| <i>Children in the top and bottom quartiles</i> | xxxii |
| <i>The different competencies</i> | xxxii |
| <i>Gender and ethnicity</i> | xxxii |
| <i>Maternal qualification and early family income</i> | xxxii |
| Children's experiences and competency levels | xxxiii |
| <i>The contribution of early childhood education and of cumulative experiences at age 12</i> | xxxiii |
| <i>Key findings</i> | xxxiii |
| <i>Early childhood education</i> | xxxiv |
| <i>Family Resources</i> | xxxiv |
| <i>Home and School</i> | xxxv |
| <i>Bullying and coping</i> | xxxvii |
| <i>Stability</i> | xxxvii |
| The children's home experiences at age 12 | xxxviii |
| <i>Key findings</i> | xxxviii |
| <i>Siblings and Birth Parents</i> | xxxix |
| <i>Parental Employment</i> | xl |
| <i>Parental Support, Income and Leisure Activities</i> | xl |
| <i>Parent–Child Interaction</i> | xli |
| <i>Children's Activities</i> | xli |
| <i>Children's Perspectives on their Home Life</i> | xliv |
| <i>Puberty</i> | xlvi |
| <i>Coping with Upsets</i> | xlvi |
| <i>Parental Concerns</i> | xlvi |
| <i>Friendships and Relations with Peers</i> | xlvii |
| <i>Children's Values</i> | xlviii |
| The children's school experiences at age 12 | l |

| | |
|--|--------------|
| <i>Key findings</i> | <i>i</i> |
| <i>School Characteristics</i> | <i>lii</i> |
| <i>Classroom Characteristics</i> | <i>liii</i> |
| <i>Attitudes to School and Teachers</i> | <i>liii</i> |
| <i>Problem-solving at School and Attendance</i> | <i>liv</i> |
| <i>Homework</i> | <i>lv</i> |
| <i>Talking about School at Home</i> | <i>lv</i> |
| <i>Children's Views on Doing Well at School</i> | <i>lvi</i> |
| <i>Teachers' Overall Assessments of Children's Performance</i> | <i>lvi</i> |
| <i>Teachers making a difference for children</i> | <i>lviii</i> |
| <i>Home support for children's learning at school</i> | <i>lviii</i> |
| <i>Selection of Secondary School</i> | <i>lx</i> |
| <i>Children's Attitudes to Secondary School</i> | <i>lxi</i> |
| <i>Parental Aspirations for Children's Education</i> | <i>lxii</i> |
| <i>Occupational interests and expectations</i> | <i>lxii</i> |
| Some overall messages | lxiii |
| <i>The role of family resources</i> | <i>lxiii</i> |
| <i>The role of participation and engagement</i> | <i>lxiv</i> |
| <i>The roles of current and early experiences</i> | <i>lxiv</i> |
| <i>The importance of understanding cumulative experiences</i> | <i>lxv</i> |
| 1. Introduction | 1 |
| Study sample | 3 |
| <i>Attrition rates</i> | 5 |
| Notes on the report | 5 |
| <i>Report structure</i> | 6 |
| 2. The children's competencies at age 12 | 8 |
| The competency measures | 8 |
| <i>Teacher-rated competencies</i> | 8 |
| <i>Task-assessed competencies</i> | 14 |
| <i>Relationships between competency measures at age 12</i> | 20 |
| Summary | 23 |
| 3. Changes in the competencies over time | 24 |
| Attitudes, behaviours, social skills | 24 |
| Mathematics, literacy, and Logical Problem-Solving | 26 |

| | |
|--|-----------|
| Contributions of earlier performance levels to age-12 scores – or, is reading like riding a bicycle (once learnt, always retrievable)? | 28 |
| <i>Path analysis</i> | 29 |
| Movement between quartiles | 31 |
| <i>Continuity of performance age 5–12</i> | 32 |
| <i>Continuity in performance between ages 8 and 12</i> | 32 |
| <i>Continuity in performance between ages 10 and 12</i> | 33 |
| <i>Patterns of improvement for initially low performing children</i> | 34 |
| <i>Differences in population sub-groups</i> | 35 |
| Summary | 45 |
| 4. Cumulative experiences | 48 |
| Family resources | 49 |
| <i>Family income</i> | 49 |
| <i>Child's time</i> | 53 |
| <i>Engagement in school</i> | 56 |
| <i>School resources</i> | 63 |
| <i>Changes in daily settings</i> | 68 |
| <i>Child's responses</i> | 71 |
| <i>Relations with others</i> | 72 |
| Summary | 73 |
| <i>Does stability confer advantages?</i> | 73 |
| <i>Few paths through school run entirely smoothly</i> | 74 |
| <i>Structural aspects of school</i> | 75 |
| 5. Contributions of early childhood education | 76 |
| Associations between ECE experience and children's competencies at age 12 | 76 |
| <i>Length of ECE experience</i> | 77 |
| <i>Final ECE type</i> | 79 |
| <i>Early childhood education socio-economic mix</i> | 79 |
| <i>Early childhood education quality</i> | 80 |
| <i>Do aspects of ECE make separate contributions after age 5?</i> | 87 |
| Summary | 89 |
| 6. Differences in competencies related to gender and family characteristics | 91 |
| Gender | 91 |
| Ethnicity | 93 |
| <i>Language spoken at home</i> | 94 |

| | |
|---|------------|
| Maternal qualification | 95 |
| Family income | 98 |
| Income-related differences in children's competencies at age 12 | 100 |
| Summary | 104 |
| 7. Family composition and parents | 105 |
| Family composition | 105 |
| Income sources and welfare receipt | 107 |
| Parental employment | 108 |
| <i>Childcare out of school hours</i> | 110 |
| Parental occupations | 111 |
| Parental health and general happiness | 111 |
| Informal support for parents | 112 |
| Parental use of leisure | 112 |
| Parental enjoyment of reading | 115 |
| Parental time spent watching television | 115 |
| Do mothers and fathers see things differently? | 116 |
| Summary | 116 |
| 8. Activities and interests | 118 |
| Leisure activities | 118 |
| Home equipment | 121 |
| Television watching | 122 |
| Computer use | 124 |
| Reading | 128 |
| Writing at home | 131 |
| Mathematics at home | 133 |
| Interests | 136 |
| <i>Club membership</i> | 136 |
| <i>Lessons outside school</i> | 137 |
| <i>Music</i> | 138 |
| Extracurricular activities | 139 |
| Money | 140 |
| Summary | 141 |

| | |
|---|------------|
| <i>Use of leisure</i> | 141 |
| <i>The role of television</i> | 141 |
| <i>The role of computers</i> | 142 |
| <i>The role of reading</i> | 142 |
| <i>The role of writing</i> | 143 |
| <i>The role of mathematics</i> | 143 |
| <i>Clubs, lessons, participation in formal music activity, and extracurricular activities</i> | 143 |
| <i>Money</i> | 144 |
| <i>Commonality and differences in children's use of leisure</i> | 144 |
| <i>Gender</i> | 145 |
| 9. Home experiences and support | 146 |
| Children's views of their home experiences | 146 |
| <i>Children's views of their home experiences and competency levels</i> | 147 |
| Parental activities with the study children | 151 |
| Who children come home to at age 12 | 153 |
| Parental expectations | 153 |
| <i>Bed-time</i> | 155 |
| Parental responses to children | 155 |
| Summary | 157 |
| 10. Puberty, parental concerns, and change | 159 |
| Puberty | 159 |
| General happiness | 160 |
| General health | 161 |
| Residential mobility | 161 |
| Things unsettling children | 161 |
| Parental concerns | 163 |
| <i>Household help</i> | 164 |
| <i>Home behaviour</i> | 165 |
| <i>Self-esteem/self-confidence</i> | 165 |
| <i>Friendships</i> | 166 |
| <i>School</i> | 167 |
| <i>Number of parental concerns</i> | 167 |
| Summary | 168 |
| <i>Puberty</i> | 168 |
| <i>Coping with upsets</i> | 169 |

| | |
|---|------------|
| <i>Parental concerns</i> | 169 |
| <i>Residential mobility</i> | 169 |
| 11. Relations with peers, and values | 170 |
| Being with friends | 170 |
| <i>Parents and friends</i> | 172 |
| <i>The role of friendship in children's lives at age 12</i> | 172 |
| Bullying and getting a hard time at school | 173 |
| Values | 176 |
| <i>Values in adulthood</i> | 178 |
| Relations with children's peers, and their earlier competency levels | 179 |
| Current patterns of peer relations, attitudes to school, and competency levels | 182 |
| Summary | 185 |
| <i>Friendships</i> | 185 |
| <i>Bullying</i> | 186 |
| <i>Values</i> | 186 |
| <i>Patterns of peer relations and children's earlier social skills and school behaviour</i> | 187 |
| <i>Patterns of peer relations, attitudes to school, and competency levels</i> | 187 |
| 12. School and class characteristics | 189 |
| Characteristics of schools attended by the competent children sample at age 10 | 189 |
| School socio-economic decile | 192 |
| School ownership | 196 |
| School type | 197 |
| Classroom characteristics | 198 |
| <i>Class size</i> | 198 |
| <i>Year level</i> | 199 |
| <i>Composite and single-level classrooms</i> | 199 |
| <i>Numbers of teachers and variation in physical classrooms</i> | 199 |
| Parental support for children's schoolwork | 201 |
| Peer support | 202 |
| Summary | 203 |
| <i>School socio-economic decile</i> | 203 |
| <i>School ownership</i> | 203 |
| <i>School type</i> | 203 |
| <i>Classroom characteristics</i> | 204 |
| <i>Year level</i> | 204 |

| | |
|--|------------|
| 13. School experiences – children’s and parents’ perspectives | 205 |
| Children’s attitudes to school at age 12 | 205 |
| <i>Does liking the teacher matter?</i> | 206 |
| Children’s views of their school experience at age 12 | 208 |
| Children’s perceptions of their classrooms | 216 |
| Children’s responses to difficulty in their work | 219 |
| Homework | 220 |
| <i>Children’s views</i> | 220 |
| <i>Teacher views</i> | 222 |
| <i>Homework completion and children’s competency scores at age 12</i> | 222 |
| <i>Parents’ views</i> | 223 |
| Talking about school at home | 224 |
| Children’s views on doing well at school | 225 |
| Relation of attitudes to school with earlier competency levels and problem-solving | 230 |
| School mobility | 232 |
| Summary | 234 |
| <i>Attitudes to school and teachers</i> | 234 |
| <i>Problem-solving</i> | 235 |
| <i>Homework</i> | 236 |
| <i>Talking about school at home</i> | 236 |
| <i>Children’s views on doing well at school</i> | 237 |
| <i>Traces of earlier attitudes to school work</i> | 237 |
| <i>School mobility</i> | 237 |
| 14. Teachers’ perspectives on the children’s progress | 238 |
| Children’s overall progress | 238 |
| <i>Other aspects related to teachers’ overall assessments</i> | 241 |
| Mathematics and reading age | 243 |
| Curriculum strengths | 244 |
| <i>Children’s areas of difficulty in the curriculum</i> | 246 |
| <i>Teachers’ views of children’s non-curriculum strengths and weaknesses</i> | 247 |
| <i>Attendance</i> | 251 |
| <i>Teacher views of children’s highest qualification</i> | 252 |
| The difference teachers thought they could make for children | 255 |
| Summary | 256 |
| <i>Teachers’ overall assessments</i> | 256 |

| | |
|---|------------|
| <i>Curriculum strengths and difficulties</i> | 256 |
| <i>Behavioural strengths and difficulties</i> | 256 |
| <i>Attendance</i> | 258 |
| <i>Teacher views of the study children's likely highest qualification</i> | 258 |
| <i>Teachers making a difference for children</i> | 258 |
| 15. Parental contact with the school | 259 |
| Home support for schoolwork – teachers' perspectives | 259 |
| Contact with parents and teacher views of their relationship with parents | 260 |
| Parents and teachers working together for the child | 262 |
| Parental satisfaction with their child's progress at school | 263 |
| Parental interest in change in their child's class | 266 |
| Parental involvement in their child's school | 266 |
| Summary | 267 |
| <i>Teacher perspective</i> | 267 |
| <i>Parent perspective</i> | 268 |
| 16. Secondary school choice, educational, and occupational aspirations | 270 |
| Choice of secondary school | 270 |
| <i>Family characteristics and secondary school choice</i> | 271 |
| Decision-making | 273 |
| <i>Children's views</i> | 274 |
| Looking forward to secondary school | 276 |
| Parental aspirations | 277 |
| Occupational interests | 278 |
| Summary | 281 |
| <i>Choice of secondary school</i> | 281 |
| <i>Attitudes to secondary school</i> | 282 |
| <i>Parental aspirations</i> | 282 |
| <i>Occupational interests</i> | 283 |
| 17. Fitting it all together | 284 |
| Results from ANOVA analysis | 285 |
| <i>Mathematics</i> | 286 |
| <i>Reading comprehension</i> | 290 |
| <i>Communication</i> | 293 |
| <i>Individual Responsibility</i> | 296 |

| | |
|---|------------|
| <i>Perseverance</i> | 297 |
| Path analysis | 299 |
| Key factors in children's performance at age 12 | 302 |
| <i>Role of family resources</i> | 303 |
| <i>The role of participation and engagement</i> | 304 |
| <i>The roles of current and early experiences</i> | 304 |
| <i>The importance of understanding cumulative experiences</i> | 305 |
| 18. References | 307 |

Tables

| | | |
|----------|--|-------|
| Table 1 | Teachers' ratings of children's competency: communication | xxii |
| Table 2 | Teachers' ratings of children's competency: curiosity | xxiii |
| Table 3 | Teachers' ratings of children's competency: perseverance | xxiii |
| Table 4 | Teachers' ratings of children's competency: individual responsibility | xxiii |
| Table 5 | Teachers' ratings of children's competency: social skills with adults | xxiv |
| Table 6 | Teachers' ratings of children's competency: social skills with peers | xxiv |
| Table 7 | Strategies children at ages 10 and 12 said they would use when encountering difficulties in the school grounds | xxv |
| Table 8 | Writing task – scores for particular features | xxix |
| Table 9 | Characteristics of the Competent Children sample at age 12 | 4 |
| Table 10 | Communication | 10 |
| Table 11 | Curiosity | 10 |
| Table 12 | Perseverance | 11 |
| Table 13 | Individual Responsibility | 11 |
| Table 14 | Social Skills with Adults | 12 |
| Table 15 | Social Skills with Peers | 12 |
| Table 16 | Children's strategies when encountering difficulties in the playground age 10 and 12 | 14 |
| Table 17 | Teacher estimations of children's reading ages at ages 8, 10, and 12 | 17 |
| Table 18 | Writing task – scores for particular features | 19 |
| Table 19 | Correlations between the 4 measures of literacy at age 12 | 20 |
| Table 20 | Loadings for the 3 factors derived in the factor analysis of age 12 competencies | 21 |
| Table 21 | Correlations for social and attitudinal competency scores between ages 5 and 12 | 25 |
| Table 22 | Results of modelling age 12 social and attitudinal competency scores by using scores at each of ages 5, 6, 8, and 10 | 26 |

| | | |
|----------|---|----|
| Table 23 | Correlations for cognitive competency scores comparing ages 5, 6, 8 and 10 with age 12 within each competency | 27 |
| Table 24 | Results of modelling age 12 cognitive competency scores using scores at each of ages 5, 6, 8, and 10 | 28 |
| Table 25 | Partial correlations for selected models for age 12 competencies | 29 |
| Table 26 | Retention and changes between ages 5 and 12 – departures from estimate | 32 |
| Table 27 | Retention and changes between ages 8 and 12 – departures from estimate | 33 |
| Table 28 | Retention and changes between ages 10 and 12 – departures from estimate | 34 |
| Table 29 | Retention and movement of children in quartiles 1 and 4 at age 5 and 8, in relation to the median at age 12 | 35 |
| Table 30 | Gender and movement from lowest quartile groups at ages 5 and 8 to above the median at age 12 | 36 |
| Table 31 | Gender and retention of highest quartile groups ages 5 and 8 above the median at age 12 | 37 |
| Table 32 | Ethnicity and movement from lowest quartile group at 5 or 8 to above the median at age 12 | 38 |
| Table 33 | Ethnicity and retention in highest quartile group at 5 or 8 above the median at age 12 | 38 |
| Table 34 | Maternal qualification and movement from lowest quartile group at age 5 to above the median at age 12 | 39 |
| Table 35 | Maternal qualification and movement from lowest quartile group at age 8 to above the median at age 12 | 40 |
| Table 36 | Maternal qualification and retention of highest quartile group at age 5 above the median at age 12 | 40 |
| Table 37 | Maternal qualification and retention of highest quartile group at age 8 above the median at age 12 | 41 |
| Table 38 | Family income and movement from lowest quartile group at age 5 to above the median at age 12 | 42 |
| Table 39 | Family income and movement from lowest quartile group at age 8 to above the median at age 12 | 42 |
| Table 40 | Family income and retention of highest quartile group at age 5 above the median at age 12 | 43 |
| Table 41 | Family income and retention of highest quartile group at age 8 above the median at age 12 | 43 |
| Table 42 | History of family income age 5–12, and children’s competency levels at age 12 | 50 |
| Table 43 | History of TV watching and children’s competencies at age 12 | 54 |
| Table 44 | History of child’s participation in music ages 8–12 and competencies at age 12 | 55 |
| Table 45 | Average percentage points differences (contrasts) for homework completion patterns ages 10–12 | 58 |
| Table 46 | History of teacher view of relationship with parent and competencies at age 12 | 59 |

| | | |
|----------|--|-----|
| Table 47 | History of problems tackled by parents and teachers together and children's competencies at age 12 | 61 |
| Table 48 | History of parental involvement at school at ages 8, 10 & 12 and children's competencies at age 12 | 62 |
| Table 49 | History of parental satisfaction and competencies at age 12 | 63 |
| Table 50 | History of class size in 4 levels and children's competencies at age 12 | 64 |
| Table 51 | History of school ownership age 6–12 and competencies at age 12 | 65 |
| Table 52 | History of school socio-economic decile and competencies at age 12 | 67 |
| Table 53 | Number of times child's family has shifted house since child's birth and children's competencies at age 12 | 69 |
| Table 54 | History of upsets and child's response at ages 8-12, and age 12 competencies | 72 |
| Table 55 | History of child's involvement in bullying age 10–12 and competencies at age 12 | 73 |
| Table 56 | Total length of ECE and children's competencies at age 12 | 78 |
| Table 57 | ECE socio-economic mix and children's competencies at age 12 | 80 |
| Table 58 | ECE quality rating items | 81 |
| Table 59 | Mean scores for the mathematics measures at ages 5, 6, 8,10, and 12 by quartile groups of ECE staff responsiveness to children | 83 |
| Table 60 | Means for the mathematics measures at ages 5, 6, 8, 10, and 12 by quartile groups of ECE staff guided children in context of activities | 84 |
| Table 61 | Means for the mathematics measures at ages 5, 6, 8,10, and 12 by quartile groups of ECE staff joined children in their play | 86 |
| Table 62 | ECE factors showing significant associations with age 12 mathematics scores, and their associations after accounting for age 5 competency scores | 88 |
| Table 63 | ECE factors showing significant associations with age 12 PAT Reading Comprehension scores, and their associations after accounting for age 5 competency scores | 89 |
| Table 64 | Student's gender and children's competencies at age 12 | 92 |
| Table 65 | Child ethnicity and family income | 93 |
| Table 66 | Ethnicity and children's competencies at age 12 | 94 |
| Table 67 | Maternal qualification at the birth of her first child and children's competencies at age 12 | 96 |
| Table 68 | Proportions of children in relation to their mother's qualification, scoring at or above the study median for reading comprehension and mathematics, at age 12 | 96 |
| Table 69 | Family income levels age 5 in relation to maternal qualification levels | 97 |
| Table 70 | Paternal qualification when child was 5 and children's competencies at age 12 | 97 |
| Table 71 | Paternal qualification by maternal qualification | 98 |
| Table 72 | Family incomes for children in the study ages 5 to 12 | 98 |
| Table 73 | Family income, age 5 and age 12 compared | 99 |
| Table 74 | Current family income levels in relation to parental employment | 100 |
| Table 75 | Family income at age 12 and maternal qualification levels | 100 |
| Table 76 | Family income at age 5 and children's competencies at age 12 | 101 |

| | | |
|-----------|---|-----|
| Table 77 | Proportions of age-5 family income groups scoring at or above the study median for reading comprehension and mathematics, at age 12 | 102 |
| Table 78 | Family income at age 12 and children's competencies at age 12 | 102 |
| Table 79 | Available income per person and children's competencies at age 12 | 103 |
| Table 80 | Sources of income in relation to family income levels | 107 |
| Table 81 | Family income source at age 12 and children's competencies at age 12 | 108 |
| Table 82 | Parental employment by gender | 109 |
| Table 83 | Average parental work hours by employment status | 109 |
| Table 84 | Maternal employment and childcare at age 12 | 110 |
| Table 85 | Parental occupations when study children aged 12 | 111 |
| Table 86 | Informal support for parents | 112 |
| Table 87 | Parental leisure activities | 113 |
| Table 88 | 12-year-old leisure activities | 118 |
| Table 89 | Activities most enjoyed by 12-year-olds | 120 |
| Table 90 | Equipment in the child's bedroom at age 12 | 121 |
| Table 91 | Children's 3 favourite TV programmes at ages 8, 10, and 12 | 122 |
| Table 92 | Children's computer activities and children's computer use at age 10 and 12 | 125 |
| Table 93 | Internet activities at age 12 | 127 |
| Table 94 | Children's reading at home at age 12 | 128 |
| Table 95 | Enjoyment of reading and children's competencies at age 12 | 129 |
| Table 96 | Frequency of visits to public library—children's responses at ages 8,10, and 12 | 131 |
| Table 97 | Children's home writing activities at ages 6, 8,10, and 12 | 132 |
| Table 98 | Enjoyment of writing and children's competencies at age 12 | 133 |
| Table 99 | Enjoyment of numbers and children's competencies at age 12 | 134 |
| Table 100 | Children's home mathematics activities at ages 6, 8, 10, and 12 | 135 |
| Table 101 | Other mathematics activities | 136 |
| Table 102 | Children's club membership at age 12 | 137 |
| Table 103 | Family characteristics and children's lessons outside school | 138 |
| Table 104 | Children's extracurricular activities at school (teachers' report) | 139 |
| Table 105 | Extracurricular activities at school and gender | 140 |
| Table 106 | Children's views of home – age 12 | 146 |
| Table 107 | Main activities parents do with their children at age 12 | 151 |
| Table 108 | Parental expectations or rules – parents' and children's views | 154 |
| Table 109 | Parental responses to disagreement between parent and child at age 12 | 156 |
| Table 110 | Parental handling of disagreements and children's competencies at age 12 | 157 |
| Table 111 | Puberty changes (reported by parents) | 159 |
| Table 112 | Parental concerns at their child's life at age 12 | 163 |
| Table 113 | Parental concern about help around the house and children's competencies at age 12 | 164 |
| Table 114 | Parental concern about home behaviour and children's competencies at age 12 | 165 |
| Table 115 | Parental concern about self-confidence and children's competencies at age 12 | 166 |

| | | |
|-----------|--|-----|
| Table 116 | Parental concern about friendships and children's competencies at age 12 | 166 |
| Table 117 | Parental concern about school and children's competencies at age 12 | 167 |
| Table 118 | Number of parental concerns and children's competencies at age 12 | 168 |
| Table 119 | Activities with friends at age 12 | 170 |
| Table 120 | Good things about friendships at age 12 | 171 |
| Table 121 | Bullying and children's competencies at age 12 | 175 |
| Table 122 | Children's most important 3 things at age 12 | 176 |
| Table 123 | Values of most importance in adulthood | 178 |
| Table 124 | Family income and school characteristics | 192 |
| Table 125 | School socio-economic decile and children's competencies at age 12 | 194 |
| Table 126 | School decile and reading ages | 195 |
| Table 127 | School ownership and children's competencies at age 12 | 196 |
| Table 128 | School decile and school type | 197 |
| Table 129 | School type and children's competencies at age 12 | 198 |
| Table 130 | Year level and children's competencies at age 12 | 199 |
| Table 131 | Subjects with other teachers | 200 |
| Table 132 | Parental support for most children in the class and children's competencies at age 12 | 201 |
| Table 133 | Teacher rating for parental support for most children in their class | 202 |
| Table 134 | Level of peer support for most children in the class and children's competencies at age 12 | 202 |
| Table 135 | Student's current response to school and competencies at age 12 | 206 |
| Table 136 | Student's attitude to current teacher and children's competency scores | 207 |
| Table 137 | Children's views of their experience at school | 208 |
| Table 138 | Children's perceptions of their classroom at age 8, 10, and 12 | 218 |
| Table 139 | Children's responses to finding a project hard at age 12 | 219 |
| Table 140 | Responses to difficulty in finding a book in the school library | 219 |
| Table 141 | Homework completion and children's competencies at age 12 | 223 |
| Table 142 | Topics of school children discuss with their family | 225 |
| Table 143 | Children's views on progress at school at age 10 and 12 | 225 |
| Table 144 | Number of schools attended and children's competencies at age 12 | 234 |
| Table 145 | Teacher view overall achievement in 4 levels and children's competencies at age 12 | 239 |
| Table 146 | Teacher view overall achievement at age 6 and children's competencies at age 12 | 240 |
| Table 147 | Children's areas of strength in the curriculum: ages 6, 8, 10, and 12 | 244 |
| Table 148 | Children's areas of difficulty in the curriculum: ages 6, 8, 10, and 12 | 246 |
| Table 149 | Teachers' views of children's non-curriculum strengths: ages 6, 8, 10, and 12 | 247 |
| Table 150 | Teachers' views of children's non-curriculum weaknesses: ages 6, 8, 10, and 12 | 248 |
| Table 151 | Clusters of children's classroom behaviour | 250 |
| Table 152 | Relations of clusters of children's classroom behaviour with their competency scores | 251 |

| | | |
|-----------|---|-----|
| Table 153 | Attendance – teacher view, and children's competencies at age 12 | 252 |
| Table 154 | Teachers' views of study children's likely highest qualification in relation to current performance level at age 12 | 252 |
| Table 155 | Table Maternal qualification and teachers' view of children's likely highest qualification | 254 |
| Table 156 | Teachers' perceptions of the main obstacle to children's educational achievement at age 10 and 12 | 254 |
| Table 157 | Teacher view of home support for schoolwork and children's competencies at age 12 | 260 |
| Table 158 | Frequency of teachers' meetings with parents | 261 |
| Table 159 | Parental satisfaction with child's progress at 10 and children's competencies at age 12 | 265 |
| Table 160 | Parental involvement at their child's school ages 8, 10, and 12 | 266 |
| Table 161 | Characteristics of secondary schools already chosen by children's parents | 271 |
| Table 162 | Family characteristics and characteristics of their child's chosen secondary school | 272 |
| Table 163 | Decision-making about secondary school | 273 |
| Table 164 | Parental and student reasons for choice of secondary school | 274 |
| Table 165 | Maternal qualification and educational aspirations for child at age 12 | 277 |
| Table 166 | Children's and parents' views on children's future occupations | 279 |
| Table 167 | Starting model for effects of variables in model accounting for variance in age 12 mathematics scores | 286 |
| Table 168 | Final model for effects of variables accounting for variance in age 12 mathematics scores | 288 |
| Table 169 | Final model of variables accounting for variance in PAT Reading Comprehension test scores at age 12 | 291 |
| Table 170 | Starting model for effects of variables in model accounting for variance in age 12 Communication scores | 294 |
| Table 171 | Final model for effects of variables in model accounting for variance in age 12 Communication scores | 295 |
| Table 172 | Initial model for effects of variables in model accounting for variance in age 12 Individual Responsibility scores | 296 |
| Table 173 | Final model for effects of variables in model accounting for variance in age 12 Individual Responsibility scores | 297 |
| Table 174 | Initial model for effects of variables in model accounting for variance in age 12 Perseverance scores | 298 |
| Table 175 | Initial model for effects of variables in model accounting for variance in age 12 Perseverance scores | 299 |

Figures

| | | |
|-----------|---|-----|
| Figure 1 | Paths between mathematics, literacy, and communication | 22 |
| Figure 2 | Paths between achievement and social and attitudinal competency ages 8 –12 | 30 |
| Figure 3 | History of school decile and Cognitive Composite score | 68 |
| Figure 4 | Length of ECE experience | 78 |
| Figure 5 | ECE staff responsiveness to children and mathematics scores age 12 | 82 |
| Figure 6 | ECE staff responsiveness to children and PAT Reading Comprehension scores age 12 | 82 |
| Figure 7 | ECE staff guidance and PAT Reading Comprehension scores age 12 | 83 |
| Figure 8 | ECE staff guidance and age-12 mathematics scores | 84 |
| Figure 9 | ECE staff open-ended questioning and age-12 PAT Reading Comprehension scores | 85 |
| Figure 10 | ECE staff joined in children's play and age-12 mathematics scores | 85 |
| Figure 11 | Family composition when study children aged 12 | 106 |
| Figure 12 | Children's daily TV watching | 123 |
| Figure 13 | Children's experience of being upset and age-12 Composite Cognitive Competency | 162 |
| Figure 14 | Relations between age-10 and age-12 peer experiences and behaviour | 181 |
| Figure 15 | Relations between school engagement and patterns of peer relations and values | 185 |
| Figure 16 | School characteristics | 190 |
| Figure 17 | School decile and Composite Cognitive Competency | 193 |
| Figure 18 | Children's views of progress | 229 |
| Figure 19 | Age 10 dispositions and communication and children's age 12 attitudes to school | 232 |
| Figure 20 | Teachers' study assessments of children's overall achievement level | 238 |
| Figure 21 | Teacher views of children's overall achievement and Composite Competency at age 12 | 241 |
| Figure 22 | Study children's mathematics performance relative to their class level | 243 |
| Figure 23 | Teachers' views of children's likely highest qualification level in relation to their views of their overall progress at age 12 | 253 |
| Figure 24 | Parental satisfaction with their child's progress at school | 263 |
| Figure 25 | Paths between family resources, school engagement, communication, mathematics, and literacy | 301 |

Appendices

| | |
|--|-----|
| Appendix 1: Statistical techniques used | 309 |
| Appendix 2: Relations between competency scores at age 12 | 324 |
| Appendix 3: Transformations of competency scores used in cluster analysis of teachers' perspectives of children's non-curriculum dispositions and habits | 329 |
| Appendix 4: Summaries of sizeable associations | 330 |

Executive Summary

The Competent Children Project

The Competent Children project, funded by the Ministry of Education, focuses on a group of about 500 Wellington region children. The study has charted these children's cognitive, social and attitudinal competencies from when they were close to 5 years of age and still in early childhood education, and aims to continue this process until they leave school.

The study's main aims are to explore the roles of home and education in the development of the children's competencies and to investigate if these roles change over time and as the children have other experiences. We have accordingly collected at stages information about the children's home resources and activities, experiences out of school, and school experiences. The first stage was when the children were near age 5, the second when they were age 6, the third, age 8 and the fourth, age 10. This summary report presents the findings for the fifth stage—age 12.¹ Findings from the sixth stage, when the study participants were age 14, will be available in 2005. Next year, we will also be returning to find out what is happening in the children's lives as they turn 16.

Like the two other longitudinal cohort studies of children's development being undertaken in New Zealand (the Dunedin and Christchurch studies, which began in the 1970s), this study is limited to a single region of the country. However, we drew the sample in relation to early childhood education types rather than the Wellington region population. The sample therefore has a higher representation of children from high-income homes, whose mothers have a trade or tertiary qualification (other than university), and who identify as Pākehā/European than would be the case if the sample had been drawn for the Wellington region or the country as a whole. Similarly, the proportions of children (engaged in, for example, sport or accessing the Internet at home) and the mean levels on the cognitive competencies that we report probably differ from those if the sample had been taken for the country as a whole, particularly where activities and experiences relate to differences in family income and maternal qualification.

The information we have collected thus far during our study provides rich and comprehensive pictures of the children's lives at each of the different ages. It also allows us to investigate questions relating to the way that changes in children's lives affect them, and to look at the relationships between their experiences, resources and activities at home and school and their engagement and achievement in school.

¹ At ages 5 and 6, the study included some 300 children. At age 8, we brought in around 200 children from a related parental survey done when these children were age 5 and at the same time as our first stage of this research.

This stage of the project

Our look at the children at age 12 covers a wide range of the current activities, experiences and views of 12-year-olds in contemporary New Zealand. It also takes account of information from the study children's parents and teachers, whom we interviewed. At age 12, 53 percent of the study children were in Year 7 and 47 percent in Year 8.

As with the earlier stages of the study, we related the children's past and present experiences and perceptions to their competency levels. The 9 competencies we chose to focus on at age 12 were:

- communication
- perseverance
- individual responsibility
- curiosity
- social skills with peers
- social skills with adults
- mathematics
- literacy (reading comprehension, reading age, writing, vocabulary)
- logical problem-solving.

The first six competencies were measured by teacher ratings, and the last three were measured by tests/tasks that the children did. However, we accompanied one of the teacher-assessed competencies—social skills with peers—with a task for the children. In addition to asking teachers to rate the children's competency in this area, we asked the children questions relating to bullying at school.

At the time we interviewed the teachers, they had been teaching the children in the study for an average of 7.3 months, with a range of 1 month to 4 years or more. The average age of the children at this time was 12 years, with a range of 11.10 years to 12.6 years.

The children's competencies at age 12

We look first at the study children's scores on each of the competency measures at age 12, with some description of trends in particular items making up the competency measures. We then look at the relationships between the competency measures at age 12.

Because of the period of growth covered in the children's lives, we have been unable to use the same measures in every phase of the study, although we have kept the same items and tests as much as possible.

Teacher-rated competencies

? Communication ? Curiosity ? Perseverance ? Individual Responsibility

? Social Skills with Adults ? Social Skills with Peers

Key findings

- Overall, the study children's classroom behaviour on these measures, as rated by their teachers, was much the same at age 12 as it had been when the children were ages 8 and 10.
- Around two-thirds to three-quarters of the 12-year-olds seemed comfortable in the class in their role as learners, with 15 percent or fewer receiving poor scores for individual items making up the six measures.
- The study children had higher scores for the listening items on the communication measure than for the speaking items.
- While many of the study children enjoyed new experiences, thinking laterally or "outside the square" was common for only around a third of them.
- Most children were getting on with their peers.
- The teachers did not consider peer pressure to be a major issue for most of the children. However, the children's responses to a hypothetical situation (being given a "hard time" in the school grounds) showed fewer of the children would respond assertively at age 12 than they would have at age 10 and a doubling across the two ages of the (albeit small) proportion of children indicating they would respond with aggression. A greater number of the study children said they would seek their parents' help if their first response to receiving a hard time did not work.

Communication

The measure of communication covered receptive language, or listening skills, and expressive language, or speaking skills.

As at earlier ages, the study children's listening scores tended to be higher than their speaking scores (Table 1). Around three-quarters or more of the children always or often understood the information their teacher gave them

in class, asked for something they did not understand to be repeated or explained again and followed conversations and stayed on topic. Just over half the children were seen by their teachers to often or always speak confidently or to offer a clear and convincing argument.

Table 1 Teachers' ratings of children's competency: communication

| Ranking [®] | 5 | 4 | 3 | 2 | 1 |
|---|----|----|----|----|---|
| Item [™] | % | % | % | % | % |
| <i>Receptive</i> | | | | | |
| Follows conversation and stays on same topic | 31 | 43 | 20 | 6 | 0 |
| Understands information given to the class | 31 | 50 | 17 | 3 | 0 |
| Asks for something not understood to be repeated or explained again | 29 | 36 | 20 | 13 | 3 |
| Good listener | 27 | 41 | 20 | 11 | 1 |
| Can remember and carry out instructions after hearing them once | 24 | 44 | 22 | 9 | 2 |
| <i>Expressive</i> | | | | | |
| Clearly explains things seen or done | 23 | 44 | 22 | 9 | 2 |
| Expresses his/her views and needs appropriately | 22 | 40 | 26 | 11 | 1 |
| Confident speaker | 22 | 33 | 27 | 14 | 4 |
| Modifies language according to situation and audience | 18 | 42 | 27 | 12 | 2 |
| Provides clear and convincing argument | 17 | 37 | 30 | 12 | 4 |

5 = always, 1 = never. Figures in tables may not total 100% due to rounding.

Curiosity

The children's scores at age 12 for the curiosity items were much the same as at ages 8 and 10, but were generally much lower than for the items on our other measures. Around two-thirds of the 12-year-olds were seen by their teachers always or often to enjoy new experiences/challenges (Table 2).

Table 2 Teachers' ratings of children's competency: curiosity

| Ranking [®] | 5 | 4 | 3 | 2 | 1 |
|---|----|----|----|----|---|
| Item ⁻ | % | % | % | % | % |
| Takes an active interest in surroundings | 19 | 46 | 27 | 8 | 1 |
| Enjoys new experiences/challenges | 17 | 43 | 30 | 10 | 1 |
| Asks a lot of questions/wants to know how and why | 12 | 36 | 32 | 16 | 4 |
| Thinks laterally, "outside the square" | 8 | 29 | 37 | 20 | 5 |

5 = always, 1 = never.

Perseverance

As at earlier ages, most children (77 percent) finished all their work always or often (Table 3). This percentage was much the same as at age 10 and somewhat higher than the 65 percent at age 8. Just over half the children always or often persisted with solving a problem, even when things went wrong.

Table 3 Teachers' ratings of children's competency: perseverance

| Ranking [®] | 5 | 4 | 3 | 2 | 1 |
|--|----|----|----|----|---|
| Item ⁻ | % | % | % | % | % |
| Finishes all work | 39 | 37 | 14 | 8 | 1 |
| Good concentration span when working in the classroom | 27 | 36 | 22 | 13 | 2 |
| Makes an effort to do something even if s/he doesn't want to | 24 | 42 | 20 | 12 | 2 |
| Persists with solving a problem, even when things go wrong | 18 | 38 | 28 | 14 | 3 |

5 = always, 1 = never.

Individual Responsibility

Just over half the study children could always be relied on to pass messages between school and home at age 12, and just over a third always followed class routines without having to be reminded. Just over half always or often acted with some thought to the consequences of their action (Table 4).

Table 4 Teachers' ratings of children's competency: individual responsibility

| Ranking [®] | 5 | 4 | 3 | 2 | 1 |
|---|----|----|----|----|----|
| Item ⁻ | % | % | % | % | % |
| Can be relied on to pass messages between school and home | 51 | 28 | 14 | 8 | 0 |
| Takes responsibility for his/her actions | 42 | 35 | 17 | 5 | 1 |
| Keeps track of time, puts books away in right place | 40 | 32 | 17 | 11 | 1 |
| Follows class routines without having to be reminded | 36 | 42 | 16 | 6 | 1 |
| Acts without thinking of consequences* | 3 | 11 | 27 | 35 | 23 |

5 = always, 1 = never. * Reverse scored (5 = never, 1 = always).

Social Skills with Adults

All but 11 percent of the children showed respect for the adults in the school often or always. Around two-thirds also showed confidence in their interactions with adults in the school and could present their point of view appropriately to an adult, even when there was a disagreement (Table 5). The scores on the social skills with adults items were much the same as at age 10.

Table 5 Teachers' ratings of children's competency: social skills with adults

| Ranking® | 5 | 4 | 3 | 2 | 1 |
|---|----|----|----|---|---|
| Item™ | % | % | % | % | % |
| Shows respect for adults in the school | 57 | 32 | 9 | 2 | 0 |
| Presents his/her point of view appropriately | 34 | 34 | 22 | 7 | 2 |
| Confident in her/his interactions with adults in the school | 28 | 42 | 20 | 8 | 2 |

5 = always, 1 = never.

Social Skills with Peers

In their teachers' experience, most children got on with others (the positive side of relations with peers) and were not influenced by peer pressure to do something out of character (the negative side of peer relations). Just over half the children were never left out of groups by other students, and just under half were never difficult for their peers to get on with (Table 6).

Table 6 Teachers' ratings of children's competency: social skills with peers

| Ranking® | 5 | 4 | 3 | 2 | 1 |
|--|----|----|----|---|---|
| Item™ | % | % | % | % | % |
| Good at making and keeping friendships | 31 | 47 | 15 | 6 | 1 |
| Works with other students over time without adult intervention | 22 | 50 | 18 | 8 | 2 |
| Most students find ___ difficult to get on with* | 49 | 31 | 12 | 5 | 2 |
| Influenced by peer pressure to do something out of character* | 37 | 35 | 21 | 7 | 1 |
| Left out of groups by other students* | 58 | 27 | 10 | 5 | 0 |

5 = always, 1 = never. * Reverse scored (5 = never, 1 = always).

The proportion of study children who could always work with other children over an extended time period without needing adult intervention had continued to increase (22 percent at age 12 compared with 18 percent at age 10 and 12 percent at age 8). There were also increases in the proportions of children considered always good at keeping and making friendships (31 percent at age 12 compared with 25 percent at age 10 and 20 percent at age 8) and never influenced by peer pressure (37 percent compared with 27 percent at age 10 and 23 percent at age 8). However, the proportions of children experiencing difficulties in peer relations (ratings of 1 and 2) had remained much the same between ages 10 and 12, indicating a widening range of skills and confidence.

Task Related to Bullying

As an adjunct to the teacher rating of the children's peer-related social skills, we asked the children these questions:

- "What would you say or do if someone gave you a hard time in the school grounds?"

- “What would you say or do if they continued to give you a hard time in the school grounds?”²

Table 7 shows a drop between ages 10 and 12 in the proportion of children who would give an assertive response if given “a hard time” in the school grounds, and double the proportion who would give an aggressive response. Teachers were still seen as the key sources of help in this situation, and parents as more likely to be involved if the first response did not deter the person giving the child a hard time. Slightly higher proportions of 12-year-old than 10-year-old children said they would avoid the situation or did not know what they would do. There was also an increase across the two ages in the small proportions of children who said they would seek help from other students or groups of friends. Although a number of the schools attended by children had peer mediators, few students mentioned them as people they would involve in this particular situation.

Table 7 **Strategies children at ages 10 and 12 said they would use when encountering difficulties in the school grounds**

| Strategy ⁻ | Initial response at age 10 (N = 507) % | Second response at age 10 (N = 507) % | Initial response at age 12 (N = 496) % | Second response at age 12 (N = 496) % |
|--------------------------------------|--|---------------------------------------|--|---------------------------------------|
| Assertive response | 46 | 14 | 29 | 12 |
| Ask teacher to help | 21 | 55 | 29 | 48 |
| Go somewhere else/do something else | 21 | 18 | 26 | 16 |
| Aggressive | 5 | 4 | 10 | 9 |
| Passive/do not know | 3 | 3 | 7 | 5 |
| Tell mum/dad/parents | 0 | 2 | 5 | 17 |
| Seek help from another student | 2 | 1 | 3 | 3 |
| Seek help from group of friends/gang | 1 | 2 | 3 | 4 |
| Peer mediators | 0 | 1 | 1 | 1 |

² These questions were very similar to a question the children were asked at age 10: “What would you say or do if you were playing outside at lunchtime and another child picked on you?” Some of the study children possibly gave different responses at age 12 than at age 10 because “someone” could be perceived to be an adult rather than another child.

Task-assessed competencies

? Literacy? Mathematics? Logical Problem-Solving

Key findings

- Children in Year 8 had slightly higher scores on average than the children in Year 7 for the Burt Word Reading Test, writing task and reading age, but not for mathematics or the Progressive Achievement Test (PAT) in Reading Comprehension.
- The average reading age on the PAT Reading Comprehension was 12.0–12.6 years.
- The study children now recognised an average of 85 words out of the 110 on the Burt Word Reading (Vocabulary) Test.
- As at previous ages, the teachers' estimates of the children's reading age showed a median about a year above the children's chronological age, and they were increasingly aware of those who were lagging behind.
- The proportion of children estimated by their teachers to be reading below their chronological age had grown by age 12 to 27 percent (from 20 percent at age 10 and 16 percent at age 8).
- All but 14 percent of the children wrote more than 15 lines about something interesting they had seen or done, their favourite book or their favourite television programme.
- Most of the study children used correct punctuation and spelling within a simple range of syntax and provided an argument for their point of view that had at least some supporting ideas. Under half could vary sentence structure and order their ideas logically.
- The range of writing scores was wider at age 12 than at age 10, with slightly higher average scores for surface features than deep features.
- No clear patterns showing areas that were better or less understood than others emerged in the mathematics scores. Three-quarters of the children correctly answered a question asking for application of measurement; only 26 percent correctly answered a question seeking understanding of graphs.
- The study children now had a median score of 72 percent on the Standard Progressive Matrices task which we used to assess logical problem-solving, up from their median score of 63 percent when they were aged 10.
- The cognitive competencies were relatively strongly correlated, as were the social and attitudinal competencies other than curiosity.
- A path analysis showed relationships among the mathematics, literacy and communication scores. Communication—listening and speaking—was directly related to vocabulary, reading comprehension, writing and mathematics. Vocabulary performance contributed to performance in reading comprehension and writing; reading comprehension contributed to mathematics and writing.

Literacy

We used four measures of literacy: the Burt Word Reading test, the PAT Reading Comprehension, teacher estimates of each child's reading age and a slightly modified version of the writing task used at ages 8 and 10.

The Burt Word Reading Test

At age 12, the median percentage score on this test was 79 percent, up from the medians of 66 percent at age 10, 45 percent at age 8 and 17 percent at age 6. One child got all 110 items correct, and the fourth (top) quartile started at 88 percent compared with 79 percent at age 10 and 59 percent at age 8. The first (lowest) quartile of children was 35 percent at age 8. At age 10, this lowest quartile mark had shifted upwards to 51 percent; by age 12, it was 69 percent.

The mean raw score out of 110 was 84.61. As in previous phases of the Competent Children Project, the study children's mean score was higher than the comparable age group when the Burt Test was standardised for New Zealand in 1980. Then, the mean raw score was 78.94 for students 12.0–12.5 years of age. The study children in Year 8 achieved a mean raw score of 86.9 (*SD* 15.2) and those in Year 7, a mean raw score of 82.3 (*SD* 17.2).

PAT Reading Comprehension

This test has different questions for Year 7 and Year 8 students, with an overlap of 31 questions. Year 7 students' mean raw score (using Form A of the PAT Reading Comprehension) was 21.97 (*SD* 9.64), close to the mean raw score of 22.07 (*SD* 8.52) for Form 1 (now Year 7) students on Form A achieved in the 1990 NZCER review of PAT. The Year 8 mean raw score in the current study was 22.37, slightly higher than the Form 2 (now Year 8) mean raw score of the 1990 review, which was also 22.07 (*SD* 8.82).

Teachers' Estimates of Reading Age

We used reading age as a quick way to tap into teachers' professional judgement based on their knowledge of what children the children were reading and had been reading.

The median for teachers' estimates of children's reading ages was 13.0–13.5 years, compared with 11.5–12.0 years at age 10 and 9.0–9.5 years at age 8. The upper quartile was age 14.0–14.5 years, and the lower quartile, age 11.5–12.0 years, with four students given a reading age of under 8 years. There had been a gradual increase in the proportion of children thought to be reading below their chronological age as they had become older. Sixteen percent of the children were thought to be reading below their chronological age at age 8, 20 percent at age 10 and 27 percent at age 12.

Writing

The writing task we gave at age 12 extended the ones used at ages 8 and 10. The study children were asked to write 15–20 lines about something interesting that they had seen or done, or about their favourite book or television programme, telling us what happened and what they liked most about it. A non-fiction topic was chosen to put boys and girls on an equal footing. Forty-five percent of the children chose to write about something they had done, 27 percent about their favourite book and 25 percent about their favourite television programme. Six percent wrote about something they had seen.

The median raw score on the writing test was 50 percent. There was a somewhat wider range of scores than at age 10. The top quartile was 67 percent and the bottom quartile, 45 percent: thus, half the study children's scores fell within this range. At age 10, around half the children scored between 65 and 79 percent. There was a greater increase in writing scores between the ages of 8 and 10 than there was between the ages of 10 and 12.

Most of the study children wrote more than 15 lines, and three-quarters produced text that had just a few words misspelt. Around two-thirds were using punctuation that was mostly correct, within a simple range. Seventy percent were using simple syntax correctly. All but 10 percent had a vocabulary wider than high frequency words, and half were beginning to or did match their choice of vocabulary to their task. Forty percent could vary their sentence structure; around 30 percent were ordering their ideas logically and starting to use paragraphs. Sixty-nine percent provided an argument that had at least some supporting ideas for their point of view.

Table 8 Writing task – scores for particular features

| Features | % |
|--|-----|
| Surface features | |
| <i>Length</i> | |
| 1–8 lines | 1 |
| 9–14 lines | 13 |
| 15+ lines | 86 |
| <i>Spelling</i> | |
| More than 20% spelling errors | 1 |
| 10–20% spelling errors | 6 |
| 5–10% spelling errors | 15 |
| 3–5% spelling errors | 28 |
| < 3% spelling errors | 51 |
| <i>Punctuation</i> | |
| Beginning use of full stops and capitals. | 31 |
| Mostly correct use of full stops, capitals, commas for listing, question marks, and beginning use of quotation marks. | 50 |
| Mostly correct use of full stops, capitals, commas for listing, question marks, exclamation marks, and quotation marks. | 17 |
| Accurate use of full stops and capitals, commas, question marks, exclamation marks, speech marks, apostrophes, parentheses, dashes, colons, and semi-colons. | 2 |
| Using conventions of writing [punctuation] accurately and confidently. | 0.4 |
| <i>Grammar and syntax</i> | |
| None — jumble of words | 0 |
| Beginning use of conventional syntax [word order]. | 24 |
| Conventional syntax generally evident. Control of verb forms, i.e. singular/plural agreement, subject/verb agreement and tense. | 70 |
| Wide use of subordinated structures in sentences with variety in length and errors rare. [Complex sentences with subject/object, descriptive passages and use of pronouns, adverbs, and adjectives. Clauses appropriately linked. Tense mostly correct.] | 6 |
| Using conventions of writing [grammar] accurately and confidently. | 0.4 |
| Deep features | |
| <i>Vocabulary choice</i> | |
| High frequency vocabulary predominates. | 10 |
| Vocabulary broadening beyond high frequency. | 36 |
| Beginning to use vocabulary appropriate to task/genre. | 42 |
| Makes language choices appropriate to the audience. Vocabulary generally appropriate to task/genre. | 10 |
| Evidence of vocabulary carefully chosen for task and audience. | 2 |
| <i>Choice of form</i> | |
| Simple sentences only. | 4 |
| Beginning to vary sentence beginnings and structure. Beginning to extend sentences with conjunctions. | 57 |
| Varies sentence beginnings and length. Beginning to use clauses within sentences. | 34 |
| Varies sentence beginnings and sentence length to suit purpose. Range of sentence types showing accurate use of clauses within sentences. | 5 |
| Structures material confidently in appropriate styles. | 0.6 |
| <i>Progression of description</i> | |
| Writes several related sentences on the topic. | 19 |
| Some sequencing is evident. | 51 |
| Sequences ideas logically. Beginning to organise some ideas into paragraphs. | 25 |
| Organises and links ideas logically. Organises ideas into coherent paragraphs. | 4 |
| Links main and supporting ideas. Strong sequential structures evident within and between paragraphs. | 0.6 |
| <i>Quality of argument</i> | |
| No justification for ideas. | 29 |
| Includes several ideas, some with supporting detail – some facts and opinions. | 54 |
| Beginning to support main ideas with some detail – expresses personal viewpoints. | 14 |
| Consistently includes details to support main ideas – expresses and explains a point of view. | 3 |
| Links main and supporting ideas. Justifies point of view persuasively – expresses and argues a point of view. | 0.6 |

Mathematics

As at ages 8 and 10, we used a reduced set of 20 items from the standardised PAT Mathematics. The selected items were those that are around the median in their level of difficulty and power to differentiate between students (high scorers overall got the items correct and low scorers overall did not). The mean raw score out of 20 for the study children was 10.19 (*SD* 4.77). The mean raw score of the children in Year 7 was 9.82 (*SD* 4.57); for those in Year 8, it was 10.57 (*SD* 4.9).

Most of the scores ranged around 50 percent, with no clear patterns showing areas of mathematics that were better or less understood than others. Three-quarters of the study children got the correct answer for a question seeking application of measurement; only 26 percent correctly answered a question seeking understanding of graphs (related to data, statistics and probability).

Logical problem-solving

We used a pattern-matching test, the Standard Progressive Matrices, to assess logical problem-solving. The median score was 72 percent, an increase from the median scores of 63 at age 10, and 40 percent at age 8. The study children now correctly matched an average 42 patterns out of the 60 they were presented with.

Children’s performance across time

Key findings

- Overall, children’s level of performance at age 5 was not a reliable guide to their level of performance at age 12 for literacy and the social and attitudinal measures.
- However, there was more consistency over time in the scores of children who were performing at high or low levels at nearly age 5, just before they reached school. For example, 77 percent of those who were in the top quartile of mathematics scores at age 5 had scores at or above the median at age 12, compared with 13 percent of those whose mathematics scores at nearly age 5 put them in the lowest quartile.
- Consistency firmed over time. Eighty-nine percent of the top quartile group for mathematics at age 10 scored at or above the median at age 12, compared with 4 percent of those in the lowest quartile group at age 10.

Children in the top and bottom quartiles

Two-thirds of the children who were performing in the top quartile at age 5 were scoring above the median at age 12 for the cognitive competencies and curiosity. At least two-thirds of those in the top quartile at age 8 were performing above the median at age 12 for all the competencies. Between a fifth to two-fifths of the children who performed in the lowest quartile at age 5 were performing above the median at age 12, but fewer children lifted their performance to this extent between ages 8 and 12. Improved performance was much less likely for mathematics.

However, more children from the lowest quartile at age 8 had progressed above the median by age 12 than seemed likely from our analysis at age 10. This finding suggests that though the windows of opportunity for developing performance do seem to narrow over time, particularly by the end of the first three years of school, they are not closed. The opportunities—support, experiences and relationships—available to children can make a marked difference.

The different competencies

Mathematics had the highest level of consistency in performance between ages 5 and 12. Around a third of the variance, or spread, in the children’s scores for mathematics at age 12 could be accounted for by their scores at age 5, indicating the importance of activities and conversations using mathematics, patterns and symbols before children reach school.

The strength of correlations between earlier and age 12 scores for the social and attitudinal competencies was moderate rather than strong, although they became more consistent between the ages of 8 and 12. Children’s scores on the social and attitudinal competencies may reflect different individual responses and interactions between

individual children, their teachers and peers, as well as different settings. Social and attitudinal competencies may be more influenced by context than are the cognitive competencies.

Reading seems to be the competency that is least context-dependent, with the children's earlier levels of performance most likely to be subsumed into age 10 performance. Path analysis showed that the social and attitudinal competencies "feed into" the cognitive competencies at the same age, and that the cognitive competencies feed into the social and attitudinal competencies of the next age.

Gender and ethnicity

The children's gender and ethnicity did not make marked differences to the patterns of progress for children who were in the top quartile of earlier performance. Once a certain level of knowledge and skills had been gained, it was likely to be maintained.

Gender and ethnicity were more apparent in differences in patterns of progress for children in the bottom quartile at age 5. Boys in the lowest quartile at the earlier ages were more likely than their female counterparts to progress above the median at age 12 for mathematics and the Burt Word Reading Test, although the girls were more likely to have moved above the median for the social and attitudinal competencies. The trends for ethnicity suggest that Māori children who scored in the bottom quartile at age 5 were less likely than their Pākeha/European counterparts to progress above the median for mathematics, and less likely to make progress from age 8 to age 12 in mathematics, reading comprehension and writing.

Maternal qualification and early family income

Maternal qualification and family income showed more links with patterns over time. Children whose family income was low when they were age 5 were less likely to perform at or above the median at age 12 if they had been in the top quartile at age 5 for mathematics, reading and communication, but this pattern was not evident in relation to children in this category who were in the top quartile at age 8. Children whose mothers had no qualification and who were in the top quartiles at age 5 and/or age 8 were somewhat less likely than their peers whose mothers had some qualification to have scores at or above the median at age 12 for mathematics, reading comprehension and writing.

Children whose mothers had a university qualification were most likely to move from the lowest quartile at age 5 for the cognitive competencies, and those whose mothers had no qualification or a school qualification, least likely. Progress from the bottom quartile at age 8 to above the median at age 12 was more likely for children whose mothers had a university qualification. Children whose families had very high incomes at age 5 were more likely to progress from the lowest quartile at age 5 to above the median at age 12 for mathematics, and there was a similar trend for progress from age 8.

Comparison of the activities and experiences of children from low-income homes who were scoring above the median at age 12 for mathematics and reading comprehension, and those who were not, showed differences in the children's use of time and use of language that are consistent with theories of cultural capital.

Children’s experiences and competency levels

Longitudinal pictures of children’s experience and access to resources show that behind the “snapshots” taken at each age lies (sometimes) considerable variability in previous experience and access to resources. We therefore look here first at how differences in patterns over time for some key family resources and experiences at home and school related to the study children’s competency levels at age 12, after taking into account family income when the children were age 5, and maternal qualification levels. We then take a closer look at the children’s experiences at home and school at age 12, and the relationship between their experiences in these environments and their competency levels.

The contribution of early childhood education and of cumulative experiences at age 12

Key findings

- Early childhood education quality was still contributing to the children’s competency in mathematics and literacy at age 12.
- Family income levels when the children were nearly age 5 had more bearing than current family incomes on their competency at age 12.
- While high numbers of house shifts and changes of school disadvantaged some children, high levels of maternal qualification and family income appeared to be acting as buffers.
- Maternal qualification levels mattered more than family income for children’s competency levels at age 12. (High parental qualification levels relate to the opportunities children have to use symbols and language from an early age. These experiences foster enjoyment, and enjoyment is associated with higher performance levels.)
- Competency levels at age 12 were not related to the kind of family a child was living in (i.e., one- or two-parent) or to whether the family had remained intact since the child was born.
- Age 12 competency levels were also unrelated to patterns of maternal employment from when the child was nearly age 5, or to current maternal employment.
- Few paths through school had run smoothly, with most children having experienced a problem that parents and teachers had resolved together, or a teacher they did not like. These experiences, however, did not influence competency at age 12 unless the problems continued.
- Children who had received consistent messages about the value of school from their parents’ voluntary work at their school had higher average scores at age 12.

- The few children whose classes always numbered below 25 had higher scores at age 12 for mathematics, literacy and logical problem-solving.
- Children who had consistently attended high-decile schools had higher average scores at age 12. Little overall difference was evident between consistent attendance at state, state integrated and private schools, but those who had attended state integrated schools had higher scores for social skills with peers, and those who had attended private schools, for writing.
- Staying clear of bullying behaviour over the years, whether as victim, bully or both, benefited children.

Early childhood education

The study children's early childhood education experience was still contributing to their mathematics and reading comprehension scores seven years later. By age 12, the range of early childhood education aspects showing relationships with the children's mathematics scores was wider than with their PAT Reading Comprehension scores, perhaps because more reading activities occur in homes, or perhaps because the kinds of activities and interactions provided by early childhood education staff support mathematics performance through practice in patterns and puzzle-solving.

Most of the associations with mathematics remained after taking the children's scores at age 5 and family income and maternal qualification into account. The proportion of variance in scores, and the size of the difference between the scores for children with different levels of early childhood education experience increased rather than decreased with time. Both these patterns suggest that early childhood education contributes to children's performance at age 12 through ways of working and thinking, rather than the simple provision of knowledge at a certain level.

The particular early childhood education quality aspects that continued to show associations with the PAT Reading Comprehension scores focused on staff-child interaction, along with a "print-saturated" environment. The centrality of staff-child interaction found in this study for long-term outcomes is consistent with other large-scale research on concurrent and short-term relations between early childhood education quality and outcomes for children.

Family Resources

House Moves

Sixty-nine percent of the study children had moved house at least once since their birth, and 14 percent had moved at least five times. Mobility between houses was more common for children in two-parent families with one step-parent, for children from low-income families, children of one-parent families, and those children whose mothers had no maternal qualification. Children who had moved house five or more times were those most likely to have lower average scores on mathematics and social skills with peers. Maternal qualification and family income appeared to be protective factors for the other competencies with regard to a high number of house shifts.

Family Income

Family income levels were not static over this period for many of the study children. They were mostly likely to be much the same for those children whose family incomes had been more than \$80,000 when the study child was age 5 (84 percent). Over the seven years between the study children being nearly age 5 and age 12, 65 percent of those who had had low family incomes (below \$30,000) saw some increases, as did 54 percent of those with family incomes between \$30,000–60,000, and 61 percent of those with family incomes of between \$60,000–80,000. Nine percent of the families saw some decreases in their family income over this period.

Children whose family incomes were low when they were age 5 had lower average scores at age 12, whether or not their family income levels improved over the seven years. Earlier levels of family income accounted for more of the variance in children's scores at age 12 than did current levels of family income. Children from homes that were then low-income were only half as likely as those from then high-income homes to score at or above the study median score at age 12 for mathematics and the PAT Reading Comprehension.

Parental Qualifications

Although there are overlaps between family income and maternal qualification levels, maternal qualification is the stronger factor in relation to children's competency levels at age 12. Paternal qualification levels also make a separate contribution to children's cognitive scores. The higher the level of maternal qualification, the more likely that the children's father would have the same qualification level.

Home and School

Homework, TV and music

Always completing homework and consistently watching, from age 5, fewer than an average of two hours of television a day benefited children in terms of their competency scores. The reverse was true for children who had watched large amounts of television consistently from ages 5 to 12. (This association with lower competency levels was not reduced by sometimes watching smaller amounts.) Children whose participation in music varied between ages 8 and 12 did not have lower average scores than those whose participation was consistent. Those with the lower scores were those who had consistently had no participation in music.

Family composition

By age 12, 71 percent of the study children had always lived with both their biological parents, and 6 percent with one biological parent. Twenty-three percent had experienced some changes in their family composition, with 13 percent living with a step-parent and 10 percent living sometimes with two parents and sometimes with one. Family type, whether stable or changing, was not related to the children's competency levels at age 12.

Maternal employment and welfare benefits

Few of the study children had mothers who did not undertake some paid employment between the time the children were nearly 5 years of age and when they were age 12. A few mothers were in full-time work throughout this period. Different patterns of maternal employment were unrelated to the children's scores at age 12.

Twenty-two percent of the study children were in families that had received welfare during the age 8 to age 12 period. There was an indication that the cumulative experience of being in such a family may disadvantage mathematics performance at age 12.

Parents' engagement with the school

Most of the study parents had engaged with a teacher at least once during the age 8 to age 12 period on a problem that their child was experiencing. However, problems only had an adverse effect on cognitive competencies for those children consistently experiencing academic problems. Social and attitudinal competencies were affected if the children experienced a problem in two or more of the three study phases.

The children's teachers reported that they had relationships that they thought consistently good/excellent with only 13 percent of the children's parents over the ages 8 to 12 period. These children, and those for whom the relationship was seen as very good/excellent for two of the three phases, tended to have higher average scores.

Sixty-nine percent of the parents gave voluntary help at their child's school in at least one of the three study phases during the age 8 to age 12 period, and only 2 percent of the parents had had no involvement in their child's school for two or three of the study phases. Children whose parents did voluntary work at their school for at least two of the three phases had higher average scores, suggesting that children were receiving a consistent message about the value of school. Conversely, children whose parents had no involvement in their school in two or three of the phases had lower scores. They, too, were getting consistent messages, but not ones supporting their engagement in school.

Thirty-four percent of the children's parents were always satisfied with their child's progress at school across ages 6 to 12. Only 8 percent were never satisfied or only once satisfied. Children whose parents consistently reported satisfaction with their child's progress or whose parents said they were becoming satisfied with the child's progress at ages 10 or 12 had higher competency scores at age 12.

School characteristics

The few children whose classes had always been small (i.e., 25 or fewer students) had higher average scores for mathematics, literacy and logical problem-solving. Otherwise, there were no differences related to cumulative experiences of classes of different size, whether the classes were much the same in size over the years or varied. However, the variation in class size in our sample was not large.

The children who had consistently attended state integrated schools since school entry had higher average scores for social skills with peers. Children who had consistently attended private schools had higher average scores for writing.

Half the study children had been attending schools, on a consistent basis, in the same socio-economic decile band (low, medium, high) since school entry. Children who had attended a high-decile school for at least three of the four

study phases between ages 6 to 12 had higher average scores. Children who had always attended a low-decile school had lower average scores. Children with mixed attendance patterns had much the same average scores as those who had consistently attended medium-decile schools, indicating that switching to different decile schools, even when the move is to a higher decile school, may not confer benefits.

Number of schools attended

By age 12, only 25 percent of the children were in the same school in which they had started, reflecting the break that comes for most at the end of Year 6. Fifty-one percent were at their second school, and 16 percent at their third school. Thus, most of the study children had attended three schools at most.

Eight percent of the children had attended four or more schools (the highest being eight) by age 12. Children whose parents said their child had had teachers he or she did not like were almost twice as likely to be those who had changed schools as those who had stayed in the same school. This dislike may have been the reason for changing schools and a school change under such circumstances should not be seen as school mobility per se.

On the whole, children who had attended a single school tended to have higher average scores for reading and writing, and children who had attended four or more schools to have lower than average scores for mathematics. Family resources diluted the strength of these associations. Although there is high interest in the effects of transition between different school stages, we found no disadvantages for children who changed schools between age 10 and 12, usually moving from a primary to an intermediate school.

Bullying and coping

Staying clear of bullying behaviour, whether as victim or bully, or both benefits competency. Only three of the study children were consistently upset and not coping in all three phases between ages 8 and 12. Children who were upset more than once over this time, or currently, and who did not cope with it tended to have lower average scores. Children who had upsets but coped with them tended to have higher average scores for mathematics. Those who experienced no upsets during this time had higher average scores for perseverance, individual responsibility and social skills with peers.

Stability

Overall, the experience of stability or just a couple of changes in the daily settings of children's lives—their homes (and possibly neighbourhoods) and schools—appeared to give children advantages in some, but by no means all, of the competencies. However, family income and maternal qualification levels appear to act “protectively” in relation to large numbers of changes in residence and schools for some competencies.

That mathematics performance seems to be affected by a higher number of changes of residence and school is consistent with children being more likely to develop their knowledge and skills in mathematics than in other competencies in a “building block” way. Children generally need to master one level before they can make further progress.

The children's home experiences at age 12

Key findings

Family Situation

- Just under half the children's mothers were in full-time employment, and just over half their fathers were working more than 40 hours a week on average.
- Parents needing help were more likely to call on friends than on family or neighbours, and children were more likely to talk to their mothers than fathers about school or what they were reading.

Activities

- Playing sports, hanging out with friends and watching television were the children's favourite non-school activities, with the girls more focused on friends and reading and the boys on playing electronic games and watching television. The study children were watching more television on average than at age 10. Boys liked cartoons, and girls liked soap operas and sitcoms.
- Ninety percent of the children had a computer in their home and spent nearly four hours a week using it. Boys' computer time centred more on games, music and surfing the Internet, girls on word processing, seeking information and using email and online chat rooms.
- Around two-thirds of the children enjoyed reading at home, with 45 percent identifying reading among their favourite out-of-school activities. Around half enjoyed writing and 45 percent working with numbers.
- Just under half the children were receiving sports coaching or performing arts/music lessons outside school. Sports and performing arts were also the main extracurricular activities done at school.
- Most had some money (either given or earned), with boys tending to spend it on games and toys, and girls on clothes and make-up.
- The boys' greater focus on action-based activities and the girls' on language and communication fitted with the slightly higher scores that the girls achieved in literacy and their higher scores for the social and attitudinal measures.

Feelings about Life at Home

- The 12-year-olds were somewhat more positive than they had been at age 10 that they were listened to, treated fairly, and got help if they needed it. Most felt they had interesting things to do at home. However, sizeable minorities reported being bored or told off or felt that their family showed little interest in their school life or homework.
- The children's views that showed most associations (either positive or negative) with their competency scores were with doing interesting things, being bored, helping out at home, getting help if needed, getting told off at home, and expectations being fair.

Engagement with Parents

- All the parents of the study children shared some activities with their 12-year-old children, notably socialising with other family or friends and transporting the children to their activities. Favoured activities with boys were watching sport and transporting them to activities, and with girls, shopping and talking. Children whose mothers had no qualification or whose families had low incomes shared fewer activities with their parents.
- Children whose parents mentioned just one or two shared activities scored lower on mathematics; children whose parents mentioned five to seven activities scored highest.
- Most parents had expectations or rules relating to schoolwork, housework, language and media use. Parents usually dealt with disagreements (only 1 percent of parents said they and their child never disagreed) by negotiation. The next main response was the parent exerting his/her authority. Children whose parents negotiated with them had higher average scores than children whose parents let them win.
- Help around the house, self-esteem, and behaviour at home were the main areas of parental concern in relation to their 12-year-old. However, around two-thirds of the parents had no concerns about their child in terms of these factors or the child's friendships, interests or school. Children for whom parents held some concerns generally had lower average scores on the competency measures.

Relationships with Peers

- Friendships were very important to the children at age 12. Boys were much more likely to spend time with friends in physical activity or playing games, and girls to spend time talking and shopping. Just over half the study children identified something negative about their friendships, as well as their positive aspects. Around 12 percent had mainly aimless friendships, and 3 percent did not have good friendships.
- Bullying frequency at age 12 was much the same as it had been at age 10. Around a quarter of the 12-year-olds reported being bullied and 15 percent said they had bullied another child in the last few months. Most bullying occurred at school and was verbal. A child's main response to bullying was to ignore it or seek help from a teacher or parent.

Children's Values

- Enjoyment of life and doing well at school or sport were the most important values for the study children at age 12, followed by being with family, having lots of friends and being helpful or kind. A happy family life and then good health were deemed of most importance in their adulthood. Twice as many children saw having an interesting job in adulthood as more important than having lots of money.

Siblings and Birth Parents

At age 12, 83 percent of the study sample had at least one sibling, with a third having one, and just under a third, two siblings. Most either lived with, or were in contact with, their birth parents. Half of those who did not live with one birth parent saw their non-resident parent regularly. Children whose parents shared their custody or whose non-resident parent had regular access to them were more likely to get on with their non-resident parent.

Parental Employment

Full-time employment of the mothers of the study children had risen gradually over time, from 19 percent when the children in the study had yet to start school, to 32 percent at age 10 and 41 percent by age 12. Mothers in two-parent families were more likely to be working full-time than those in one-parent families. Otherwise, patterns of employment (and not being in employment) were similar across different family types. They were also similar across different levels of maternal qualification. However, maternal qualification levels were reflected in the kinds of work undertaken.

There were also gender differences in the kinds of employment undertaken by the parents of the study children. Fathers were much more likely than mothers to be in managerial or trade work. Mothers were more likely to be working as professionals (including teachers and nurses), technicians and associated professionals and clerks.

Fifty-six percent of the children's fathers worked more than 40 hours a week on average, a much higher proportion than the 29 percent of the mothers employed full-time. Use of others to help care for children when parents could not was mainly related to maternal employment, although there was less use of others where fathers were not employed. The use of paid care for children (by a caregiver or through an OSCAR programme) was related to family income and maternal qualification levels, with more use of paid care by families with higher levels of income and maternal qualification.

Parental Support, Income and Leisure Activities

Most parents could easily call on some help if they needed it, more so from friends than family or neighbours. Family characteristics were unrelated to the availability of help from others.

Most family income was earned through wages or salary. Self-employment was a source for 26 percent of the children's families. Thirteen percent received a welfare benefit. While family income levels were related to family sources of income, maternal qualification levels were not.

Eighty-nine percent of the parents reported that they were generally happy, and 80 percent that they were in very good or excellent health. Parental happiness was related to their own health and to teacher reports of their child's happiness.

Watching television, reading and talking with friends headed the list of parents' leisure activities. In contrast to the gender differences between the study children's use of leisure time, there were only a few gender differences among their parents. Maternal qualification was the family characteristic most associated with differences in the use of leisure time, followed by family income. The differences that existed were related to the use of literacy and participation in "high culture". Mothers with no qualification or in low-income homes were also less likely to do voluntary work or to garden.

Most parents interviewed said they liked reading. Enjoyment of reading was related to maternal qualification levels. Interestingly, there was no association between parental and child enjoyment of reading. Although most parents watched television most days, the higher the level of maternal qualification and family income, the less amount of time went to television viewing.

Parent–Child Interaction

There were some indications that the children talked more with their mothers than their fathers about school, possibly because of the greater likelihood of mothers being in part-time rather than full-time employment. Generally, there were few gender differences related to parental interaction with children, or involvement in their activities.

Children's Activities

At age 12, most of the study children watched television and did homework on at least two days a week. Sport, reading, computer use and spending time with friends were the next most frequent group of activities, followed by housework, playing electronic games and talking to friends on the phone or the Internet. The next and final group of activities were more occasional, with some of the children never experiencing them: reading magazines, newspapers or comics, taking part in art/music/dance classes or working for money outside the home. With the exception of homework, children usually most enjoyed those activities they did more frequently. Between 60 and 69 percent said playing sports, hanging out with friends and watching television were among their favourite activities.

There were some notable gender differences. Girls were more likely to read, talk with friends, do homework and go to art/music/dance classes. They most enjoyed hanging out with friends, talking with them and reading. Boys were more likely to play electronic games and sport and to read comics. They most enjoyed playing electronic games and watching television.

Levels of maternal qualification were reflected in the time given to reading, computer use and participation in art/music/dance classes. Children's use of their leisure time at age 12 was unrelated to their level of family income.

Television

A quarter of the children had a television in their bedroom, available for private use. Almost twice as many boys as girls had a television set in their bedroom, and four times as many of the children whose mothers had no qualification compared with those whose mothers had a university qualification. The latter group of children were more likely to have a desk in their bedroom. These differences in the items that were readily available to children for their private use may indicate differences in values.

At age 12, the study children were watching more television on average than they had at age 10, perhaps because their tastes were shifting to longer, adult programmes, with a third now watching adult soap operas. Gender played a role in programme preferences. Boys were more likely to prefer cartoons, and girls, adult soap operas and sitcoms. Boys did not watch more television on average, but their taste for cartoons may be reflected in their higher rate of watching television before school.

Television played a bigger part in the lives of children whose mothers had no qualification, were from low-income homes or were Māori or Pasifika, and a smaller part in the lives of children who enjoyed reading. More associations were evident between the children's competencies and their cumulative time spent watching television than with current time use, but those whose current television watching was less than an hour had higher average scores for mathematics and writing.

Computers

By age 12, 90 percent of the study children had a computer in their home. The average time spent using a computer at home was 3.8 hours a week. Boys spent somewhat more time than girls on the computer. Access to a home computer and the time spent on it related to maternal qualification levels. The latter accounted for most of the differences found for some competency scores in relation to time spent on the computer.

The 12-year-olds mainly used the computer for homework, email and accessing Internet. Boys were more likely to download games or music and to surf the Internet. Girls were more likely to word process, seek information for homework or projects and use email and online chat rooms.

Family characteristics of income or ethnicity were not associated with differences in computer use. However, maternal qualification was: the higher the level of maternal qualification, the greater the children's use of email and of the computer for homework or projects.

Less than 10 percent of the children had a computer in their bedroom. However, three-quarters of the study children had Internet access at home, and most could use the Internet on their own. Use of the computer rose with access to the Internet and being allowed to use it on their own. The children's main uses of the Internet were to seek information for schoolwork and to email.

Computer activities that showed significant associations with children's competencies, particularly mathematics and communication, were playing games, word processing, email, graphics and homework or projects.

Reading

Around two-thirds of the study children enjoyed reading; 45 percent put reading among their favourite out-of-school activities. Enjoyment of reading was highest among those children whose mothers had a university qualification. Girls enjoyed reading more than boys.

Many of the children were reading a range of reading material, including fiction and information. Fiction was somewhat less likely to be read by boys and children whose mothers had no qualification. Children who enjoyed reading were more likely to read across the board. Enjoyment of reading was associated with higher average scores on all the competencies.

Reading has a double value: in itself and as a topic for conversation with parents. Most children spoke to someone at home about what they were reading, more often their mother than father. Children who enjoyed reading were more likely to gain this additional value from their reading. Maternal qualification again played a role in child-parent talk about reading. Talking with parents about reading was associated with higher scores on the competency measures.

Three-quarters of the study children visited a public library, most with their family, although 15 percent went by themselves and 13 percent with friends. Public library use was lowest among those children whose mothers had no qualification, those who did not enjoy reading, and boys. Frequent use of a public library was associated with higher scores on the competency measures.

Reading is a key aspect of children's performance at age 12, and not just for scores on reading measures.

Writing

The home writing that was done by half or more of the children was largely informative and as part of relationships with others, or it was related to word knowledge or copying existing material. Half the children enjoyed writing, with girls enjoying it more than boys. Enjoyment of writing had positive associations with children's social and attitudinal competencies and writing, but not with reading or mathematics.

Mathematics

At age 12, 45 percent of the study children enjoyed working with numbers. This enjoyment was positively associated with the children's scores on the social and attitudinal competencies, mathematics and logical problem-solving. The main mathematics activities the children did at home were embedded in games or required use of a ruler. Least common were activities involving calculators or computers.

Clubs, Lessons, Formal Music and Extracurricular Activities

Seventy-nine percent of the children at age 12 belonged to a club or group—slightly down on the 85 percent at age 10. Sports club membership continued to dominate. Membership of children's service clubs had dropped to 13 percent from 21 percent at age 10. Membership of groups was more likely for boys, especially sports, and less likely for children whose mothers had no qualification and for children from low-income homes.

Forty-seven percent of the study children attended lessons or coaching outside school. Participation in lessons outside school reflected family income levels. Performing arts lessons were most popular, followed by sports. Girls were more likely to attend performing arts lessons. The higher the level of maternal qualification, the more likely it was that children would attend performing arts lessons.

Forty-nine percent of the study children played a musical instrument or took part in a musical group, according to their parents. Forty-one percent played an instrument, and 11 percent sang in a choir. Nine percent played in an orchestra or cultural group. Choir and orchestra or cultural group membership occurred in similar levels at all family income levels. Playing an instrument was related to maternal qualification and family income levels.

Most children took part in some extracurricular activity at school, predominantly sports (64 percent), followed by performing arts (32 percent) and voluntary or service groups (20 percent). Girls were more likely to take part in performing arts activities and service groups; boys in computer activities and games.

Money

Only 2 percent of the study children had no money of their own at age 12. The main sources were their family, through chores (47 percent), regular pocket money (40 percent) and irregular money (35 percent). A quarter had a job outside the home, with the main kind of work a source of employment that has since dried up in the Wellington region, delivering daily newspapers. Competency scores were unrelated to whether children worked outside the home.

Saving was the most frequent use of money earned or given, followed by buying food, games and toys or clothes and make-up. Boys were more likely to spend their money on games and toys; girls, on clothes and make-up.

Gender Differences

The gender differences in the activities the children engaged in at home show how traditional stereotypes continue in everyday life: boys focused on action; girls on language and communication. The differences give some context to the differences found in competency scores. These favoured girls, although the size of the differences was small in relation to literacy and mathematics. Gender differences were more marked in relation to social and attitudinal competencies.

Reflections on Children's Engagement with Activities

Television watching, sports and time with friends were common ways of spending time for the study children at age 12, no matter what their social background. The differences that were apparent related to either gender or social background and mainly concerned engagement in activities that use language or symbols, particularly through reading, performance and communication. These are the activities that positively contribute to children's performance levels. Cheaper options, such as spending large amounts of time on television viewing, appear to make some negative contributions.

Children whose mothers had no qualification experience a "double whammy" in relation to these differences: they do fewer of the activities that have positive associations and watch more television. Because children are more likely to value familiar activities, it becomes harder for them to take on new activities or drop old ones.

It is worth noting the overlaps of enjoyment of reading, writing and number use, and the continuing positive contributions these make to children's competency scores after taking into account maternal qualification and family income. This inter-relationship suggests another path forward for children from homes that are disadvantaged in terms of these key resources.

If children from these homes enjoy literacy- and mathematics-related activities from an early age—a matter of both opportunity and methods of engaging children's attention and interest—then they may be more likely to keep up with activities that use and extend early knowledge and skills as they grow older. One can only underline the importance of the greater awareness of providing such opportunities in early childhood education that has become evident in recent years, and of building parental confidence and skills to work with children at home.

Children's Perspectives on their Home Life

At age 12, most of the study children felt they belonged in their home, got support, had interesting things to do and were fairly treated. They were somewhat more positive than they had been at age 10 that they got help if they needed it, were treated fairly and listened to. However, there were sizeable minorities who said they got bored, felt told off or felt that their family showed little interest in their school life or homework.

Differences in gender and family resources and characteristics were reflected in just a few differences in these views, suggesting that gender and social differences were not the decisive factors in children's home experience, or their judgement of that experience, although we did find that children whose mothers had a university qualification were more likely to rate more highly the items that showed associations with the age 12 competency scores.

The children's views that showed most associations with their competency scores were:

- doing interesting things
- being bored (a negative association)

- helping out at home (a negative association for those who always helped out at home)
- getting help if needed
- getting told off at home (a negative association)
- fair expectations.

Another 10 of the items showed associations with mathematics and some of the literacy measures.

Parental Support and Sharing of Activities

Parental support came in the form of help, having things explained and having parents knowledgeable about how the children spent their time (that they had completed their homework, for example). It also came in the form of feeling close to parents, listened to by them and trusted by them to let the child do what he or she wanted to do at home.

All the parents of the study children shared some activities with their children. Socialising with other family or friends and transporting them to their activities headed the list. Parents of boys were more likely to watch sport with them and transport them to activities. Parents of girls were more likely to mention shopping and talking. These are consistent with some of the gender differences in children's activities. There were some differences related to family resources, particularly maternal qualification. Children whose mothers had no qualification or whose families had low incomes shared fewer activities with their parents.

Children's mathematics scores at age 12 were related to the number of activities shared with parents, with lower average scores for children whose parents mentioned just one or two shared activities, and the highest average scores for children whose parents mentioned five to seven activities.

Parental Expectations

Most of the study children at age 12 said they came home from school to a parent; 31 percent also mentioned a sibling. Fifteen percent came home to an empty house.

Most of the parents reported expectations or rules relating to schoolwork, housework, language and media use. Dress and telephone use were least likely to attract parental authority. Children were less aware of these expectations or rules, perhaps because they were not always overt or enforced. Parents and children were most likely to agree about the existence of rules or expectations relating to homework, television watching and housework, and least likely to agree about those relating to telephone use. Gender made little difference to the rules: boys reported more rules about electronic games, which they were more likely than girls to be playing, and girls, who talked more on the telephone than boys, to report rules about that. Two-thirds of the children who spent time in two households encountered similar rules or expectations in both.

Only 1 percent of the parents said they and their 12-year-old child never disagreed. Negotiation was the main response when they did, followed by the parent getting cross and the parent getting their way. Almost half the parents used a range of responses at different times. Parental reports of their responses to children were largely unrelated to the children's perceptions of feeling comfortable at home, listened to or treated fairly, although children who said they were rarely or never told off were more likely to have parents who would negotiate in times of disagreement. Children whose parents negotiated with them had higher average scores than children whose parents let them win.

Overall, many of the study children lived in homes that were supportive and gave them structure, but without being overly restrictive. There were some telling differences related to family characteristics, particularly maternal qualification, but social class was not operating within strict borders and distinct differences. Nor was gender clearly differentiating interactions between the study children and their parents.

Puberty

On parental reports, the girls were much more likely than the boys to be experiencing puberty changes at age 12: 84 percent compared with 59 percent. Puberty changes for girls included developing breasts (58 percent), experiencing mood swings (50 percent), getting body hair (35 percent) and starting menstruation (20 percent). Thirty percent of the girls experiencing puberty changes were sometimes or often uncomfortable with them, compared with 19 percent of the boys. Puberty changes and reactions to them were generally unrelated to children's competency levels.

There was some relationship between experience of puberty changes and experience of unsettling events, and with children's general happiness, which teachers and parents saw similarly. Most of the children were said to be in very good or excellent health, with parental reports of their overall children's health reflecting family income levels.

Coping with Upsets

Forty-one percent of the parents thought their 12-year-old child was experiencing something upsetting, a slightly higher proportion than at earlier school ages. Parents were most aware of family-related reasons for children being upset. However, as at earlier ages, most children who were upset could cope with it; 11 percent of those who were upset could not. Experiences of upsets and how children coped with them were largely unrelated to family characteristics or gender.

We found that those whose coping with being upset varied had lower scores for perseverance and social skills with peers. There was a tendency for children who were coping poorly to score lower on the cognitive competencies, although this was not evident after accounting for maternal qualification.

Parental Concerns

Help around the house, self-esteem and behaviour at home were the main areas of parental concern in relation to their 12-year-old. However, two-thirds or more of the parents of the study children had no concerns about their child in relation to help around the house, their self-esteem, behaviour at home, friendships, interests or school.

Some interesting trends emerged relating to maternal qualification: parents with university qualifications seemed more tolerant of their age 12 children becoming assertive, and possibly less likely to see that assertiveness as contesting parental authority. Help around the house and behaviour at home were more likely to be concerns where mothers had no qualification and family incomes were low.

In general, children for whom parents held some concerns had lower average scores on the competency measures. Parental concern about their child in relation to school was not related to the cognitive competencies, but to the social and attitudinal competencies.

Friendships and Relations with Peers

Friendships were very important to the study children at age 12. Being with friends was among their most preferred ways to spend their time. Much of this activity was informal. There were marked gender differences, with boys much more likely to spend their time with friends in informal physical activity or playing games, and girls much more likely to spend time talking and shopping. Boys valued sharing interests more than girls, and girls, having someone to talk to.

Just over half the study children could identify something that was not so good about their friendships—mainly arguments, or unreliability. Boys were somewhat more positive (or less critical) about their friendships than girls, perhaps reflecting different expectations and ways of relating to friends. Differences in family resources and ethnicity were not reflected in differences as marked as those with gender in the way the study children spent time with their friends or what they valued about their friendships.

Just over half the children said they had five or more close friends; 13 percent had one or two. The number of close friends was unrelated to gender or family characteristics and was largely unrelated to children's competency scores. Close friends tended to be of the same sex, but 42 percent of the boys and 27 percent of the girls said their close friends included both boys and girls.

Ninety-one percent of the study children felt that their parents liked their friends, or most of them. Parental judgement was still respected and held more weight than friendships. When we asked the study children what they would do if their parents told them not to do something and their friends really wanted them to do it, 66 percent said they would not do the activity, and another 6 percent said they would try to persuade their friends not to do it. Fourteen percent would try to persuade their parents to let them. Eleven percent thought it would depend what the activity was. Only 6 percent would go ahead and do the activity their friends proposed but their parents opposed. Girls were more likely to try to persuade their parents to let them do the activity, and boys more likely to do it anyway.

Through factor analysis, we found that fun in friendships was more likely to be valued than communication and that most children had good friendships. However, around 12 percent had mainly aimless friendships, and 3 percent did not have good friendships.

Bullying

Around a quarter of the study children said they had been picked on or bullied by someone in the last couple of months. Bullying frequency at age 12 was much the same as it was at age 10. Most bullying occurred at school (20 percent), with 4 percent of the children having been bullied at home and 2 percent in a public place. Most of the bullying was verbal. The main response to the bullying was to ignore it or seek help from a teacher or parent. Fifteen percent of the children said they had bullied another child in the last few months.

Gender was unrelated to experiences of being bullied or bullying, but children whose mothers had no qualification were more likely to be bullied. There were more reports of bullying from children attending decile 5–10 schools than those attending decile 1–4 schools. Children who had experienced bullying—as victim or bully or both—tended to score lower than those who had not been involved in bullying.

Patterns of Peer Relations and Children's Earlier Social Skills and School Behaviour

Cross-tabulation of factors relating to children's earlier social skills and their current patterns of relations with peers showed no notable associations between "ordinary" levels of social skills and comfort at school at age 10, and "ordinary" relations with peers at age 12. However, relatively poor social skills, social isolation and being bullied at age 10 were more likely to precede being bullied at age 12. Children who had been socially isolated two years earlier were less likely to see friendship as a key value, and those who had had poor social skills, less likely to think of friendships as fun. Earlier poor social skills and experiences of bullying were more likely to precede social isolation and bullying at age 12, and less likely to see friendship involving communication, fun or a part of the everyday.

Friendship mattered a great deal at both ages for these children, but was not a source of satisfaction. Looked at another way, it would appear that some children with poor social skills at age 10 need additional support from adults in their life if they are to have positive experiences of friendship two years later.

Patterns of Peer Relations, Attitudes to School and Competency Levels

We found that those who bullied other children were more likely to have friendships focused on fun and to score highly on the "appearances matter" set of values (see below). They were less likely to be engaged in learning or to view diligence as a sign that they were doing well at school. Those who were regularly bullied did not show differences in friendship patterns or values, but were more likely to feel distressed at school and to be less engaged in learning than those who were not bullied. They were more likely to see diligence as a sign that they were doing well at school. For both the bully and the bullied, school is not enjoyable, but for rather different reasons.

Distress at school was also more likely to be experienced by those who experienced isolation at school. These children saw school progress in terms of "ease" and were more likely to respond aggressively if given a hard time in school. Thus, those who felt isolated did not respond passively, but like the bully and bullied were more likely to disengage from learning.

Children who emphasised communication in their friendships were more likely to reach out for help if they needed it and to problem-solve. The other trends for other patterns of friendship that we found suggest that these relate to how children tackle work at school, with lower scores for the PAT Reading Comprehension for children who had aimless friendships or for whom friendship was an especially key value.

The indications here are that while friendship is an everyday part of most children's lives at age 12, its value can over-topple if it becomes too important, if relationships are vexed or focused on power or if the friendship has little shared content. Too large a focus on friendship can counter engagement in schoolwork, or it can be a sign that children are not engaging in the work required to make the most of school.

Children's Values

Enjoyment of life and doing well at school or sport were the most important values for the study children at age 12. The next biggest group of values in terms of importance was being with family, having lots of friends and being helpful or kind.

The connections we found between the values comprised three main groups:

The anchored life: 50 percent of the study children had high scores for the items in this group.

Action and friendship: 31 percent of the study children had high scores for the items in this group.

Appearances matter: 9 percent of the study children had high scores for the items in this group.

Children with high scores for the “anchored life” items were more likely to enjoy reading at age 12 and to have had higher scores for communication at age 10. Those with higher scores for “action and friendship” were more likely to have had higher scores for social skills at age 10. The children with higher scores for the “appearances matter” group of items were more likely to have had lower scores at age 10 for individual responsibility.

The study children said that a happy family life, followed by good health, would be of most importance to them in their adulthood. Having an interesting job was mentioned by twice as many of the children at age 12 as having lots of money.

The children's school experiences at age 12

Key findings

School Characteristics

- Most children had more than one teacher, and two-thirds were being taught in composite classes. The average class size was 28.
- Teachers thought that the general level of parental and peer support for the schoolwork of the children in their classroom was very high on average.

Enjoyment of School

- According to parents, 75 percent of the study children were enjoying school at age 12, with 77 percent liking their current teacher and girls slightly more enthusiastic than boys about school. Children's overall attitudes to school most related to maternal qualification and to a lesser extent to their current achievement levels, with lower average scores for children who were bored or unhappy.
- The children were generally positive about school. Seventy-one percent scored highly on a factor relating to engagement in school that drew together experiences of enjoyment, support, fairness and belief in the value of the work of school. However, 16 percent had medium-high scores on a factor related to feeling distress at school, and boys were somewhat less positive than girls about school and showed less engagement in it.
- Children who enjoyed reading and did not watch a lot of television were more likely to find school engaging. Distress at school, however, was unrelated to enjoyment of reading or amount of television watched. Some feelings about school were associated with maternal qualification and a few with ethnicity, but there were no associations with family income and school characteristics.
- The children's feelings about school were related to their competency levels. The feelings with the most associations were those about school work itself. Feelings about interaction with teachers, relations with peers and engagement with learning and achieving were also important. Feelings about their interaction with teachers were particularly related to mathematics scores.

Homework

- The children spent an average of 3.31 hours on homework, and 94 percent of parents said they or someone else in the house helped the child with homework. Around half the children had difficulty completing their homework, mainly because of out-of-school interests, the difficulty of the work or family obligations. Those children who spent at least an hour a week on homework and whose teachers said they always completed their homework had higher average scores for the cognitive competencies.

- Just under half the children thought it very important to do homework (49 percent). The children's views on this matter were unrelated to their competency scores.

Doing Well at School

- Children's ways of judging how well they were doing at school did not show clear-cut groupings in terms of attributions to either their own ability or effort or in terms of extrinsic or intrinsic indications. Lower average scores were however, evident for those children who equated doing well with not having anything hard to do.

- At age 12, teachers were more likely than they had been at the younger ages to describe the children as having a sense of humour and liking a challenge. They saw around half of the children as mature, reliable, kind or well-behaved, an increase from previous ages, and girls more likely than boys to exhibit these characteristics. Children whose mothers had a university qualification appeared to be more confident overall.

- Children who were seen by their teachers as making very good or excellent progress were those most likely to be described as having such attributes as maturity, confidence and liking a challenge, although some attributes (for example, kindness, having a sense of humour) were evident in much the same degree across all the achievement levels.

- The majority of the children had teachers who felt they could make a difference to the children's learning. However, 37 percent had teachers who felt they could make some difference, and 8 percent, teachers who thought they could make only a little difference. Teachers felt more confident working with children who are already working well than with children who are struggling.

- Most parents (88 percent) said they felt comfortable talking with their child's teacher about their child, but fewer were working with teachers to resolve any problems at age 12 than was the case at the earlier ages. Associations were found between academic problems and below-average progress, but not with social-emotional problems.

- The 30 percent of parents who had reservations or were dissatisfied with their child's progress at school was a somewhat larger proportion than at previous ages. While these parents were likely to work with teachers to solve problems, they were more likely to be uncomfortable talking with the teacher and to want to change something in the classroom, such as classroom resources. Parental satisfaction was unrelated to family characteristics, but was related to children not making progress or being bored.

Plans for the Future

- Decisions as to which secondary school a child would attend had been made or were being made for most of the children. Parents and children were tending to share the decision-making.
- Many of the 12-year-olds (59 percent) were looking forward to going to secondary school; only 15 percent (twice as many of whom were boys than girls) were definitely not looking forward to doing

so. Those who were not looking forward to or who felt unsure thought the work at secondary school might be too hard or the social environment difficult.

School Characteristics

Around 40 percent each of the study children were attending intermediates or full primary schools, with under 10 percent each attending Years 7–15 secondary schools, or composite schools—mostly private. A higher proportion of the study children were attending private schools than their peers in the Wellington region.

The kind of school attended by the children related to family characteristics. Children whose mothers had no qualification were more likely to be attending intermediates or decile 1 schools; very few of this group were attending private schools. There was a similar trend in relation to family income. Māori and Pasifika children were more likely to be attending decile 1–2 schools, and Māori children, state schools.

There were some apparent differences for children’s literacy and logical problem-solving levels related to the type of school they were attending. However, the patterns of distribution of school types in terms of socio-economic characteristics were uneven: most composite schools fell into the decile 9–10 or no decile brackets; few intermediates were decile 9–10 schools; and few full primary schools were decile 1–2. Once we took maternal qualification and family income into account, these differences were no longer evident.

We did find lower average scores for children currently attending decile 1–2 schools for mathematics and reading comprehension, over and above family characteristics. Some of this pattern may be due to how the study children in these schools were spending their time. They were less likely to be engaging in reading and more likely to be watching television than children attending the higher decile schools. In estimating the range of reading age in their class, the teachers in the lower decile schools gave a lower reading age at the bottom end of the range than did teachers of classes in higher decile schools, and a wider range than most others. Decile 1–2 school classes in the study also had somewhat lower average attendance, a lower average level of parental support, a higher proportion of children whose first language was not English and fewer small classes (under 20). However, decile 1–2 parents expressed satisfaction levels much the same as other parents.

Private school students in this study had higher average scores for writing, after taking family income and maternal qualification into account. No clear differences emerged in regard to children’s accounts of their time-use, or their attitudes to writing or their parents’ accounts of their relationship with the school that could shed light on why this might be so; however, private school students were more likely than others to spend a longer time on homework.

Classroom Characteristics

The average class size of 28 experienced by the children participating in the Competent Children project had remained constant from age 8. Class numbers were lowest in private schools and highest in intermediate schools. Sixty-seven percent of the children were being taught in composite classes, most covering both Year 7 and Year 8.

Only 11 percent of the children at age 12 had a single teacher for all their subjects. Almost all the classroom teachers taught their children literacy; mathematics was likely to be taught by another teacher for a third of the children, and science, a quarter. The specialist subjects of technology and music or art were most likely to be taught by another teacher. However, at age 12, children's home class teachers saw the children's parents just as often if they did not teach the child all their subjects as if they did.

Teachers rated the general level of parental support for the schoolwork of the children in their class as very high on average. There were some associations with the general level of parental support in a classroom and mathematics and the literacy measures other than the PAT Reading Comprehension. Levels of parental support were related to the school socio-economic decile, and ownership (whether the school was a state school, state integrated or private).

The general level of peer support in the study children's classrooms was also rated high by the teachers. Children who were in classrooms with low ratings for peer support had lower average scores for the social and attitudinal competencies and writing after taking family income and maternal qualification into account. Levels of peer support were unrelated to school characteristics.

Attitudes to School and Teachers

Parents' Perceptions

According to parents, 75 percent of the study children were enjoying school at age 12. Girls were slightly more enthusiastic than boys. Children's overall attitudes to school were most related to maternal qualification. They were also related to their current achievement levels, with lower average scores for children who were bored or unhappy.

It was reasonably common for children to encounter at least one teacher they did not like in their school career: 43 percent of the children had done so, and a further 14 percent had had some teachers they had mixed views about. Seventy-seven percent of the parents reported that their child liked his or her current teacher. Liking the teacher was unrelated to family characteristics but was related to gender. Children's views about their current teacher did not seem to affect their mathematics, literacy, logical problem-solving or curiosity scores. However, children were picking up something in their relationship with their teacher that was reflected in teacher ratings of the children's dispositions and social skills. Similar trends emerged when we looked at the associations with parents' reports of children's views of previous teachers.

Children's Perceptions

Overall, the children were positive about their experiences of school: most usually enjoyed themselves; they felt teachers helped them and they had good friends. Just over half said they usually did interesting things at school, liked their teachers and learnt most things pretty quickly. Seventy-one percent had high scores on a factor relating to engagement in school that drew together experiences of enjoyment, support, fairness and belief in the value of the work of school. However, 16 percent of the study children had medium-high scores on a factor relating to feeling distress at school.

Boys were somewhat less positive about their school experience than girls, and showed less engagement. Some feelings about school were associated with maternal qualification. There were no associations with family income, and only a few with ethnicity. School characteristics were not associated with differences in student views of their experiences, indicating that differences in school characteristics do not lead to quite distinct types of school experiences.

Engagement in school related to whether the children enjoyed reading and how much television they watched. Those who enjoyed reading and did not watch a lot of television were more likely to find school engaging. Distress at school, however, was unrelated to enjoyment of reading or amount of television watched.

Children's views of their school experience, and reactions to it, related to their competency levels at age 12. The views with the most widespread associations were those relating to the actual work of school, and either alienation or identification with its structure and what it offered. Views that were associated with around two-thirds of the competency measures related to the students' interaction with their teachers, to peer relations and to the student's engagement with the work of learning and achieving. All the other views also showed some associations. Overall, there were more associations with the social and attitudinal competencies than the cognitive competencies, and most of the associations with mathematics scores were found in items related to student interaction with the teacher.

On comparing the children's views of their classrooms at age 12 with their views of their classrooms at ages 8 and 10, we found that enjoyment levels were lower at age 12, but so too were perceived levels of competition and of the difficulty of classwork.

Problem-solving at School and Attendance

At age 12, children were still looking to teachers for help and advice if they encountered a problem in their work. A few children said they would do nothing or give up if faced with a difficulty in a project or finding a book in the school library.

Ninety-three percent of the study children had good attendance at school, with little difference related to school or family characteristics. Children whose attendance was lower than others had lower average scores for the social and attitudinal competencies but not the cognitive competencies.

Homework

Children's Views

Most of the study children did homework at least two days a week: 57 percent said they did homework on four or five days, and 32 percent on two or three days each week. Nine percent said they did homework on one day a week, and 1 percent said they never did homework. The average time spent on homework was 3.31 hours a week. Time on homework reflected maternal qualification and family income levels and was slightly higher for girls. Children who did homework more often spent more time on it overall.

Children who spent at least an hour a week on homework had higher average scores for the cognitive competencies than those who did not. While children who thought homework was important gave it more time, average hours spent on homework were unrelated to difficulties in completing it. Just over half the study children found some difficulty getting their homework done, mainly related to their own out-of-school interests, the difficulty of the work or family obligations.

Just under half the study children thought it was very important to do homework (49 percent). However, the children's views on the importance of homework were unrelated to their competency levels. Around two-thirds of the study children liked doing at least some of their homework, including 24 percent who liked doing most or all of what they were given. While maternal qualification was unrelated to views of homework, enjoyment of reading and working with numbers was.

Teachers' Views

Teachers reported that around three-quarters of the study children always did their homework. Homework completion was related to gender and levels of maternal qualification and family income, but not ethnicity. Children who always did their homework had higher average scores on the competencies.

Parents' Views

Ninety-four percent of the parents said they or someone else in the household gave their child some help with their homework. This help was mostly "as needed" and consisted of provision of resources or supervision. There were some differences in the kind of support parents gave which reflected family resources. Projects or research were thought to be the kind of homework students got the most value from, followed by mathematics.

Talking about School at Home

Three-quarters of the study children talked to their mothers most about their school experiences; 28 percent talked to their fathers. These children were almost twice as likely to talk about schoolwork itself as about social activities or interesting or unusual events.

Children's Views on Doing Well at School

The children's ways of judging how well they were doing at school did not show clear-cut groupings in terms of attributions to either their own (unchanging) ability or effort, or in terms of extrinsic or intrinsic indications. While we found that children who performed below average according to their teachers were more likely than those who were doing well to use ease and diligence as signs of doing well, they were just as likely as others to also see their achievement in terms of understanding.

The children with lower achievement were just as likely as others to get excited by understanding, thinking about things or getting a new idea about how things work. Boredom and lack of challenge were just as likely to be cited as reasons for dissatisfaction by parents whose child's achievement was below the average level as by parents of children achieving at the top level. This suggests that while low performers need tailored attention focused on the particular aspects that they find difficult, they also need stimulation and the opportunity for understanding and connection (rather than "the basics" only).

However, there were indications that children whose family resources may disadvantage them in terms of school experience put more emphasis on extrinsic signs and the ease with which they could do a task to guide them on how well they were doing at school. This would put them at a further disadvantage, given that we found lower average scores on the competency measures for those who saw doing well at school in terms of not having anything hard to do.

Teachers' Overall Assessments of Children's Performance

Throughout this study, teachers' overall assessments of the study children's overall performance have not given patterns of normal distribution (the Bell-shaped curve) at any age, including age 12. The teachers have placed fewer students as below average than one would expect from a normal distribution. This situation may simply reflect the particular nature of this sample, which has a higher proportion than found nationally of children from homes with high levels of maternal qualification and income. However, there are implications for communication with parents if "average" is used as a benchmark in that parents and teachers have different understandings of what this term means. Interestingly, teacher assessments of the study children's mathematics performance relative to their class level gave more of a normal distribution curve than their views of overall performance.

The categories the children were assigned to by their teachers are consistent with the children's performance on the Competent Children's Project competency measures, with clear linear gradations between each category for the cognitive competencies, which were tests done by the children, as well as the ratings given by teachers for the social and attitudinal competencies.

Teachers' overall assessments of how the study children were doing at school also reflected the children's homework completion, attendance, health and happiness, their particular strengths and difficulties related to the curriculum, their level of engagement in school and their experience of distress (as given by the children). They did not reflect differences in school characteristics, but did reflect teachers' perceptions of the level of home support for a child, maternal qualification, family income, gender and, to a lesser extent, ethnicity.

Curriculum Strengths and Difficulties

According to their teachers, 95 percent of the study children had at least one area of strength in their class curriculum. Some differences relating to gender and maternal qualification emerged, but family income and ethnicity were largely unrelated to perceptions of curriculum strengths, as were school characteristics. Around two-fifths of the study children were seen to have strengths in reading, mathematics or physical education.

Forty-two percent of the study children had no areas of difficulty in the class curriculum. Around a fifth had difficulty with spelling, mathematics, handwriting or story writing. Difficulty was more likely to be experienced by boys and children whose mothers had no qualification.

Behavioural Strengths and Difficulties

At age 12, around half the children were seen as mature, reliable, kind or well-behaved, an increase from previous ages. At age 12, the study children were more likely to be described as having a sense of humour and liking a challenge than they were at younger ages. There were some differences in gender (girls were more likely than boys to be seen as mature, reliable, well-organised and tolerant), and fewer related to maternal qualification, indicating greater confidence among children whose mothers had a university qualification.

Teachers' overall views of the children's achievement related to some of these behaviours. Children whose achievement level was seen as very good or excellent were twice as likely as those assessed as making average or below average progress to be described as having strengths of maturity, independence or confidence, and three times as likely to be seen as organised and able to concentrate, or as leaders. They also were most likely to be seen as being reliable or sensible, creative or innovative and to like a challenge. However, the qualities of kindness, warm-heartedness, tolerance, patience, willingness and of being well-behaved, trying hard, having a sense of humour and being happy or at ease were evident in much the same degree for all achievement levels.

Around a fifth of the study children were seen as having poor work habits, being passive or having low self-esteem. Boys were more likely than girls to be seen as being immature or having poor work habits. Those children who were assessed as making less than average progress overall were around four times more likely to be seen as aggressive, three times as likely to have poor work habits and to be immature or easily led astray and twice as likely to be seen as living in their own world, having low-self-esteem and being unreliable. Bossiness, rudeness, being self-centred and not trying were found at much the same levels across all achievement levels.

Children's Likely Highest Qualification

Only 15 percent of the study children were thought likely to achieve a school level qualification, or none, as their highest qualification. Twenty-one percent were thought likely to achieve a postgraduate university degree, 38 percent an undergraduate university degree, 16 percent a tertiary diploma and 8 percent a trades qualification. Views of the children's highest qualification level were linked to views of

their overall progress at age 12. They also reflected differences in gender, family characteristics and school characteristics.

Some obstacles to children achieving this likely level were seen for 64 percent of the study children. Poor self-management, low self-esteem, a greater interest in other things and more interest in being popular were the main obstacles identified. Like parents, teachers saw more obstacles for boys in achieving the highest educational level they appeared capable of, with the obstacles located in their attitudes and what they wanted to do. Teachers also considered children from homes with fewer family resources as facing the greater obstacles.

Teachers making a difference for children

Home support and resources seem to be factors in teachers' perceptions of children's progress at school and in their likely future progress. Gender also plays a part. This is probably why not all the teachers thought they could make a lot of difference to the study children's learning. Fifty-five percent of the study children had teachers who thought they could make a lot of difference to their learning, 37 percent had teachers who felt they could make some difference, and 8 percent had teachers who felt they could make only a little difference.

However, when we directly cross-tabulated teachers' views here with gender and family characteristics, we found no associations. What does seem to matter more is children's overall level of performance in their class; family characteristics and gender therefore play a "backroom" role rather than a directive role in teacher views about the efficacy of their teaching. This shows us that teachers feel more confident in working with those who are already working well, and less comfortable about their ability to improve the performance of those who are struggling, a consideration that has implications for the kind of support that teachers need to be given if we are to raise the level of achievement overall, and to reduce the gaps between those who are in the "long tail" of underachievement and those who are not.

Home support for children's learning at school

Teachers' Perspective

Seventy-five percent of the study children were thought by their teachers to be getting very good support or better from home for their work at school. Teachers' views of the children's home support reflected family income and maternal qualification levels but not ethnicity. The proportion of study children getting maximum home support was much the same across differences in school deciles and in school ownership.

One source of information that teachers use to gauge home support may be student achievement; another may be whether they have regular contact with children's parents (where there is interaction between the two realms). Where children were seen as having very good or maximum home support, teachers were more likely to think they could make a lot of difference to their learning and less likely to see difficulties in these children achieving their full potential in education.

The parent that teachers had usually interacted with throughout the study was the mother, but at age 12, the teachers had less regular contact with mothers than previous teachers: they saw 27 percent of the mothers of the children regularly, compared with 38 percent at age 10 and 43 percent at age 8. They had never met either parent of 11 percent of the study children. Patterns of teacher contact with fathers, which were less frequent, were much the same at age 12 as they had been since age 8.

The higher the level of maternal qualification, the more likely the teacher was to see the mother regularly. Student gender, ethnicity and family income were unrelated to how regularly teachers saw mothers, but they were more likely to have no relationship with mothers from low-income homes. The teachers saw 28 percent of their relationships with parents as either less than good or non-existent. On the whole, despite some broad decile-related differences, any differences in the parent–teacher relationship reflected differences in maternal qualification, parents’ likely ease in formal educational environments and their interest in education. There may be some confounding here with children’s achievement levels, since these tend to reflect maternal qualification levels at the extremes.

Parents’ Perspective

Eighty-eight percent of the parents said they felt comfortable talking with their child’s teacher about their child. Seven percent said they had not met their child’s teacher. Fewer parents worked with teachers to resolve a child’s problem at age 12: 43 percent compared with 50 percent at age 10 and 65 percent at age 8. The problems were almost evenly divided between academic issues and social-emotional problems. Academic issues were more likely to be raised by the parents of children who were making below-average progress (although not all of them); social-emotional problems were unrelated to children’s progress.

Sixty-nine percent of the parents expressed satisfaction with their child’s progress at school; 20 percent had some reservations. Ten percent were dissatisfied, a somewhat larger proportion than at previous ages. Parental satisfaction was unrelated to family characteristics, but was related to children not making progress or being bored.

Parents who were dissatisfied or whose satisfaction was qualified were more likely to work with teachers to solve problems. However, they were also more likely to be uncomfortable talking with their child’s teacher about the child and to want to change something in the classroom. A quarter of those who were satisfied with their child’s progress also said they would like to change something in their child’s classroom. Twenty-nine percent of the parents wanted to make some change; a further 9 percent were undecided. The most frequent changes desired were changes to class programme or resources.

While children whose parents had been dissatisfied with their progress two years earlier were more likely to have lower average scores at age 12, there were also low scorers in the group whose parents were satisfied with their progress. Just under half of those whose parents expressed satisfaction with their progress scored below the median for the study measure of mathematics and the PAT Reading Comprehension at age 12. Nonetheless, the higher the teacher’s assessment of child’s overall achievement, the higher the level of parental satisfaction.

Maternal qualification was unrelated to parental satisfaction with their child's progress or comfort talking to the child's teacher, joint parent-teacher effort to sort out problems, parents talking to their child about school or parents' views of their child's attitude to school. However, interest in changing something about their child's class was highest for families where the mother had a university qualification (38 percent) and lowest in those with no qualification.

Most parental involvement in their child's school consisted of parent-teacher interviews. A third of the parents had done voluntary work at the school, but only 8 percent of this was taking place in classrooms by age 12, down from 17 percent at age 10 and 42 percent at age 8. Maternal qualification levels related to voluntary work, in and out of classrooms. We found no associations between competency scores and the total number of kinds of parental involvement in a child's school. However, there were some associations between specific forms of parental involvement in the child's school: voluntary work in the school was associated with higher mathematics and communication scores for the children of parents who did this; lack of involvement with lower mathematics scores. These patterns suggest the importance of the different signals that children can receive about the value of education, as well as parental comfort in the formal educational environment.

Selection of Secondary School

Secondary schools had been selected or narrowed down two or three schools for 91 percent of the Year 8 students and for 84 percent of the Year 7 students. Twenty-seven percent of those who had selected private schools and 24 percent of those who had selected state integrated schools were already attending these schools.

The school characteristics of the secondary schools that their children would attend were similar to those mentioned by parents who had made their selection when their children were younger. However, there was a decrease in the proportion choosing decile 9-10 schools and a corresponding increase in those choosing schools in the adjacent decile 7-8 band. This shift may reflect the reality of school enrolment policies.

In relation to family income and maternal qualification, differentiation in the patterns of primary school chosen occurred largely at the ends of the socio-economic decile spectrum and in relation to private schools. The same pattern was evident with choice of secondary school for the study children at age 12. However, there were still substantial proportions of parents from low-income families and those where the mother had no qualification who wanted their child to attend a decile 9-10 school. Very high-income families deciding on a non-state school were likely to favour a private school; high-income and Pasifika families were more likely to opt for state integrated schools. Two or more schools were more likely to be being weighed against each other by those families where the mother had a post-school qualification.

Deciding which secondary school to attend was largely a shared process, although students were more likely to see this decision as shared with them than their parents did, or up to them alone. Parents were more likely to make the decision on their own in families where the mother did not have a post-school qualification. This also appeared to be the case for Pasifika children.

Parents were twice as likely as the age 12 children to mention a good reputation as one of their main reasons for their choice of secondary school and somewhat more likely to mention the proximity of the school. Just over a quarter of both parents and children mentioned family tradition, and just under a quarter of each group the fact that friends of the child would be going or were already going there. No associations were found between the reasons given and who was involved in the decision-making.

Maternal qualification levels were not reflected in the reasons given by children for the choice of secondary school, but family income was, with school reputation more likely to be mentioned more by those with high or very high incomes. School reputation was also more likely to be mentioned as a major reason by those going on to decile 9–10 schools: this was the only difference in reason related to school socio-economic decile. Children going on to private schools were more likely to mention reputation; those going on to state schools, proximity; and those going on to state integrated or private schools, religion.

Family income differences were not reflected in the most frequent reasons that parents gave for choice of secondary school, but were if the reasons related to the school being single-sex and/or of religious character. Single-sex schools were more likely to be chosen for daughters than sons. Maternal qualification was largely unrelated to parental reasons for choice of secondary school, although the school choices made for the child's friends were mentioned most in relation to children whose mothers had a university qualification. Among parents, there was no association between school decile and school reputation.

On the whole, the existing differences in patterns of current school attendance relating to differences in family resources look set to continue in the secondary schools attended by the study children. However, differences in family resources do not figure substantially in the reasons given by parents and children for choice of secondary school. While there were some expected differences, they were not consistent across both parents and children, nor were they clear-cut in relation to school decile.

Children's Attitudes to Secondary School

Fifty-nine percent of the 12-year-olds were looking forward to going to secondary school, but 26 percent were fluctuating or unsure in their response to this change. Only 15 percent were definitely not looking forward to moving on to secondary school. Boys varied more in their feelings, but twice as many girls as boys were not looking forward to secondary school.

The main reasons why students felt positive about going on to secondary school were that they felt ready for a change, thought they would learn interesting things or have more challenge and would have more choice and be more independent (22 percent). Those who were not looking forward to secondary school, or who felt unsure about it, thought the work could be too hard or feared the social environment of the secondary school. Thirteen percent felt confused about moving on and said they did not know what to expect.

Parental Aspirations for Children's Education

Half the children's parents wanted their child to definitely have a tertiary education; only 4 percent said they would settle for secondary school only. Parents' aspirations reflected ethnicity, maternal qualification and family income levels. Māori parents were less likely to aspire to university or other tertiary education for their child, as were parents where the mother had no qualification.

The latter tended to be more aware of the costs of post-school education as a potential obstacle to their child getting the education they would like them to have. The main obstacles that parents saw as standing in the way of their aspirations for their child's education were the child's own choice; lack of money; and the child's attitude or temperament; with boys seen as more prone than girls to not realising their parental aspirations through their own choice or attitude.

Aspirations for the children at age 12 that included tertiary education were highest among the very high-income families and those where the mother had a university qualification.

Forty-five percent of the parents said they were saving for their child's post-primary education, a slight increase from the 40 percent at ages 8 and 10. Saving was most likely to be occurring for children whose mothers had a university qualification, in the very high-income families and in Pasifika and Asian families.

Occupational interests and expectations

Around a fifth of the study children were interested in professional occupations and in sports. Only 7 percent of the children could not think of an occupation that they would like to do as an adult. Maternal qualification and family income levels were not significantly related to parental views of what would interest their child, although there were definite trends, notably more mention of professional occupations and science for those with mothers with a university qualification. Science was also more likely to be mentioned by children from very high-income homes. The uniformed services appealed more to those children whose mothers had a school-level qualification, or none. Gender made some difference to the parents' ideas of future occupations, but not the children's.

Some overall messages

The role of family resources

Like many other studies of children's development that have collected data on family resources as well as school and class-level data, we have found that family resources play a major role. They do not operate in a rigid manner, nor do they relate to children's competency levels in a lock-step fashion, with every single level of family income or maternal qualification corresponding with a higher level of performance by children on the cognitive competencies.

However, a comparison of the proportions of children scoring at or above the median for reading and mathematics at age 12 for different family income levels when the study children were nearly age 5 shows around a third of those who came from low-income homes, around half of those from medium-income homes and around two-thirds of those who came from high-income homes scored at this level. The range is wider in relation to maternal qualification. Around a fifth to a quarter of the study children with mothers with no qualification scored at or above the median for reading and mathematics at age 12 compared with around half for those children whose mothers had a school level, trade or tertiary level qualification, and around three-quarters to four-fifths of those whose mothers had a university qualification.

Our final statistical modelling, using two different methods, gave consistent and complementary pictures about the importance of language experience and use in everyday life, from an early age. Language experience and use is important for the development of not just comprehension in reading, but also of understanding and reasoning skills in mathematics. Language use and experience is also related to engagement in school or the ability to make the most of what schoolwork and school interactions have to offer. And they are related to family resource levels, particularly maternal qualification levels.

Many activities, behaviours and experiences are associated with advantage in terms of family resources. These include a greater use of reading and enjoyment of it and more time spent in activities that are likely to extend knowledge, analytical skills and communication skills. Some of these activities do not come cheaply, such as the performing arts. Other experiences include a greater parental interest in their children's education, an interest that is more likely to be informed by the parents' own educational experiences and confidence. And it includes more support for children to be assertive.

By treating family income and parental qualification levels separately rather than as components of a composite socio-economic status, we have been able to show that these factors do operate somewhat differently. Higher maternal qualification levels can act as a buffer for some of the disadvantages of low family income, but less so in reverse. This may be because so many activities and experiences that co-occur with having some form of maternal qualification, particularly at the upper end, are those that co-occur with engagement with the work of the school, particularly around reading and use of language in communication.

The role of participation and engagement

There are also many similarities in the way that children from different backgrounds spend their time, react to adults and peers and identify what is important to them. Although children whose mothers had a high qualification were likely to watch less television than those whose mothers had no qualification, they did watch some television, and their tastes in programmes were not clearly distinctive. Differences in children's activities and engagement related more to gender than to social class.

Children who were struggling with school, in a spiral of lack of achievement and lack of engagement (feeling supported, having trust, having interesting things to do), came from all family backgrounds. Children who had been bullied, experienced isolation, had poor social skills and who struggled to gain more positive meaning out of friendships also came from all family backgrounds. Gender was more important than family resources in relation to performance in the social and attitudinal competencies. What matters in the work of teachers and parents to arrest such negative spirals of reinforcing experience, actions and reactions is not so much children's social backgrounds as their specific needs and the patterns of experiences and habits needing to be reshaped.

The roles of current and early experiences

A longitudinal study can also compare the contribution of current and earlier experiences. Two striking findings relate to the importance of children's early experiences for their later performance. The first concerns the continued contribution of aspects of early childhood education, and the fact that some of these had grown over time rather than diminished. Second is the greater contribution that family income levels in these early years had made to children's later competencies, more so than current or improved family income levels during the seven years following.

These findings indicate that when weighing up the costs of providing support for children in their first few years, and therefore for their families, we need to take a long-term view. It seems that some of the ground lost for some of the children in this study in those early years is very difficult to regain in later years. Children from homes with high maternal qualification found it easier to make up this ground than others. It is of concern that not only was it harder for children from homes with low levels of family resources to make up this ground, but also that children from these family backgrounds who had been early high performers were more likely to lose ground over time.

The difficulty of catching up was particularly marked in relation to mathematics. This may be because of the nature of mathematics, or it may be that we have historically as a country and education system put more emphasis on reading and the teaching of reading.

While this study points to the early years, before children reach school, and then the first three years of school as providing the best window of opportunity for children to gain solid foundations for continued learning, it also shows that adult responses to children's lack of engagement, lack of performance or their being upset is not age-limited in terms of making a difference for individuals. More children than we expected from our analysis of performance at earlier years moved from low levels of performance at age

10 to performing at or above the study median at age 12. Most parents of the study children had worked with their child's teacher at some stage to sort out difficulties their child had experienced.

What is of concern is that teachers of the study children at age 12 were less confident that they could make a difference to the learning of children who were struggling in their learning. This underlines the importance of the government's strong emphasis on providing more curriculum, pedagogical and assessment leadership and resources to support teachers in their work with students, and the need to ensure that learners who are struggling are a priority in this support. We also need to ensure that engaging learning experiences are available for students who have fewer home resources than others to complement and support the work of school.

The importance of understanding cumulative experiences

Much of the analysis of "risk" and "resilience" among children emphasises both the co-occurrence of risk and supportive factors, and the need to see risk and resilience in terms of clusters of co-occurring factors rather than single decisive factors. The value of a longitudinal study such as this one is that it can show how this compounding in terms of occurrence happens through time, and that an accumulation of positive or negative experiences can tip a balance.

For example, the children in our study who had experienced just a few changes of school by age 12 were unaffected; it was the children who had experienced more than four schools by the age of 12 who showed some areas of lower performance. We also found class size at age 12 to be unrelated to children's competency levels. It was only when we looked at experiences of class size over time that we could see trends. The amounts of time that the children at age 12 were spending watching television showed fewer associations with children's competency levels than did the cumulative amounts. By not limiting ourselves to current data only, we gain a greater understanding of the relationships between children's experiences and opportunities and their performance.

Finally, many of the study children had been upset at different stages of the times when we talked with their parents, but very few were upset at every stage and most had or were coping with being upset. Around half the study children had had a teacher they did not like, but this had not affected their performance at age 12. For many of the study children, life had been a mixture of beneficial and less beneficial experiences. We cannot ensure that children have only beneficial experiences, but we can take action so that they have enough of them, a critical mass, to make the difference.

Section One

Introduction

The Competent Children study began in 1992 with a pilot study. Data collection for the study began in 1993, with full material collected for 307 children (the “original” sample), and a “light” survey collected data from parents and early childhood education centres on a further 767 children. The children were all in their last months of early childhood education, and were close to age 5. When the “original” sample were aged 6, we undertook further data collection for them.³ Then at age 8, we added 242 children from the light survey to increase our sample size, giving a total of 523 children for whom we collected data. We followed up this larger sample at age 10, with 507 children. A full record of the reports from the study and associated papers is available on the NZCER website, www.nzcer.org.nz. The project has been funded by the Ministry of Education, with some additional funding from NZCER and at the age-10 phase, the then Ministry of Social Policy.

This present report is based on the data collected when the children were aged 12, and included 496 children. At each stage we have provided descriptions of the study children’s current experiences, perceptions, and competencies, as well as using the data and analysis of earlier phases to shed light on children’s development over time, and the role in this development of early childhood education, children’s experiences, family resources, and school experiences.

This report aims to provide an overall picture of what is a reasonably comprehensive set of the different kinds of factors which can influence children’s development. The set of factors included in the age-12 phase of the Competent Children project is based on our previous findings, the research questions given below, a scan of relevant research literature to identify factors which may be more specific to this age-group, and on the aim of providing a base-line for a focus in the next phases of the study on the children’s experiences of adolescence. Our comparison of our findings with those of other studies is mainly in terms of identifying the major patterns and trends which emerge over time. There is much more that can be done in terms of providing a rationale for the factors included and of delving more deeply into particular

³ An account of the development of the study, instruments, and some of the issues with the original study design and sample arising over time, is given in Wylie (2003a).

aspects, but to do so in a single report would make this a mammoth task for both the research team and our readers. We will be pursuing some of these aspects in a range of different articles for peer-reviewed journals and popular versions aimed at a more general readership.

This particular phase of the Competent Children project focuses on the following research questions:

1. Is there a set of core competencies at age 12? How do these relate to those identified earlier in the Competent Children project?
2. How predictable are children's competency levels at age 12 from their earlier competency levels at ages near-5, 6, 8, and 10? Are there different trends for different population sub-groups and different competencies? To what extent are these results modified by school experiences, home resources and support, and children's activities?
3. What differences in children's competency levels at age 12 are attributable to stability or change in cumulative resources and experiences since near age 5?
4. Does early childhood education experience continue to have an impact at age 12? If so, which aspects remain important?
5. What weight do these aspects of children's lives play in their competencies compared to each other: family resources, school experiences, home-based and out-of-school activities, and early childhood education experiences?
6. How are children's earlier competency levels in social skills, parental and teacher reports of their attitude to school and relevant school behaviour related to their experience at age 12 of their peers (including bullying), and the pattern of their peer relations outside school?
7. How are children's earlier competency levels in perseverance, communication, and individual responsibility, parent and teacher reports of their dispositions and ability to cope with problems, related to their competency levels at age 12, and their attitudes to school, including motivation and engagement?
8. How are children's attitudes to school, including motivation and engagement, their problem-solving approaches and competency levels at age 12 related to the pattern of their peer relations in and outside school?
9. What consistency is there between the child's school progress and children's judgments of their school experiences, parental satisfaction with their child's school, their involvement in the child's school, and teacher perceptions of the child's school engagement, their relations with the parents, and parental support for the child?
10. Do different population sub-groups show different patterns of school choice and satisfaction with their child's school progress?

As the study children were now in their early adolescence, there was more of an emphasis in this phase on collecting data on the children's friendships and aspirations. We have gathered this data to see how

friendships and aspirations at age 12 related to children's competency levels, and to provide base-line information so that we could track changes in patterns of peer relations and aspirations and factors that might affect them as the study children move through adolescence, and any enduring or emerging associations with their competency levels and school and other achievements in later phases of the Competent Children project.

The choice of material that we collected was based on existing research (both findings and aspects which emerged from analysis as needing more attention), the questions we had used in earlier phases of the Competent Children project, to allow comparison over time, and the main research questions for this phase. We also undertook focus groups with students, parents, and staff at 3 Wellington schools in different socio-economic areas to check some of the items we proposed to cover, and to gain more understanding of specific aspects so we could word our questions appropriately. Many of the questions we asked in the age-12 phase, for children and parents particularly, were open-ended, and captured both in the words given and by the interviewer using pre-coded categories on the interview schedule.

Study sample

The original Wellington region sample was chosen in terms of providing sufficient numbers of children in each of the 3 main types of early childhood education other than te kōhanga reo, with as many as were available from family day care and the few existing a'oga amata in the area.⁴ It was not chosen to be representative of the family characteristics of the Wellington region population of near-5-year-olds. The absence of the ngā kōhanga reo in the study⁵ accounts to some extent for the under-representation of Māori children in the study, as shown in the table following. There is also an under-representation of children from Pasifika homes. The Competent Children sample is under-representative of low-income families, and over-representative of high-income families (to some extent reflecting the higher than average national income levels in the Wellington region). The sample under-represents women (parents) with school-level qualifications, and over-represents those with trade or tertiary level (other than university) qualifications, compared with the overall New Zealand population.

⁴ Full details are given in the *Competent children at age 5* report.

⁵ Kōhanga reo are Māori medium early childhood education centres which are centred around the revitalisation of Māori language and tikanga. Because of these differences with English-medium early childhood education types, a parallel study with differences in instruments and approach was discussed with the Te Kōhanga Reo National Trust. If funding could be found, there was some interest in this possibility, but capacity building and managing the growth of kōhanga reo were then the priorities for the Trust.

Table 9 Characteristics of the Competent Children sample at age 12

| (n=496) | Study sample numbers | Study sample % | Comparison with Wellington data from 2001 census ⁶ % | Comparisons with national 2001 census data % |
|-------------------------------|----------------------|----------------|---|--|
| Gender | | | | |
| Male | 261 | 53 | | |
| Female | 235 | 47 | | |
| Family income level | | | | |
| <\$30,000 | 70 | 15 | 23 | 28 |
| \$30,000–\$50,000 | 98 | 19 | 17 | 19 |
| \$51,000–\$70,000 | 104 | 21 | 16 | 16 |
| >\$70,000 | 208 | 41 | 29 | 20 |
| Not stated | 16 | 3 | 16 | 17 |
| Maternal qualification | | | | |
| None | 68 | 14 | 16 | 20 |
| School level | 152 | 31 | 35 | 37 |
| Trade/tertiary | 185 | 37 | 22 | 21 |
| University | 86 | 17 | 19 | 13 |
| Not known | 5 | 1 | 8 | 9 |
| Ethnicity | | | | |
| Pākehā/European | 393 | 79 | 66 | 66 |
| Māori | 52 | 10 | 17 | 19 |
| Pasifika | 25 | 5 | 11 | 8 |
| Asian | 14 | 3 | 6 | 6 |
| Other | 12 | 2 | 1 | 1 |

We have sufficient numbers of children in each group to allow full analysis in terms of differences in family characteristics of income, and maternal qualification; the numbers in the non-Pākehā/European groups are small, allowing more cautious comparisons. Since the sample is not representative of the country as a whole, analysis of differences between family characteristics has an additional value in this study. It would be possible to see whether findings for the study sample as a whole – e.g. ways in which 12-year-olds spend their time, or their views of school – would be modified for a nationally representative sample by taking such differences where they exist into account in terms of the national distribution of family income and maternal qualification. We have not done that further analysis in this report, since a nationally representative picture was not the main aim of this study.

⁶ The comparison for family income with the census data uses families with dependent children; the comparison for maternal qualification uses females aged 35 to 49 years; the comparison for ethnicity uses the ethnicity of 12 year olds, adjusted to sum to 100 percent (2001 Census allowed multiple ethnicity).

Attrition rates

549 children in total have taken part in the study. The characteristics of those who remained in the study at age 12 and the 53 who had left were compared to see if there were any differences in terms of family income, maternal qualification, gender, and ethnicity. There were no significant differences, with one exception. There has been a higher attrition rate among Pasifika children (17 percent compared with 10 percent overall). Family movements out of New Zealand have been one of the main reasons for children leaving the study.

When they were 12, 454 (92 percent) of the children remaining in the study were still attending schools in the Wellington region. Forty-two children lived in other parts of the country: 33 in the North Island, and 9 in the South Island. Fifteen had gone to live in the Auckland region, 8 in the Manawatu-Wanganui region, 5 in the Canterbury region, and 4 in the Bay of Plenty.

Of the 307 in the “original” sample at age 5, 268 remained at age 12 (87 percent). Of the 242 who joined the study at age 8, 228 remain (94 percent). For the “original” sample, data collection included: at their final early childhood education centre, ratings of its quality, observation of child behaviour, and interview-based material; material from the children themselves, including tasks to assess competencies, and ratings of the children’s social and attitudinal competencies from their early childhood education teachers. There was also material from children, parents, and teachers when the children were aged 6, after their first school year. For those who joined the study at age 8, we have some age 5 material which was collected in a “light” survey at age 5 (collecting data from parents by phone, and from centres by survey).

We checked whether there were differences in scores for early literacy and mathematics competency measures at age 5 between those who had left the study and those who remained; there were none, indicating that those remaining in the study continue to be representative of the original study sample in terms of competency scores as well as family characteristics. We also did this same analysis with the mathematics and PAT Reading Comprehension test scores at age 8 for the children who joined the study fully at age 8, with the same result.

Notes on the report

The material from parents, students, and teachers is largely of their own perceptions and reporting. To keep the report readable, we have not continually repeated the source of all the findings (as in “their report of”). where people are reporting on their own experiences and activities. We have tended to note that people are giving us perceptions when they are describing their impression of another’s reaction, for example, parental reports of how children feel about school.

Appendix 1 gives a full description of the statistical methods used in this report, including a glossary of statistical terms used. Please refer to this in reading the report, since we have not repeated these descriptions or definitions in the text of the report. In the descriptive findings, we have reported

differences between groups or characteristics if they were significant at the $p < 0.05$ level. We have also reported differences whose p-value is slightly above this (.06 or .07) where the results are consistent with other findings, and where it seems possible that the results would have been significant with a larger sample.

In our reporting of ANOVA analysis of the relationships between children's competency levels and particular factors, we have reported results that remain significant (here at the $p < 0.01$ level) after first taking into account maternal qualification levels and family income levels at age 5, separately. We used family income levels at age 5 rather than current levels of family income because we found stronger associations with children's competency levels with the earlier rather than current family income levels in this phase as well as previous phases of the project. The fact that a factor does not continue to show significant associations with a competency after taking into account these two strong aspects of the resources available to children indicates possible links between these aspects of resources and the particular factor, and may well be describing elements of income or education which have an effect in relation to the competency.

The income levels used in the descriptive material are less than \$30,000 (also sometimes referred to as "low" income), between \$30–60,000 (sometimes referred to as "middle" income), between \$60–80,000 (sometimes referred to as "high" income), and above \$80,000 (sometimes referred to as "very high" income). We have used 4 levels of maternal qualification in the descriptive analysis, but 5 for the ANOVA analysis of the relationship of this factor with the study children's competency levels.

Report structure

The first section of the report describes the children's competency levels on the measures we used, looks at relations between the competencies, both current and in relation to previous scores, and then concludes by looking at whether there are different trends for children's movement over time in terms of gender, family income levels, maternal qualification levels, and ethnicity. This section covers the first 2 research questions for this phase of the project.

In the next section, we cover the third research question, looking at the relationship between children's age-12 competency levels, and cumulative patterns or "history" of children's experiences for some key factors.

We then focus on an analysis of the associations between the children's early childhood education experience, and their competency levels at age 12, covering the fourth research question.

The next section provides descriptions of children's current experiences at home, with peers, and at school, and analysis of some of these with their current competency levels. The remaining research questions are covered in these sections.

The final section gives a number of multifactor models to give a more specific answer to the fifth research question, and draws together the separate threads from the different sections of the report in an overall conclusion of the ways in which children develop, the roles of their different experiences, and the ways these experiences are combined.

Section Two

The children's competencies at age 12

The competency measures

In this section, we look first at the study children's scores on each of our competency measures at age 12, with some description of trends in particular items making up the competency measures. Then we look at the relationships between the competency measures at age 12.

The selection and development of the measures in this study have been described elsewhere (Wylie, Thompson, and Kerslake Hendricks, 1996; Wylie, 2003a). Because of the period of growth covered in the children's lives, it has not been possible to use the same measures in every phase of the study, although we have kept the same items and tests as much as possible. The reliability of each of the measures (the degree to which the scores on each of the items within it are associated with the total score for the measure) has been above 0.7 for all measures other than Social Skills with Peers.

We have made some changes to individual items within each competency measure as the study children have grown. At age 12, we changed 2 of the 5 items within the measure of Individual Responsibility, 4 of the items within the measure of Communication, and one each within the measures of Curiosity and Social Skills with Peers. We added a new item to the measure of Communication, and withdrew one from the measure of Social Skills with Adults.

Teacher-rated competencies

Communication, Curiosity, Perseverance, Individual Responsibility,
Social Skills with Adults, Social Skills with Peers

The teachers had taught the individual children in the study for an average of 7.3 months, with a range from 1 month (3 percent) to 4 years or more (4 children). The average age of the children when their teachers were interviewed was 12 years, with a range from 11 years 10 months (3 percent) to 12 years 6 months (one child).

For these 6 competencies, teachers rated children by matching a set of statements related to each competency area to the child, using a 5-point scale, which we then converted to a numerical rating: always (5); often (4); sometimes (3); hardly ever (2); never (1). The scores for each of the items within each of the competency measures were added together, and converted into percentages to give an overall rating.

We look at each of these competencies in turn, giving scores on the individual items used to measure them.⁷ Our focus is mainly on those items where more children scored at the top end of the scale, and those items where more children scored at the lowest end of the scale, and on trends over time in the scores in each item.

Then we look at how well a child's score on an item matched their score on another item used for the same competency measure. If each child in the study had the same individual score on each of the 2 items being compared, that would give a correlation of 1 (written as $r=1$). This would be the strongest possible correlation. A correlation of below 0.3 means that there is practically no match in the scores on the 2 items being compared. We were not seeking high correlations between the items, since we wanted a multidimensional measure, with each item giving insight into a different aspect of the competency area.

Communication

The measure of Communication covered receptive language, or listening skills, and expressive language, or speaking skills. At age 12, we included 5 items for each of these 2 dimensions of Communication. Previously, we had had 4 items for speaking skills. The Communication measure had stayed much the same from age 5 to age 10. At age 12, we undertook some revision, adjusting the wording to ensure clarity, splitting one item which asked about both explanations and descriptions into one about the clarity of explanations, and one about the clarity of argument. We also dropped 2 items which some thought were too dependent on contextual opportunities for children, or difficult for teachers to know about. These items focused on children's experimentation with language, and on the ease with which their speech was understood, even by strangers. The reliability of the measure was 0.90.⁸

As at earlier ages, the study children's listening scores tended to be higher than their speaking scores. Around three-quarters or more always or often understood the information their teacher gave them in class, asked for something they did not understand to be repeated or explained again, and followed conversations and stayed on the same topic. Just over half the children were seen by their teachers to often or always speak confidently, or offer a clear and convincing argument.

⁷ The scores of the original children in the study, and those who joined at age 8 from the survey, were compared and found to be very similar in their distributions for all the competencies at age 10. We therefore use the whole sample in our analyses except where otherwise stated.

⁸ Reliability here refers to the correlation of scores on individual items with scores overall for the measure. A correlation of 0.7 or more is generally considered adequate. We have used Cronbach's coefficient alpha to calculate the reliability of the competency measures, using standardised scores.

Table 10 **Communication**

| Ranking® Item | 5 % | 4 % | 3 % | 2 % | 1 % |
|---|----------------|----------------|----------------|----------------|----------------|
| <i>Receptive</i> | | | | | |
| Follows conversation and stays on same topic | 31 | 43 | 20 | 6 | 0 |
| Understands information given to the class | 31 | 50 | 17 | 3 | 0 |
| Asks for something not understood to be repeated or explained again | 29 | 36 | 20 | 13 | 3 |
| Good listener | 27 | 41 | 20 | 11 | 1 |
| Can remember and carry out instructions after hearing them once | 24 | 44 | 22 | 9 | 2 |
| <i>Expressive</i> | | | | | |
| Clearly explains things seen or done | 23 | 44 | 22 | 9 | 2 |
| Expresses his/her views and needs appropriately | 22 | 40 | 26 | 11 | 1 |
| Confident speaker | 22 | 33 | 27 | 14 | 4 |
| Modifies language according to situation and audience | 18 | 42 | 27 | 12 | 2 |
| Provides clear and convincing argument | 17 | 37 | 30 | 12 | 4 |

5 = always, 1 = never. Figures in tables may not total 100% due to rounding.

Most of the correlations between the items which made up this measure were between $r=0.45$ and $r=0.55$, with the highest at $r=0.69$, and the lowest at $r=0.15$. The overall median rating for Communication at age 12 was 69 percent, a little lower than the 72 percent of ages 6, 8, and 10. At age 5, the median was 78 percent.

Curiosity

Scores for the Curiosity items were generally much lower than for our other measures. Around two-thirds of the children were seen by their teachers to always or often "enjoy new experiences/challenges".

Table 11 **Curiosity**

| Ranking® Item | 5 % | 4 % | 3 % | 2 % | 1 % |
|---|----------------|----------------|----------------|----------------|----------------|
| Takes an active interest in surroundings | 19 | 46 | 27 | 8 | 1 |
| Enjoys new experiences/challenges | 17 | 43 | 30 | 10 | 1 |
| Asks a lot of questions/wants to know how and why | 12 | 36 | 32 | 16 | 4 |
| Thinks laterally, "outside the square" | 8 | 29 | 37 | 20 | 5 |

5 = always, 1 = never.

Children's scores at age 12 for these items were much the same as they were at age 10 and 8. The items in this measure have correlations between $r=0.47$ and $r=0.61$ at age 12, somewhat higher than at age 10. The reliability score was 0.83.

The median score for Curiosity was 63 percent, the same median as at ages 6, 8, and 10, compared with 69 percent at age 5.

Perseverance

As at earlier ages, most children finished all their work always or often (77 percent, much the same as at age 10, and somewhat higher than the 65 percent at age 8). Just over half the children always or often persisted with solving a problem, even when things went wrong.

Table 12 Perseverance

| Ranking® Item | 5 % | 4 % | 3 % | 2 % | 1 % |
|--|--------|--------|--------|--------|--------|
| Finishes all work | 39 | 37 | 14 | 8 | 1 |
| Good concentration span when working in the classroom | 27 | 36 | 22 | 13 | 2 |
| Makes an effort to do something even if s/he doesn't want to | 24 | 42 | 20 | 12 | 2 |
| Persists with solving a problem, even when things go wrong | 18 | 38 | 28 | 14 | 3 |

5 = always, 1 = never.

The median score for Perseverance was 75 percent, the same as the median score at age 10, and slightly higher than the 69 percent of the 3 earlier phases. Correlations between the items have increased over time, with a narrower range. Some minor changes were made to the wording of the items between ages 10 and 12. The reliability score of the measure was 0.88.

Individual Responsibility

Just over half the study children could always be relied on to pass messages between school and home at age 12, and just over a third always followed class routines without having to be reminded. Just over half always or often acted with some thought to the consequences of their action.

Table 13 Individual Responsibility

| Ranking® Item | 5 % | 4 % | 3 % | 2 % | 1 % |
|---|--------|--------|--------|--------|--------|
| Can be relied on to pass messages between school and home | 51 | 28 | 14 | 8 | 0 |
| Takes responsibility for his/her actions | 42 | 35 | 17 | 5 | 1 |
| Keeps track of time, puts books away in right place | 40 | 32 | 17 | 11 | 1 |
| Follows class routines without having to be reminded | 36 | 42 | 16 | 6 | 1 |
| Acts without thinking of consequences* | 3 | 11 | 27 | 35 | 23 |

5 = always, 1 = never. * Reverse scored (5 = never, 1 = always).

Correlations between items ranged from $r=0.39$ to $r=0.71$. The item that was least correlated with the other items was "Acts without thinking of the consequences". The reliability score was 0.87.

The median score at age 12 on our measure of Individual Responsibility was 80, somewhat higher than the median of 70 percent at ages 8 and 10, but much the same as the median of 83 percent at ages 5 and 6.

Social Skills with Adults

All but 11 percent of the children showed respect for the adults in the school often or always. Around two-thirds also showed confidence in their interactions with adults in the school, and could present their point of view appropriately to an adult, even when there was a disagreement.

Table 14 Social Skills with Adults

| Ranking® Item | 5 % | 4 % | 3 % | 2 % | 1 % |
|---|--------|--------|--------|--------|--------|
| Shows respect for adults in the school | 57 | 32 | 9 | 2 | 0 |
| Presents his/her point of view appropriately | 34 | 34 | 22 | 7 | 2 |
| Confident in her/his interactions with adults in the school | 28 | 42 | 20 | 8 | 2 |

5 = always, 1 = never.

The scores on these items were much the same as they had been at age 10. The median score continued to be 75.⁹

The item which was most highly correlated with the other 2 items in this measure was *Presents his/her point of view appropriately* ($r=0.44$ and $r=0.54$). There was a lower correlation ($r=0.23$) between showing respect for adults, and being confident in interactions with them. The reliability score for the Social Skills with Adults measure was 0.67.

Social Skills with Peers

In their teachers' experience, most children got on with others – the positive side of relations with peers – and were not influenced by peer pressure to do something out of character – the negative side of peer relations. Just over half the children were never left out of groups by other students, and just under half were never difficult for their peers to get on with.

Table 15 Social Skills with Peers

| Ranking® Item | 5 % | 4 % | 3 % | 2 % | 1 % |
|--|--------|--------|--------|--------|--------|
| Good at making and keeping friendships | 31 | 47 | 15 | 6 | 1 |
| Works with other students over time without adult intervention | 22 | 50 | 18 | 8 | 2 |
| Most students find ___ difficult to get on with* | 49 | 31 | 12 | 5 | 2 |
| Influenced by peer pressure to do something out of character* | 37 | 35 | 21 | 7 | 1 |
| Left out of groups by other students* | 58 | 27 | 10 | 5 | 0 |

5 = always, 1 = never. * Reverse scored (5 = never, 1 = always).

There was a continued increase in the proportion of the study children who could always work with other children over an extended period of time without needing adult intervention (22 percent at age 12, compared with 18 percent at age 10, and 12 percent at age 8). There were also increases in the proportion of the study children who were seen as always good at keeping and making friendships (31 percent at age 12, compared with 25 percent at age 10 and 20 percent at age 8), and who were never influenced by peer pressure (37 percent compared with 27 percent at age 10, and 23 percent at age 8). However, the proportions of children who did experience difficulties in peer relations (with ratings of 1 and 2) remained much the same between ages 10 and 12, indicating a widening range of skills and confidence.

⁹ One item was dropped between age 10 and 12, "Asks teachers for help or information when needs it", since it was seen to have some overlap with the Communication measure.

The lowest correlation ($r=0.19$) was between children's susceptibility to peer pressure and their being left out of groups. The reliability score for these items was 0.77.

In devising the overall measure of Social Skills with Peers in earlier phases, we have given equal weight to each of the 5 items rated by teachers, and to each of the 2 stages of the social problem-solving task given to the children. This is described below. We have followed this process for our analysis of the age-12 phase, to keep consistency. However, the correlation between the teacher ratings and scores on this task have been very low; and when we include the results of this task in the measure, the reliability score dropped to 0.67.

The median score on the Social Skills with Peers at age 12 was 73 percent, slightly higher than at age 10.

Social problem-solving task

At age 12, we used only one task, dropping a task focused on getting a fair share of a scarce and valued resource. The remaining task is related to bullying. The children were asked "*What would you say or do if someone gave you a hard time in the school grounds?*" They were then asked "*What would you say or do if they continued to give you a hard time in the school grounds?*" This is much the same question they were asked at age 10, with some rephrasing to be more appropriate for the age-12 group.¹⁰

The next table shows a drop in the proportion of children who would be assertive in the face of being given a hard time in the school grounds, and double the proportion who would give an aggressive response. Teachers remain key sources of help in this situation, and parents are more likely to be involved if the first response does not deter the person who is giving the child a hard time. There are slightly higher proportions of children who would avoid the situation, did not know what they would do, and increases in the small proportions of children who said they would seek help from other students, or groups of friends. Though a number of the schools attended by children had peer mediators, few students mentioned them as people they would involve in this particular situation.

¹⁰ At age 10, the question was phrased "What would you say or do if you were playing outside at lunchtime and another child picked on you?" Possibly some of the study children gave different responses at age-12 than at age 10 because "someone" could be conceived as an adult rather than another child.

Table 16 Children's strategies when encountering difficulties in the playground age 10 and 12

| Strategy ⁻ | Initial response At age 10 (n=507) % | Second response At age 10 (n=507) % | Initial response At age 12 (n=496) % | Second response At age 12 (n=496) % |
|--------------------------------------|---|--|---|--|
| Assertive response | 46 | 14 | 29 | 12 |
| Ask teacher to help | 21 | 55 | 29 | 48 |
| Go somewhere else/do something else | 21 | 18 | 26 | 16 |
| Aggressive | 5 | 4 | 10 | 9 |
| Passive/do not know | 3 | 3 | 7 | 5 |
| Tell mum/dad/parents | 0 | 2 | 5 | 17 |
| Seek help from another student | 2 | 1 | 3 | 3 |
| Seek help from group of friends/gang | 1 | 2 | 3 | 4 |
| Peer mediators | 0 | 1 | 1 | 1 |

Task-assessed competencies

Mathematics, Literacy, Logical Problem-Solving

These 3 competencies were mostly assessed by tasks carried out by the study children during the research interview, but the writing and PAT Reading Comprehension tests were usually done by teachers within class time. The average age when the research interview took place was 12 years, with a spread of ages from 11 years 10 months (3 percent of the sample) to one child aged 12 years 6 months.

Fifty-two percent of the study children were in Year 8, and 47 percent were in Year 7 classes when we interviewed them. Three children attended Montessori or Steiner schools where they were not grouped by year level.

Mathematics

As at ages 8 and 10, we used a reduced set of 20 items from the standardised PAT (Progressive Achievement Test) for Mathematics.¹¹ The items selected from the whole test for Year 7 and 8 students were those which were around the median in their level of difficulty (the proportion of students who got them right), and in their power to differentiate between students (high scorers overall got the items correct, and low scorers overall did not).

¹¹ Ninety-five percent of the teachers used PATs or multi-choice tests for children aged 12, an increase from 74 percent at age 8, and 88 percent at age 10. Decile 1–2 schools were now just as likely to use them, a contrast to their much lower use in these schools at ages 8 and 10. Decile 3–4 schools were least likely to use them (25 percent).

The mean raw score out of 20 was 10.19 (s.d. 4.77). The mean raw score of the study children who were in Year 7 was 9.82 (s.d. 4.57), and for those in Year 8, 10.57 (s.d. 4.9).

A higher proportion of the study children got 9 of the 20 items correct than did form 2 (Year 8) students in the 1992 standardisation of the PAT Mathematics, the same on 6 of them, and lower for 5 of them. This is a somewhat different picture than at ages 8 and 10, when the Competent Children project sample had a higher proportion of correct items than the standardised sample. Most of the scores ranged around 50 percent, with no clear patterns showing areas of mathematics which were better, or less, understood than others. Three-quarters of the study children got the correct answer for a question seeking application of measurement; only 26 percent got the correct answer for a question seeking understanding of graphs (related to data, statistics, and probability).

Literacy

We used 4 measures of literacy: the Burt Word Reading test, the PAT Reading Comprehension test, teacher's estimate of the child's reading age, and a slightly modified version of the writing task used at ages 8 and 10.

Burt Word Reading test

The Burt Word Reading test is a single test which does not change as children grow older. Children are asked to read a set of increasingly difficult words. Children's marks should increase as their word recognition (vocabulary) skills increase, as they did in this sample, though a plateau is reached. We see the beginnings of this in the much lower increase in scores between ages 10 and 12 than between younger ages, and a much smaller range of scores.

At age 12, the median percentage score on the Burt Word Reading test was 79 percent, up from the medians of 66 percent at age 10, 45 percent at age 8, and 17 percent at age 6. One child got all 110 items correct, and the fourth (top) quartile started at 88 percent compared with 79 percent at age 10, and 59 percent at age 8. The first (lowest) quartile of children was 35 percent at age 8; at age 10, this lowest quartile mark had shifted upwards to 51 percent, and by age 12, it was 69 percent.

The mean raw score was 84.61 out of 110. As in previous phases of the Competent Children project, the study children's mean score was higher than the comparable age group when the Burt test was standardised for New Zealand in 1980. Then the mean raw score was 78.94 for students aged 12 years to 12 years 5 months.¹²

The mean raw score was 86.9 (s.d. 15.2) for Year 8 students in the study, and 82.3 (s.d. 17.2) for Year 7 students.

¹² Gilmore, A., Croft, C., & Reid, N. (1981). *Burt Word Reading Test. NZ Revision. Teachers' Manual*. Wellington: New Zealand Council for Educational Research, p. 2.

PAT Reading Comprehension test

The PAT Reading Comprehension test has different questions for Year 7 and Year 8 students, with an overlap of 31 questions. The median raw score for the Year 7 students (for the Year 7 test) was 57.9 percent, and for the Year 8 students (for the Year 8 test), 56.1 percent. The median score in percentile terms for both year groups – ignoring differences in the tests – was 58.5 percent, up from 51 percent at age 10, and 37 percent at age 8. As at age 10, we devised a score adjusted to take account of the differences in tests for each year level. This was done by looking first at the scores on the 31 questions in common, which showed a median of 53 percent for the Year 7 students, and 61 percent for the Year 8 students. A Student's T-test showed that the probability that both year groups had the same mean was $p = 0.003$, and a 95 percent confidence interval of the true difference between the two groups was between 2 percent and 10.2 percent, with the average difference of 6.1 percent. The Year 7 student scores were therefore adjusted downwards by 6.1 percent.

Year 7 students' mean raw score (using form A of the PAT Reading Comprehension test) was 21.97 (s.d. 9.64), close to the mean raw score of 22.07 (s.d. 8.52) for form 1 (now Year 7) students on form A achieved in the 1990 NZCER review of PAT. The Year 8 mean raw score in this study was 22.37, slightly higher than the form 2 (now Year 8) mean raw score of the 1990 review, which was also 22.07 (s.d. 8.82).

Teachers' estimates of reading age

We have used reading age as a quick way to tap into teachers' professional judgment based on their knowledge of what children are reading and have been reading.

The median on teachers' estimates of children's reading ages was 13–13½ years, compared with 11½–12 years old at age 10, and 9–9½ years at age 8. The upper quartile was age 14–14½ years, and the lower quartile, age 11½–12 years, with 4 students given a reading age of less than 8 years.

The next table shows a gradual increase in the proportion of children thought to be reading below their chronological age, as the children grow older. Sixteen percent of the study children were thought to be reading below their chronological age at age 8, 20 percent at age 10, and 27 percent at age 12.

Table 17 Teacher estimations of children's reading ages at ages 8, 10, and 12

| Reading Age | Age 8 (n=521) % | Age 10 (n=505) % | Age 12 (n=496) % |
|-------------------|-----------------------|------------------------|------------------------|
| Below 8 years | 16 | 3 | 1 |
| 8.0–8.11 months | 22 | 6 | 2 |
| 9.0–9.5 months | 13 | 5 | 2 |
| 9.6–9.11 months | 11 | 6 | 2 |
| 10.0–10.5 months | 8 | 9 | 2 |
| 10.6–10.11 months | 8 | 13 | 4 |
| 11.0–11.5 months | 6 | 8 | 6 |
| 11.6–11.11 months | 4 | 7 | 8 |
| 12.0–12.5 months | 3 | 9 | 11 |
| 12.6–12.11 months | 3 | 9 | 12 |
| 13 years and over | 5 | (25)* | (51)* |
| 13.0–13.5 months | | 6 | 9 |
| 13.6–13.11 months | | 6 | 9 |
| 14.0–14.5 months | | 7 | 10 |
| 14.6–14.11 months | | 3 | 7 |
| 15 years and over | | 3 | 16 |

* Total percentage for 13 years and over.

Writing

The writing task we gave at age 12 extended the ones used at ages 8 and 10. The study children were asked to write 15–20 lines about something interesting that they had seen or done, or about their favourite book or television programme, telling us what happened, and what they liked most about it. A non-fiction topic was chosen to put boys and girls on an equal footing. Forty-five percent chose to write about something they had done, 27 percent about their favourite book, 25 percent about their favourite television programme, and 6 percent, something they had seen.

The median score on our writing test when converted to percentages was 50 percent. There was a somewhat wider range of scores than at age 10. The top quartile was 67 percent, and the bottom quartile, 45 percent: thus half the study children's scores fell within this range. At age 10, around half the children scored between 65 and 79 percent. There was a greater increase in writing scores between the ages of 8 and 10 than between the ages of 10 to 12.

The mean raw score was 29.95 (s.d. 5.99) out of a possible total of 58. The lowest score was 15, and the highest, 52. Mean raw scores were much the same for Years 7 and 8: 29.23 for Year 7 (s.d. 6.15), and 30.69 (s.d. 5.71) for Year 8 students in the study.

Both surface (e.g. spelling) and deep (e.g. clarity of thought) features were marked. Average scores were slightly higher for the surface features than for the deep features. The reliability score for the writing test part-scores was 0.80. The number of lines written, and the argument given, had the lowest correlations with the overall score.

Most of the study children wrote more than 15 lines, and three-quarters produced text that had just a few words misspelt. Around two-thirds were using punctuation that was mostly correct, within a simple

range. Seventy percent were using simple syntax correctly. All but 10 percent had a wider vocabulary than high frequency words, and half were beginning to or did match their choice of vocabulary to their task. Forty percent could vary their sentence structure, and around 30 percent were ordering their ideas logically, and starting to use paragraphs. Sixty-nine percent provided an argument for their point of view which had at least some supporting ideas.

Table 18 Writing task – scores for particular features

| Features | % |
|--|-----|
| Surface features | |
| <i>Length</i> | |
| 1–8 lines | 1 |
| 9–14 lines | 13 |
| 15+ lines | 86 |
| <i>Spelling</i> | |
| More than 20% spelling errors | 1 |
| 10–20% spelling errors | 6 |
| 5–10% spelling errors | 15 |
| 3–5% spelling errors | 28 |
| < 3% spelling errors | 51 |
| <i>Punctuation</i> | |
| Beginning use of full stops and capitals. | 31 |
| Mostly correct use of full stops, capitals, commas for listing, question marks, and beginning use of quotation marks. | 50 |
| Mostly correct use of full stops, capitals, commas for listing, question marks, exclamation marks, and quotation marks. | 17 |
| Accurate use of full stops and capitals, commas, question marks, exclamation marks, speech marks, apostrophes, parentheses, dashes, colons, and semi-colons. | 2 |
| Using conventions of writing [punctuation] accurately and confidently. | 0.4 |
| <i>Grammar and syntax</i> | |
| None — jumble of words | 0 |
| Beginning use of conventional syntax [word order]. | 24 |
| Conventional syntax generally evident. Control of verb forms, i.e. singular/plural agreement, subject/verb agreement and tense. | 70 |
| Wide use of subordinated structures in sentences with variety in length and errors rare. [Complex sentences with subject/object, descriptive passages and use of pronouns, adverbs, and adjectives. Clauses appropriately linked. Tense mostly correct.] | 6 |
| Using conventions of writing [grammar] accurately and confidently. | 0.4 |
| Deep features | |
| <i>Vocabulary choice</i> | |
| High frequency vocabulary predominates. | 10 |
| Vocabulary broadening beyond high frequency. | 36 |
| Beginning to use vocabulary appropriate to task/genre. | 42 |
| Makes language choices appropriate to the audience. Vocabulary generally appropriate to task/genre. | 10 |
| Evidence of vocabulary carefully chosen for task and audience. | 2 |
| <i>Choice of form</i> | |
| Simple sentences only. | 4 |
| Beginning to vary sentence beginnings and structure. Beginning to extend sentences with conjunctions. | 57 |
| Varies sentence beginnings and length. Beginning to use clauses within sentences. | 34 |
| Varies sentence beginnings and sentence length to suit purpose. Range of sentence types showing accurate use of clauses within sentences. | 5 |
| Structures material confidently in appropriate styles. | 0.6 |
| <i>Progression of description</i> | |
| Writes several related sentences on the topic. | 19 |
| Some sequencing is evident. | 51 |
| Sequences ideas logically. Beginning to organise some ideas into paragraphs. | 25 |
| Organises and links ideas logically. Organises ideas into coherent paragraphs. | 4 |
| Links main and supporting ideas. Strong sequential structures evident within and between paragraphs. | 0.6 |
| <i>Quality of argument</i> | |
| No justification for ideas. | 29 |
| Includes several ideas, some with supporting detail – some facts and opinions. | 54 |
| Beginning to support main ideas with some detail – expresses personal viewpoints. | 14 |
| Consistently includes details to support main ideas – expresses and explains a point of view. | 3 |
| Links main and supporting ideas. Justifies point of view persuasively – expresses and argues a point of view. | 0.6 |

Correlations between the literacy measures at age 12

The next table shows the correlations between these 4 assessments of the children's literacy at age 12. The correlations between PAT Reading Comprehension, Burt Word Reading, and the teacher assessment of children's reading age are quite marked. The writing task was slightly more strongly correlated with the reading assessments at age 12 than at earlier ages.

Table 19 **Correlations between the 4 measures of literacy at age 12**

| | Burt Word Reading | Reading age | Writing |
|---------------------------|-------------------|-------------|---------|
| PAT Reading Comprehension | 0.64 | 0.69 | 0.52 |
| Burt Word Reading | | 0.67 | 0.58 |
| Reading Age | | | 0.50 |

Logical problem-solving

The median score achieved here using the Standard Progressive Matrices (SPM) was 72 percent, an increase from the medians of 63 percent at age 10, and 48 percent at age 8, using the same test and scoring at both ages. The upper quartile was 78, and the lower quartile was 63, a slightly smaller range than we found at age 10, when the upper quartile was 72, and the lower quartile was 53.

The highest score out of 60 items was 56, and the lowest, 8. The mean raw score of 42.2 (s.d. 7.2) was the same as the mean raw score of 42.2 (s.d. 7.9) for the 12–12.5-year-old group on which the SPM were normed for New Zealand children in 1984.¹³

Relationships between competency measures at age 12

In this section, we answer the research question:

Is there a set of core competencies at age 12? How do these relate to those identified earlier in the Competent Children project?

In earlier phases of the Competent Children project, we have undertaken multivariate analysis of the relationships between the competency measures. The aim of this analysis has been to see whether there is a set of core competencies (as we measured them), or ones which have stronger relations with all the other measures, than other competencies. In the past we have used principal components analysis and factor analysis, which have given slightly different results, and correlation analysis. At age 6, the principal components analysis gave 3 groupings of the competency measures, by age 8, and by age 10, one large one which grouped together Communication, Perseverance, Individual Responsibility, Mathematics, and the 3 reading measures. The factor analysis at age 8 and 10 gave 2 main groupings, one of the cognitive

¹³ The standard deviation for the study children was similar to the national standardisation, 9.4, compared with 9.1 (NZCER. (1984). *Standard Progressive Matrices—NZ Norms Supplement*. Wellington: author, p. 9).

competencies, and the other of most of the social and attitudinal competencies, with a third small grouping of Communication and Curiosity.

To see if there was a set of core competencies at age 12, we computed the correlations between children's scores on each of the competency measures, and undertook a factor analysis.

As at age 10, Curiosity, Social Skills with Peers, Social Skills with Adults, and Individual Responsibility had the lowest levels of correlation with other competency measures, suggesting a grouping of the cognitive competencies with Communication, Perseverance, and Individual Responsibility. The full set of correlations is given in Appendix 2.

The lower correlations for the social and attitudinal competencies is of note, since by getting the child's teacher to rate the child for all of these, we ran the risk that a general judgment would colour replies on specific aspects, particularly one based on academic performance. This does not seem to have happened: one cannot accurately predict an individual child's score on one social and attitudinal competency from another. While we have found marked associations between teachers' overall judgments of children's academic performance and their competency levels, these exist also for the independent tests of the "cognitive competencies" which the study children undertook, and the associations found are consistent with other research on the kinds of behaviours in class that indicate engagement in learning.

The factor analysis gave another perspective of the relations between the competencies. It yielded 3 factors. The first factor features mathematics and the reading measures, and to a lesser extent writing and logical problem-solving, while the second features the social and attitudinal competencies, with a lower loading for Communication. The third factor groups Curiosity and Communication together. The cumulative variance these 3 factors accounted for is 63.4 percent, comprising 29.4 percent from the first factor, 23.5 percent from the second, and 10.5 percent from the third.

Table 20 Loadings for the 3 factors derived in the factor analysis of age 12 competencies

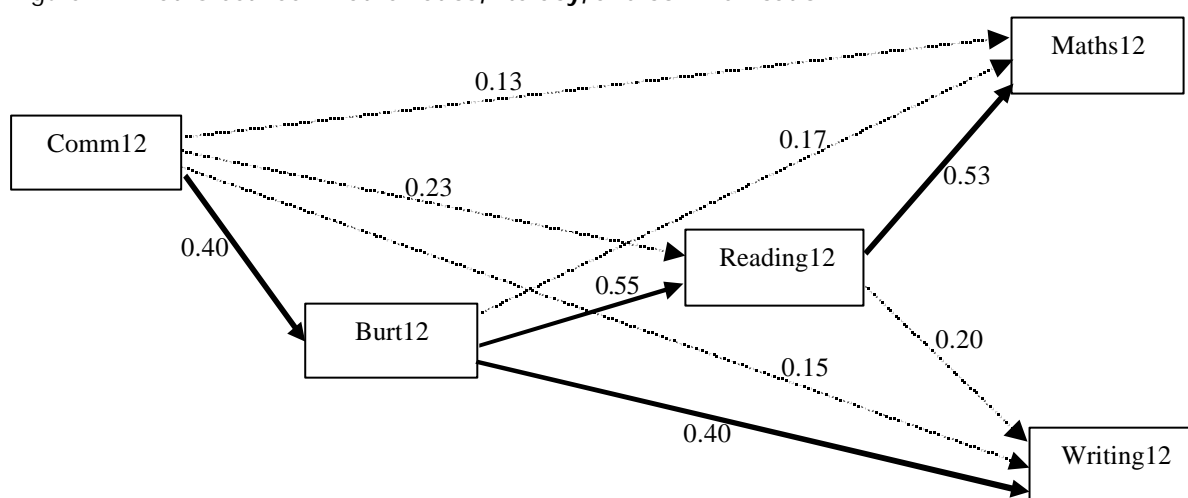
| Competency at age 12 | Factor 1 | Factor 2 | Factor 3 |
|---------------------------|-------------|-------------|-------------|
| Curiosity | 0.31 | 0.31 | 0.62 |
| Perseverance | 0.31 | 0.79 | 0.23 |
| Individual Responsibility | 0.13 | 0.92 | 0.07 |
| Social Skills with Peers | 0.09 | 0.65 | 0.19 |
| Social Skills with Adults | 0.12 | 0.62 | 0.46 |
| Communication | 0.36 | 0.54 | 0.66 |
| Mathematics | 0.75 | 0.13 | 0.13 |
| PAT Reading Comprehension | 0.83 | 0.14 | 0.11 |
| Burt Word Reading | 0.77 | 0.10 | 0.12 |
| Writing | 0.60 | 0.18 | 0.14 |
| Reading Age | 0.75 | 0.22 | 0.22 |
| Logical Problem-Solving | 0.63 | 0.11 | 0.14 |

These factors are very similar to the results of factor analyses carried out for age 8 and 10 (see Appendix 2), suggesting stability in the underlying relations between children's scores on the competency measures between ages 8 to 12. The age 12 factors account for around 6 percent more of the variance in children's scores.

We also explored the inter-relationships between the children's scores on the Communication, mathematics, and the literacy measures using path analysis. Mathematics and writing appear to be "end-result" variables. Reading comprehension scores are related to¹⁴ both mathematics and writing scores (more strongly for mathematics than writing). The vocabulary knowledge tested by the Burt Word Reading test is strongly related to reading comprehension and writing scores, and also to mathematics. Communication skills (receptive and expressive) are strongly related to vocabulary knowledge, and less strongly to reading comprehension, writing, and mathematics.

In the graph below, the strongest paths are shown with continuous black lines, and the weaker, but still significant, paths, with dotted lines.

Figure 1 Paths between mathematics, literacy, and communication



| Significant path coefficients | | | | |
|-------------------------------|---------|-----------|-----------|------------|
| From: | To: | | | |
| | Maths12 | Writing12 | Reading12 | BurtTest12 |
| Reading12 | 0.53 | 0.20 | - | - |
| BurtTest12 | 0.17 | 0.40 | 0.55 | - |
| Communication12 | 0.13 | 0.15 | 0.23 | 0.40 |

| R ² statistics | 0.53 | 0.40 | 0.46 | 0.16 |
|---------------------------|------|------|------|------|
|---------------------------|------|------|------|------|

| Fit statistics | |
|--|--------|
| Pr > Chi-Square | 0.2543 |
| Bentler's Comparative Fit Index | 0.9997 |
| Bentler & Bonett's (1980) Non-normed Index | 0.9997 |
| Bentler & Bonett's (1980) NFI | 0.9987 |

¹⁴ Structural equation modelling relies on correlational data as input, so causality cannot be inferred from the pathways.

Summary

The study children's classroom behaviour was much the same at age 12 as it had been when they were aged 10 and 8. Around two-thirds to three-quarters seemed comfortable in the class in their role as learners, with 15 percent or fewer receiving poor scores for individual items making up the social and attitudinal competencies. The study children had higher scores for listening than speaking. While many enjoyed new experiences, thinking laterally or "outside the square" was common for only around a third. Relations with peers continued to strengthen, but there was no increase in the proportion of children who seemed to their teachers to be subject to peer pressure. However, children's responses to a hypothetical situation, being given a hard time in the school grounds, did show that fewer children would be assertive at age 12 than at age 10, and a doubling of the (small) proportion of children who would respond with aggression. More of the study children would turn to their parents for help if their first response did not work.

The study children were almost evenly divided between Year 7 and Year 8. There was little difference between each year on their scores for the cognitive competency measures. The median raw score on the Burt Word Reading test (vocabulary) was now 79 percent, with some evidence that the study children were beginning to approach the plateau found with this test. Teachers' estimates of the children's reading age continue to show a median which is about a year above the children's chronological age. However, as children grow older, teachers seem more aware of those who are lagging behind. The proportion of children estimated to be reading below their chronological age has grown to 27 percent (from 20 percent at age 10, and 16 percent at age 8).

There was a wider range of writing scores at age 12 than there had been at age 10, with slightly higher average scores for surface features than deep features. Most of the children used correct punctuation and spelling, within a simple range of syntax, and provided an argument for their point of view which had at least some supporting ideas. Under half could vary sentence structure, and order their ideas logically.

The "cognitive" competencies are relatively strongly correlated (they group together as one factor); as are 5 of the 6 social and attitudinal competencies, which form another factor, with Curiosity and Communication forming a third factor which makes a smaller contribution to the variance in children's scores at age 12. These groupings are consistent with those found at ages 8 and 10. A path analysis indicates relationships amongst mathematics, literacy and Communication scores, with Communication — listening and speaking — directly feeding into vocabulary, reading comprehension, writing, and mathematics; vocabulary feeding into reading comprehension and writing; and reading comprehension feeding into mathematics and writing.

Section Three

Changes in the competencies over time

This section explores patterns of children's progress over time, in relation to this research question:

How predictable are children's competency levels at age 12 from their earlier competency levels at ages near-5, 6, 8, and 10? Are there different trends for different population sub-groups and different competencies? To what extent are these results modified by school experiences, home resources and support, and children's activities?

There is a range of ways in which we can analyse children's progress over time to answer this question. We have used 5 different methods: simple correlations between percentile scores, more complex regression analysis, partial correlations, path analysis, and finally, analysis of children's movement across quartile groups, which, unlike the other 4 approaches, does not assume linearity in the measures.

The main reason for using a range of methods here is to ensure that the patterns found are not merely the result of a single method of analysis. Where there are similar results from using different methods, it is more likely that the trends found are real. This is particularly important because our measures of the children's competencies were not identical at every age.

Attitudes, behaviours, social skills

The next table shows the correlations between individual scores on the teacher-rated competencies, Communication, Perseverance, Individual Responsibility, Curiosity, Social Skills with Peers, and Social Skills with Adults, between the ages of 5 to 12. There is an increase in the correlation of individual scores over time for all these measures bar Curiosity between ages 6 and 12, after the first year at school, suggesting growth in children's knowledge and ability to operate in the school environment over time.

These social and attitudinal competencies are weakly or moderately correlated, but all correlations are statistically significant (all p-values were less than or equal to 0.007). Given that different teachers rated the children, the lack of strong correlation over time is likely to reflect different individual responses and interactions between individual children, their teachers, and peers, as well as different settings and expectations in those settings.

Table 21 **Correlations for social and attitudinal competency scores between ages 5 and 12**

| | 5yrs & 12yrs scores (n=268) | 6yrs & 12yrs scores (n=268) | 8yrs & 12yrs scores (n=495) | 10yrs & 12yrs scores (n=495) |
|---------------------------|-----------------------------------|-----------------------------------|-----------------------------------|------------------------------------|
| Curiosity | 0.25 | 0.24 | 0.24 | 0.28 |
| Perseverance | 0.27 | 0.40 | 0.51 | 0.48 |
| Individual Responsibility | 0.23 | 0.34 | 0.49 | 0.48 |
| Social Skills with Peers | 0.17 | 0.33 | 0.37 | 0.43* |
| Social Skills with Adults | 0.18 | 0.17 | 0.27 | 0.33 |
| Communication | 0.24 | 0.32 | 0.40 | 0.48 |

* n=494.

There are some differences in the patterns for different competencies. There is a continuing increase in the correlation or consistency of children's performance between ages 10 and 12 for the social skills and Communication measures, but not for Perseverance and Individual Responsibility, where between ages 8 and 12 the correlations are relatively consistent.

There is least change in the consistency in individual children's scores over time for Curiosity. This suggests that children's performance on the Curiosity measure does not reflect something inherent or unchanging for all children, but something which may be more context and relationship dependent.

The correlations show that earlier scores on these measures do not closely predict children's later scores. A child who scored highly at age 10 is more likely to score highly at age 12, but one could not guarantee that for every individual child. For example, half of the children who scored 75 or more for Perseverance at age 10 scored below this at age 12, though none scored below 25.

What do we see when we analyse the cumulative relationship of earlier scores to age-12 scores? We fitted multiple regression models using all earlier age scores to predict age-12 scores to see which earlier stages might be more closely related to age-12 scores. In all cases, earlier performance levels may be making a contribution of their own to the age-12 scores. Comparing the last column in the table above with the first column in the table below, there is an increase in the proportion of variance accounted for in the age-12 scores by fitting each of the earlier scores, with the age 5 score first, and the age-10 score fitted last.

Table 22 Results of modelling age 12 social and attitudinal competency scores by using scores at each of ages 5, 6, 8, and 10¹⁵

| Competency | Percent variance accounted for by the linear association - ages 12 & (5+6+8+10) (full-model) | Ages for which terms in time order added significantly | Individual age period/s showing largest growth with respect to variance explained | Actual difference in % points variance accounted for by largest growth period |
|---------------------------|--|--|---|---|
| Curiosity | 15.5 | 5, 6, 10 | Age 8–10 | 4.3 |
| Perseverance | 38.5 | 5, 6, 8, 10 | Ages 5–6, 6–8 | 12.7 |
| Individual Responsibility | 35.3 | 5, 6, 8, 10 | Age 6–8 | 15.7 |
| Social Skills with Peers | 23.9 | 5, 6, 8, 10 | Ages 5–6, 6–8 | 9.1 |
| Social Skills with Adults | 12.3 | 5, 8, 10 | Age 6–8, 8–10 | 3.8 |
| Communication | 31.4 | 5, 6, 8, 10 | Age 6–8, 8–10 | 10.1 |

The first 3 years of school appear most important for the development of Perseverance and Social Skills with Peers, and the second to third year for the development of Individual Responsibility, since there is cumulative growth here—each stage building on the previous, and having the highest association with the age-12 scores. However, for Communication and Social Skills with Adults, the similar more critical—or “most-opportunity”—time-period appears to be between ages 6 and 10, and the time-period which has most association with age-12 scores for Curiosity lies between ages 8–10.

Mathematics, literacy, and Logical Problem-Solving

We find higher levels of correlations in children’s performance in mathematics, literacy, and Logical Problem-Solving. All of the correlations between age 5 and age-12 scores are 0.36 or above, compared to the highest correlation of 0.27 for the social and attitudinal competencies; and correlations between age 10 and age-12 scores are at least 0.46, compared to the highest correlation of 0.48 for the social and attitudinal competencies.

Over time, the correlations increase, indicating increasing consistency in performance measures over time, as the next table shows.¹⁶

¹⁵ There were 268 children in each model involving ages 5, 6, 8, and 10. Where only age 8 or age 10 was fitted we had data on 495 children.

¹⁶ There is an oddity in the pattern for the correlations for Writing performance, which is likely to be due to our using the Burt Word Reading test at age 6 to look at correlations over time, since we did not measure Writing performance at age 6.

Table 23 **Correlations for cognitive competency scores comparing ages 5, 6, 8 and 10 with age 12 within each competency**

| | Correlation between 5yrs & 12yrs scores (n=250–267) % | Correlation between 6yrs & 12yrs scores (n=256–268) % | Correlation between 8yrs & 12yrs scores (n=472–496) % | Correlation between 10yrs & 12yrs scores (n=351–496) % |
|--|--|--|--|---|
| Mathematics | 0.57 | 0.52 | 0.67 | 0.73 |
| PAT Reading Comprehension (cf. Early Literacy at age 5, cf. Burt Word Reading test at age 6) | 0.39 | 0.52 | 0.67 | 0.81 |
| Burt Word Reading (cf. Early Literacy at age 5) | 0.36 | 0.63 | 0.77 | 0.87 |
| Writing (cf. Early Literacy at age 5, cf. Burt Word Reading test at age 6) | 0.39 | 0.60 | 0.42 | 0.46 |
| Reading Age (cf. Early Literacy at age 5, cf. Burt Word Reading test at age 6) | 0.37 | 0.50 | 0.57 | 0.65 |
| Logical Problem-Solving | 0.38 | 0.43 | 0.59 | 0.68 |

For these competencies, we also see a much higher proportion of the variance (R^2 , the correlations in the table above squared) in age-12 scores accounted for by age 5 scores, particularly for mathematics. Indeed, age 5 mathematics scores are accounting for slightly more variance in the age-12 scores than the age-6 scores. This may indicate that knowledge and skills practice before starting school are particularly key to mathematics. This is consistent with our findings on the continuing contribution that early childhood education makes to age-12 mathematics performance (in Section Five).

Variance in writing, Reading Age, and Logical Problem-Solving performance at age 12 was most poorly accounted for by the study children's earlier performance levels.

We used multiple regression to analyse the contribution of earlier performance levels to age-12 levels. We find that the most recent earlier performance – at age 10 – is the most successful predictor of age-12 scores, though the performance at each phase is statistically significant in the model. In mathematics, the largest increase in the amount of age-12 scores variance came between the ages of 6 and 8. It would seem that patterns of performance in mathematics are possibly set at an earlier age than for literacy or Logical Problem-Solving.

Table 24 Results of modelling age 12 cognitive competency scores using scores at each of ages 5, 6, 8, and 10¹⁷

| Competency | Percent variance accounted for by the linear association – ages 12& (5+6+8+10) (full-model) | Ages for which terms in order added significantly | Age having largest residual impact | Age having smallest residual impact | Age having largest impact when fitted alone | Var. explained by this one factor | Individual age period showing largest growth with respect to variance explained | Change in variance explained in this time step, relative to variance explained in full model | Actual diff. in points |
|---------------------------|---|---|------------------------------------|-------------------------------------|---|-----------------------------------|---|--|------------------------|
| Mathematics | 59.6 | 5,6,8,10 | 10 | 6 | 10 | 53.6 | age 6–8 | 35.4 to 52.4 | 17.0 |
| PAT Reading Comprehension | 69.2 | 5,6,8,10 | 10 | 6 | 10 | 65.6 | age 8–10 | 48.3 to 69.2 | 20.9 |
| Burt Word Reading | 74.6 | 5,6,8,10 | 10 | 6 | 10 | 75.6 | age 5–6 | 13.1 to 40.4 | 27.2 |
| Writing* | 27.7 | 8,10 | 10 | 8 | 10 | 21.5 | ** | ** | ** |
| Reading Age* | 46.1 | 8,10 | 10 | 8 | 10 | 42.5 | ** | ** | ** |
| Logical Problem-Solving | 53.2 | 5,6,8,10 | 10 | 6 | 10 | 46.9 | age 6–8 | 24.3 to 43.0 | 18.7 |

* Only comparisons with ages 8 and 10 are valid here so full model is 12&(8+10).

** We have information for only one interval so no comparisons can be made.

Contributions of earlier performance levels to age-12 scores – or, is reading like riding a bicycle (once learnt, always retrievable)?

There are 2 further ways in which we have analysed the relationship of earlier performance levels to age-12 scores. The next table gives a set of partial correlations. These show whether performance levels at a particular earlier age continue to have an impact of their own, after accounting for the impact of all the other ages, rather than being subsumed into later (but earlier than age 12) performance. From this we can see that there is some continuing additional contribution from age-5 performance levels for Curiosity, Mathematics, and Logical Problem-Solving. Age 6 Writing scores continue to have an association over and above writing performance at ages 8 and 10 on age-12 Writing scores. Age-8 performance levels have some continuing impact on age-12 scores for Perseverance, Individual Responsibility, Communication, and Social Skills with Peers. The reading measures are least likely to show additional contributions from ages earlier than age 10.

¹⁷ There were 257–262 children in each model involving ages 5, 6, 8, and 10. Where only age 8 or age 10 was fitted we had data on 487–496 children.

Thus there are a number of patterns, indicating different consistency in performance related to different competencies. There are 2 kinds of explanation for this: the nature of the skills, and the nature of the tests. Reading may show more consistency in performance because earlier performance accumulates steadily, or is harder to “lose” or change, compared to all the other competencies, which appear to be more context and event dependent. Even mathematics appears to contain knowledge or skills which can fluctuate over time, perhaps dependent on the intensity or extent of use, as well as relationships with teacher/s and peers.

An alternative explanation for differences in patterns in these competencies is that the same knowledge and skills were not tested in the same way at every stage. For instance, we asked the children oral questions for mathematics at ages 5 and 6, but gave them multiple-choice questions from age 8. However, we did not change the form of questioning for Curiosity and Logical Problem-Solving, which showed similar trends of an additional contribution from age 5 performance to age-12 performance.

Table 25 Partial correlations for selected models for age 12 competencies

| Competency | Partial correlations of each year's results with age-12 results. This may be seen as the extent of any lasting impact. | | | |
|---------------------------|---|--------|-------|-------|
| | 5 | 6 | 8 | 10 |
| Curiosity | 0.156 | 0.119 | 0.100 | 0.219 |
| Perseverance | 0.043 | 0.173 | 0.337 | 0.298 |
| Individual Responsibility | 0.065 | 0.102 | 0.325 | 0.266 |
| Social Skills with Peers | -0.022 | 0.206 | 0.248 | 0.201 |
| Social Skills with Adults | 0.082 | 0.040 | 0.128 | 0.203 |
| Communication | 0.030 | 0.048 | 0.260 | 0.343 |
| Mathematics | 0.213 | -0.046 | 0.291 | 0.387 |
| PAT Reading Comprehension | 0.060 | 0.004 | 0.184 | 0.636 |
| Burt Word Reading | 0.070 | -0.042 | 0.184 | 0.576 |
| Writing | 0.089 | 0.434 | 0.061 | 0.297 |
| Reading Age | 0.080 | 0.146 | 0.128 | 0.355 |
| Logical Problem-Solving | 0.145 | 0.107 | 0.218 | 0.422 |

Correlations less than about 0.12 cannot be considered as different from zero with the sample size we have. Correlations below 0.3 are weak, so although we see some contribution to age-12 scores from earlier performance levels, earlier performance levels alone cannot account for the age-12 scores.

Path analysis

We used path analysis to confirm the picture from the partial correlations analysis that earlier stages were not entirely subsumed into later performance scores, but made their own contribution, and also to see the general relationships over time between the social and attitudinal competencies, and the achievement competencies.

First, we undertook factor analyses for the competency scores at ages 8, 10, and 12, which in each case gave 2 factors, one we have called “achievement” (abbreviated to Achmt in the model below), and the other “social and attitudinal competency” (abbreviated to Compt in the model below).

Changes in the competencies over time

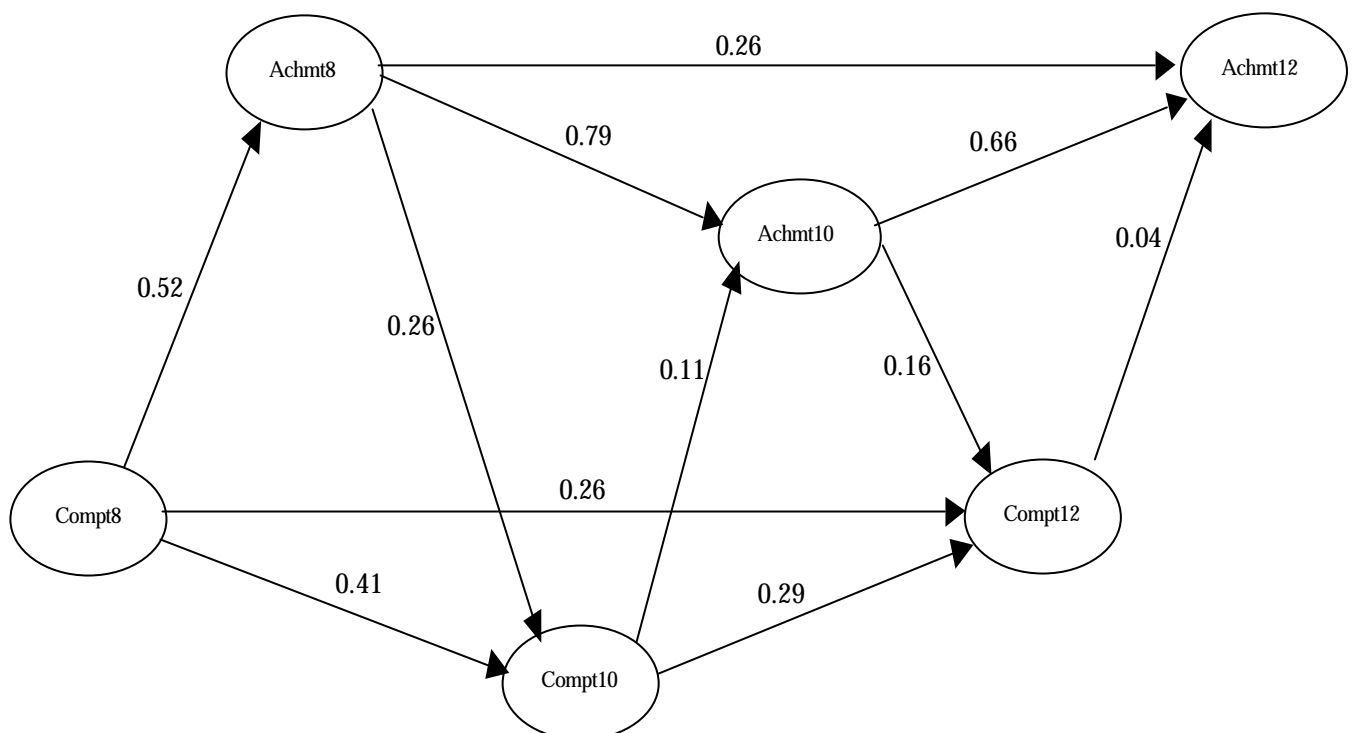
| Factor 1 – Achievement | a (Cronbach's alpha) |
|--------------------------------|-----------------------------|
| Mathematics | 12-year-old $\alpha = 0.89$ |
| Writing | 10-year-old $\alpha = 0.89$ |
| PAT Reading Comprehension test | 8-year-old $\alpha = 0.88$ |
| Burt Word Reading test | |

| Factor 2 – Social & Attitudinal Competency | a |
|--|-----------------------------|
| Perseverance | 12-year-old $\alpha = 0.85$ |
| Responsibility | 10-year-old $\alpha = 0.84$ |
| Social Skills with Peers | 8-year-old $\alpha = 0.85$ |
| Social Skills with Teachers | |
| Communication | |

Using these composite variables, we obtain a much simpler view of the flow of achievement and social and attitudinal competencies over ages 8, 10, and 12. This analysis confirms that earlier performance in the factor formed from most of the cognitive competencies (other than Reading Age and Logical Problem-Solving) makes a separate contribution from age 8 to age 12, as well as feeding into age-10 scores. The same pattern is evident in relation to the social and attitudinal competencies factor.

The model also indicates relationships between the social and attitudinal competencies and the cognitive competencies. The social and attitudinal competencies “feed into” the cognitive competencies at the same age; the cognitive competencies feed into the social and attitudinal competencies of the next stage.

Figure 2 Paths between achievement and social and attitudinal competency ages 8 –12



Changes in the competencies over time

| Path coefficients | | | | | |
|---|-----------------------|-----------------------|----------------------|---|---|
| From: | To: | | | | |
| | Achievement at age 12 | Achievement at age 10 | Achievement at age 8 | Social & Attitudinal Competency at age 12 | Social & Attitudinal Competency at age 10 |
| Achievement at age 10 | 0.66 | - | - | 0.16 | - |
| Achievement at age 8 | 0.26 | 0.79 | - | - | 0.26 |
| Social & Attitudinal Competency at age 12 | 0.04 | - | - | - | - |
| Social & Attitudinal Competency at age 10 | - | 0.11 | - | 0.29 | - |
| Social & Attitudinal Competency at age 8 | - | - | 0.52 | 0.26 | 0.41 |
| R ² statistics | 0.81 | 0.71 | 0.27 | 0.34 | 0.35 |

| Fit statistics | |
|--|--------|
| Pr > Chi-Square | 0.7131 |
| Bentler's Comparative Fit Index | 1.0000 |
| Bentler & Bonett's (1980) Non-normed Index | 1.0035 |
| Bentler & Bonett's (1980) NFI | 0.9990 |

Movement between quartiles

Previous reports from the study have shown that there are different patterns of performance for children who start school with different levels of knowledge and skills. This result is consistent with other studies showing a “Matthew effect”, with children who start at relatively high levels more likely to continue to perform at that level, and those who start at relatively low levels, more likely to continue to perform at a lower level than their peers. There was more volatility among those who start school in the middle 2 quartiles of performance, and it was not until age 10 that we could see age 8 inclusion in the middle 2 quartiles as showing higher retention rates, providing more guidance to subsequent performance.

The next 3 tables show the extent to which children stayed within the quartile group of their performance at age 5, 8, and 10 (their retention), or moved from the top quartile (those scoring at or above the fourth quartile) to the bottom quartile (those scoring at or below the first quartile), and vice versa, in terms of their performance at age 12. The tables are based on an estimate of the proportion of the group which should remain in the quartile if movements over time were based on chance alone, and give the calculation of the difference from this estimate so that patterns for different competencies can be compared. A minus sign indicates that fewer children than the estimate were actually retained or moved.

Continuity of performance age 5–12

We continue to see high retention among children who were in the bottom (#1) or top (#4) quartile groups at age 5, for the cognitive competencies. The retention for mathematics is particularly marked. It was more unlikely for the top quartile group children at age 5 to reverse their performance and find themselves in the bottom quartile group at age 12, than vice versa. Children who had been in the top quartile group for 3 of the 6 social and attitudinal competencies were also less likely to have reversed their behaviour and be in the bottom quartile group at age 12; this trend was also present at age 10, but for all the social and attitudinal competencies bar Curiosity. There is no continuity in performance levels for the children who were in the two middle quartile groups at age 5.

In the table below, the “departures from the estimate” refer to the proportion of children who stayed in a given quartile group between ages 5 and 12 relative to the proportion (“the estimate”) who were likely to stay in that quartile group if chance was the only factor involved. So, looking at the first column, we see that 31.4 percent more of the children who were in quartile 1 group for mathematics at age 5 remained in quartile 1 group at age 12 than would have been likely if chance was the only factor involved.

Table 26 Retention and changes between ages 5 and 12 – departures from estimate

| Retention and changes from age 5 to age 12 [®] | Stays quartile 1 Departure from estimate | Stays quartile 2 Departure from estimate | Stays quartile 3 Departure from estimate | Stays quartile 4 Departure from estimate | Upward progress, quartile 1 [®] 4 Departure from estimate | Declining progress, quartile 4 [®] 1 Departure from estimate |
|---|---|---|---|---|---|--|
| Competency⁻ | | | | | | |
| Curiosity | 5.6 | 1.2 | 0.2 | 10.6 | -10.6 | -14.2 |
| Perseverance | 11.2 | 5.5 | 2.1 | 2.5 | -6.1 | -17.6 |
| Individual Responsibility | 10.2 | -2.2 | -4.7 | 7.1 | -4.2 | -12.3 |
| Social Skills with Peers | 7.9 | 0.1 | 2.4 | 5.6 | -5.9 | -9.0 |
| Social Skills with Adults | 5.7 | -0.1 | 1.6 | 6.7 | -9.2 | -3.8 |
| Communication | 7.0 | 6.9 | 4.4 | 9.3 | -5.3 | -2.3 |
| Mathematics | 31.4 | 3.1 | 3.9 | 28.9 | -21.1 | -19.2 |
| PAT Reading Comprehension ¹⁸ | 24.2 | 7.2 | -1.1 | 14.7 | -14.0 | -20.9 |
| Burt Word Reading | 17.0 | 0.7 | 9.3 | 17.9 | -12.5 | -13.9 |
| Writing Score | 19.5 | -2.2 | 1.3 | 13.9 | -9.1 | -12.7 |
| Reading Age | 21.4 | 3.4 | 2.4 | 11.5 | -12.5 | -18.2 |
| Logical Problem-Solving | 18.6 | 13.1 | 9.3 | 14.6 | -13.6 | -15.6 |

Bold shows significant departures from the estimate.

Continuity in performance between ages 8 and 12

When we compare age-8 and age-12 performance, we see more continuity: for the first time within the second and third quartile groups, for the cognitive competencies; and spreading to the social and

¹⁸ The PAT Reading Comprehension test, Burt Word Reading test, and Reading Age were compared with age 5 early literacy scores; the writing score was compared with the writing component only of the age 5 early literacy score.

Changes in the competencies over time

attitudinal competencies for those who had been in the bottom and top quartile groups at age 8. The size of the retention for these 2 ends of the performance spectrum has also increased, with the highest rates of increase in the Burt Word Reading test and Logical Problem-Solving.

Table 27 Retention and changes between ages 8 and 12 – departures from estimate

| Retention and changes age 8 to age 12 [®] | Stays quartile 1 Departure from estimate | Stays quartile 2 Departure from estimate | Stays quartile 3 Departure from estimate | Stays quartile 4 Departure from estimate | Upward progress, quartile 1 [®] 4 Departure from estimate | Declining progress, quartile 4 [®] 1 Departure from estimate |
|--|--|--|--|--|--|---|
| Competency ^ˆ | | | | | | |
| Curiosity | 9.2 | -5.4 | -1.5 | 8.8 | -5.6 | -15.8 |
| Perseverance | 26.4 | 2.1 | 5.1 | 19.3 | -13.7 | -22.0 |
| Individual Responsibility | 24.3 | 5.3 | 3.5 | 13.4 | -14.4 | -18.1 |
| Social Skills with Peers | 17.5 | 7.7 | 4.5 | 14.1 | -9.7 | -16.3 |
| Social Skills with Adults | 12.8 | 4.4 | 1.3 | 2.8 | -5.6 | -21.1 |
| Communication | 19.0 | -1.2 | 7.7 | 19.0 | -12.7 | -15.9 |
| Mathematics | 40.2 | 16.8 | 17.3 | 40.9 | -22.9 | -23.1 |
| PAT Reading Comprehension | 36.4 | 11.0 | 17.6 | 39.8 | -19.9 | -23.2 |
| Burt Word Reading | 43.2 | 17.0 | 18.3 | 40.0 | -23.3 | -25.5 |
| Writing Score | 27.7 | 9.2 | 1.6 | 16.3 | -15.3 | -22.0 |
| Reading Age | 30.5 | 3.3 | 7.5 | 31.2 | -20.9 | -18.6 |
| Logical Problem-Solving | 35.5 | 17.7 | 9.8 | 32.2 | -21.2 | -25.1 |

Continuity in performance between ages 10 and 12

However, the comparison of age-10 quartile retention and movement is much the same as at age 8—there does not seem to have been any further “hardening” of comparative performance within the sample.

Changes in the competencies over time

Table 28 Retention and changes between ages 10 and 12 – departures from estimate

| Retention and changes from age 10 to age 12 [®] | Stays quartile 1 Departure from estimate | Stays quartile 2 Departure from estimate | Stays quartile 3 Departure from estimate | Stays quartile 4 Departure from estimate | Upward progress, quartile 1 ^{® 4} Departure from estimate | Declining progress, quartile 4 ^{® 1} Departure from estimate |
|--|---|---|---|---|---|--|
| Competency [™] | | | | | | |
| Curiosity | 14.1 | 3.4 | 2.6 | 8.4 | -7.2 | -11.8 |
| Perseverance | 25.4 | 3.2 | 1.8 | 23.2 | -13.9 | -22.3 |
| Individual Responsibility | 26.0 | -2.4 | 4.6 | 18.9 | -15.1 | -23.0 |
| Social Skills with Peers | 17.2 | 3.1 | -0.4 | 14.0 | -8.6 | -13.5 |
| Social Skills with Adults | 18.5 | -1.6 | 4.3 | 9.6 | -9.5 | -19.4 |
| Communication | 23.1 | 0.1 | 5.8 | 26.9 | -16.2 | -16.3 |
| Mathematics | 42.6 | 18.5 | 15.2 | 37.4 | -23.7 | -25.0 |
| PAT Reading Comprehension | 41.1 | 21.0 | 22.7 | 46.9 | -21.7 | -25.5 |
| Burt Word Reading | 54.6 | 29.0 | 23.9 | 46.4 | -23.3 | -25.5 |
| Writing Score | 26.9 | 7.0 | 0.2 | 9.9 | -12.1 | -17.2 |
| Reading Age | 31.4 | 8.4 | 5.8 | 27.3 | -22.5 | -21.4 |
| Logical Problem-Solving | 37.0 | 13.7 | 10.4 | 37.2 | -18.8 | -24.7 |

Patterns of improvement for initially low performing children

Another way to look at the consistency of children's performance over the 7 years between age 5 and age 12 is to look at movement across the median line. This indicates a performance which improves from below average to above average, or declines from above average to below average. The table below contrasts patterns for children in the bottom (1) and top (4) quartiles at ages 5 and 10 with their performance at age 12.

If we look at the trends in top quartile performance, we see that half or more of the children who at age 5 performed in the top quartile for the children in this study performed above the median at age 12, for all the competencies. Two-thirds or more of the top quartile children at age 5 were scoring above the median at age 12 for the cognitive competencies, and Curiosity. Performance in Curiosity is relatively stable over time: there is not much difference between the proportions in the top quartiles at ages 5, 8, and 10 who were performing above the median at age 12. The other competencies show either a steady increase in consistency of individual scores over time, or an increase between the ages of 5 and 8, and then similar scores (a possible plateau) between ages 8 and 10. At least two-thirds of those in the top quartile at age 8 were performing above the median at age 12, with even higher proportions for the cognitive competencies.

Turning to the trends in bottom quartile performance, we see mirror images of these trends, in reverse, for most, but not all, of the competencies. Other than for mathematics, between a fifth and two-fifths of the children whose scores were in the lowest quartile at age 5 would have improved their performance by age 12, to score above the median. The picture is less optimistic by ages 8 and 10 particularly for the reading measures, Logical Problem-Solving, and Perseverance. Mathematics scores and Social Skills with Adults follow a different pattern, with a higher rate of improvement in performance from those in the lowest

quartile at age 8, than those in the lowest quartile at age 10. Why this should be so is not clear. When we did the same analysis when the study children were aged 10, we found much lower proportions of children moving from the bottom quartile above the median between ages 8 and 10 for mathematics and Social Skills with Adults, and to a lesser extent, PAT Reading Comprehension and Reading Age scores. Thus more of the children who were in the bottom quartile at age 8 have made progress in the last 2 years than seemed likely. This underlines the fact that although the windows of opportunity to improve performance do seem to narrow over time, particularly by the end of the first 3 years of school, they are not locked. The opportunities – experiences and relationships – available to children can make a marked difference.

Table 29 **Retention and movement of children in quartiles 1 and 4 at age 5 and 8, in relation to the median at age 12**

| Retention and movement ® | % of quartile 1 at age 5 above median at age 12 | % of quartile 1 at age 8 above the median at age 12 | % of quartile 1 at age 10 above the median at age 12 | % of quartile 4 at age 5 above the median at age 12 | % of quartile 4 at age 8 above the median at age 12 | % of quartile 4 at age 10 above the median at age 12 |
|---------------------------|--|--|---|--|--|---|
| Curiosity | 37 | 31 | 36 | 66 | 65 | 57 |
| Perseverance | 21 | 13 | 11 | 49 | 62 | 69 |
| Individual Responsibility | 33 | 19 | 18 | 60 | 66 | 67 |
| Social Skills with Peers | 39 | 30 | 31 | 60 | 67 | 69 |
| Social Skills with Adults | 20 | 39 | 29 | 49 | 69 | 71 |
| Communication | 38 | 29 | 20 | 59 | 72 | 80 |
| Mathematics | 13 | 21 | 4 | 77 | 87 | 89 |
| PAT Reading Comprehension | 27 | 12 | 9 | 72 | 88 | 97 |
| Burt Word Reading | 27 | 6 | 2 | 64 | 86 | 97 |
| Writing | 21 | 26 | 25 | 65 | 73 | 72 |
| Reading Age | 31 | 15 | 11 | 60 | 78 | 78 |
| Logical Problem-Solving | 30 | 14 | 19 | 66 | 86 | 87 |

Differences in population sub-groups

Next we compare the movements of the lowest and highest quartiles of children at ages 5 and 8, in relation to their performance at age 12 in terms of 4 characteristics: gender, ethnicity, family income, and maternal qualification. Section Six provides more information about the distribution of these characteristics among the study children and their families at age 12, and associations with their competency levels at age 12. There are some trends evident in the material, though differences for individual competencies cannot be regarded as statistically significant because of the small numbers involved in some of the sub-groups.

Gender

Boys make up around two-thirds of the bottom quartile at both ages 5 and 8 for most of the competencies. There are some differences in the patterns of progress of girls and boys from the lowest quartiles. Girls who scored in the lowest quartile at ages 5 and 8 were more likely than their male counterparts to have

Changes in the competencies over time

moved above the median by age 12 for the social and attitudinal competencies, other than Curiosity. The patterns are much the same for both ages 5 and 8. There is a different pattern for the cognitive competencies: boys who scored in the bottom quartile at age 5 were more likely than the girls in this quartile to have moved above the median by age 12 for mathematics, and the reading measures (other than in relation to PAT Reading Comprehension test scores, where both were equally likely to move above the median). The age-5 and age-8 patterns are also similar, though not in relation to Reading Age and Logical Problem-Solving.

Table 30 **Gender and movement from lowest quartile groups at ages 5 and 8 to above the median at age 12**

| Competency | % of quartile 1 at age 5 moved above the median by age 12 | | | | | | % of quartile 1 at age 8 moved above the median by age 12 | | | | | |
|---------------------------|---|-----------|----|------|----------|----|---|-----------|----|------|----------|----|
| | n | | % | n | | % | n | | % | n | | % |
| | girls | tot girls | | boys | tot boys | | girls | tot girls | | boys | tot boys | |
| Curiosity | 13 | 45 | 29 | 14 | 29 | 48 | 21 | 68 | 31 | 19 | 63 | 30 |
| Perseverance | 15 | 28 | 54 | 11 | 56 | 20 | 8 | 38 | 21 | 9 | 93 | 10 |
| Individual Responsibility | 21 | 34 | 62 | 6 | 49 | 12 | 14 | 37 | 38 | 15 | 121 | 12 |
| Social Skills with Peers | 13 | 26 | 50 | 14 | 44 | 32 | 18 | 46 | 39 | 31 | 113 | 27 |
| Social Skills with Adults | 13 | 44 | 30 | 7 | 57 | 12 | 26 | 48 | 54 | 28 | 92 | 30 |
| Communication | 22 | 35 | 63 | 5 | 36 | 14 | 19 | 45 | 42 | 21 | 93 | 23 |
| Mathematics | 1 | 22 | 5 | 8 | 45 | 18 | 2 | 52 | 4 | 6 | 75 | 8 |
| PAT Reading Comprehension | 5 | 21 | 24 | 13 | 45 | 29 | 5 | 42 | 12 | 10 | 83 | 12 |
| Burt Word Reading | 4 | 21 | 19 | 14 | 46 | 30 | 1 | 42 | 2 | 7 | 83 | 8 |
| Writing | 5 | 16 | 31 | 9 | 52 | 17 | 20 | 45 | 44 | 12 | 79 | 15 |
| Reading Age | 4 | 21 | 19 | 14 | 46 | 30 | 6 | 48 | 12 | 9 | 82 | 11 |
| Logical Problem-Solving | 17 | 40 | 42 | 9 | 49 | 18 | 8 | 57 | 14 | 9 | 67 | 13 |

When we look at the proportions of girls and boys who had been in the top quartiles at age 5 or 8, we see much higher proportions than their lowest quartile peers scoring above the median at age 12 – though similar proportions of girls in both quartiles in terms of their age 5 Perseverance scores. There is a similar pattern of girls in the highest quartile at age 5 being more likely than their male counterparts to score above the median at age 12 for the social and attitudinal competencies, other than Perseverance, but here including Curiosity. The differences favouring girls from age 8 to 12 are not so marked. Girls were more likely than boys to score above the median for writing.

But the progression patterns for top quartile boys and girls are much more similar than they were for lowest quartile boys and girls, supporting those who have concluded that the issues with boys' learning are not across the board, but that efforts to improve boys' performance should focus on the low achievers.

The gender gap favouring lowest quartile boys in relation to mathematics is not at all evident for highest quartile movement. This is consistent with the other findings in relation to progress on mathematics: that it is more dependent than literacy on the basis that exists when children start school. Thus it is harder to erode that basis, if it is well founded; but also harder to develop it without the earlier underpinning. However, we are still left with the question of why boys from the lowest quartile appear to make more progress in mathematics over time than the girls. Is it because boys are now seen as being more at-risk,

and more attention paid to them for reading, so that there is little gender difference there, but by contrast, that gender stereotypes still operate in relation to mathematics?

Table 31 **Gender and retention of highest quartile groups ages 5 and 8 above the median at age 12**

| Competency | % of quartile 4 at age 5 retained above the median by age 12 | | | | | | % of quartile 4 at age 8 retained above the median by age 12 | | | | | |
|---------------------------|--|-------|-------|------|------|------|--|-------|-------|------|------|------|
| | n | tot | % | n | tot | % | n | tot | % | n | tot | % |
| | girls | girls | girls | boys | boys | boys | girls | girls | girls | boys | boys | boys |
| Curiosity | 13 | 18 | 72 | 20 | 32 | 62 | 26 | 42 | 62 | 39 | 58 | 67 |
| Perseverance | 13 | 27 | 48 | 6 | 12 | 50 | 49 | 72 | 68 | 27 | 50 | 54 |
| Individual Responsibility | 25 | 34 | 74 | 12 | 28 | 43 | 45 | 63 | 71 | 10 | 21 | 48 |
| Social Skills with Peers | 28 | 40 | 70 | 13 | 27 | 48 | 47 | 66 | 71 | 17 | 30 | 57 |
| Social Skills with Adults | 13 | 22 | 59 | 5 | 14 | 36 | 35 | 52 | 67 | 20 | 27 | 74 |
| Communication | 22 | 30 | 73 | 11 | 25 | 44 | 45 | 59 | 76 | 21 | 33 | 64 |
| Mathematics | 24 | 32 | 75 | 27 | 35 | 77 | 40 | 45 | 89 | 56 | 65 | 86 |
| PAT Reading Comprehension | 21 | 32 | 66 | 23 | 29 | 79 | 57 | 66 | 86 | 42 | 47 | 89 |
| Burt Word Reading | 19 | 32 | 59 | 21 | 30 | 70 | 62 | 64 | 97 | 51 | 54 | 94 |
| Writing | 9 | 12 | 75 | 4 | 8 | 50 | 56 | 68 | 82 | 27 | 45 | 60 |
| Reading Age | 21 | 32 | 66 | 18 | 30 | 60 | 43 | 52 | 83 | 33 | 50 | 66 |
| Logical Problem-Solving | 14 | 23 | 61 | 25 | 36 | 69 | 54 | 61 | 89 | 52 | 62 | 84 |

Ethnicity

Here we compare the progression patterns of Māori and Pākehā/European children in the study. This is a comparison of progress within English-medium education, since there were only a few Māori children in the sample who had ever attended kōhanga reo. We give numbers as well as percentages, since the number of Māori children is low, and we have not tried to interpret any data where there are fewer than 3 Māori in any category. This means we have not made any comparisons for movement from age-5 highest quartile to above the median at age 12.

Māori children who were in the lowest quartile at age 5 were more likely than their Pākehā/European counterparts to have progressed above the median at age 12 for writing and the most of the social and attitudinal competencies, and as likely to have done so for the cognitive competencies other than Reading Age and mathematics. The picture is similar for progression from the lowest quartile at age 8 for the social and attitudinal competencies – but not for the cognitive competencies other than Logical Problem-Solving and the Burt Word Reading test. It would appear that it is particularly important to provide more pedagogical support for low-achieving Māori students in their first 3 years of school for mathematics and reading comprehension.

Changes in the competencies over time

Table 32 Ethnicity and movement from lowest quartile group at 5 or 8 to above the median at age 12

| Competency | % of quartile 1 at age 5 moved above the median by age 12 | | | | | | % of quartile 1 at age 8 moved above the median by age 12 | | | | | |
|---------------------------|---|-----|----|----|-----|----|---|-----|----|----|-----|----|
| | M=Māori, P=Pākehā/European | | | | | | M=Māori, P=Pākehā/European | | | | | |
| | n | tot | % | n | tot | % | n | tot | % | n | tot | % |
| | M | M | M | P | P | P | M | M | M | P | P | P |
| Curiosity | 6 | 10 | 60 | 16 | 53 | 30 | 6 | 17 | 35 | 29 | 101 | 29 |
| Perseverance | 4 | 9 | 44 | 21 | 65 | 32 | 5 | 21 | 24 | 11 | 90 | 12 |
| Individual Responsibility | 5 | 12 | 42 | 16 | 59 | 27 | 5 | 19 | 26 | 20 | 118 | 17 |
| Social Skills with Peers | 4 | 9 | 44 | 17 | 49 | 35 | 9 | 20 | 45 | 35 | 122 | 29 |
| Social Skills with Adults | 2 | 15 | 13 | 17 | 70 | 24 | 14 | 24 | 58 | 34 | 98 | 35 |
| Communication | 4 | 10 | 40 | 21 | 49 | 43 | 6 | 18 | 33 | 33 | 103 | 32 |
| Mathematics | 0 | 12 | 0 | 8 | 47 | 17 | 0 | 25 | 0 | 8 | 85 | 9 |
| PAT Reading Comprehension | 3 | 11 | 27 | 13 | 44 | 30 | 1 | 20 | 5 | 13 | 86 | 15 |
| Burt Word Reading | 3 | 12 | 25 | 12 | 44 | 27 | 1 | 20 | 5 | 5 | 93 | 5 |
| Writing | 2 | 5 | 40 | 11 | 54 | 20 | 3 | 21 | 14 | 26 | 88 | 30 |
| Reading Age | 2 | 12 | 17 | 13 | 44 | 30 | 1 | 22 | 5 | 14 | 93 | 15 |
| Logical Problem- Solving | 4 | 12 | 33 | 22 | 70 | 31 | 4 | 22 | 18 | 13 | 104 | 12 |

There are no statistically significant ethnic differences in terms of retention of the top quartile students at age 8 above the median at age 12. This is consistent with the overall lack of differences within top quartile movement related to gender: that once a certain level of performance has been reached after the first 3 years or so of schooling, it is likely to be maintained, certainly until age 12.

Table 33 Ethnicity and retention in highest quartile group at 5 or 8 above the median at age 12

| Competency | % of quartile 4 at age 5 retained above the median by age 12 | | | | | | % of quartile 4 at age 8 retained above the median by age 12 | | | | | |
|---------------------------|--|-----|-----|----|-----|----|--|-----|-----|----|-----|----|
| | M=Māori, P=Pākehā/European | | | | | | M=Māori, P=Pākehā/European | | | | | |
| | n | tot | % | n | tot | % | n | tot | % | n | Tot | % |
| | M | M | M | P | P | P | M | M | M | P | P | P |
| Curiosity | 2 | 3 | 67 | 28 | 41 | 68 | 2 | 7 | 29 | 55 | 80 | 69 |
| Perseverance | 1 | 3 | 33 | 16 | 31 | 52 | 7 | 11 | 64 | 62 | 97 | 64 |
| Individual Responsibility | 0 | 1 | 0 | 36 | 58 | 62 | 5 | 5 | 100 | 43 | 68 | 63 |
| Social Skills with Peers | 3 | 4 | 75 | 32 | 53 | 60 | 4 | 6 | 67 | 54 | 80 | 68 |
| Social Skills with Adults | 1 | 1 | 100 | 17 | 32 | 53 | 3 | 5 | 60 | 46 | 66 | 70 |
| Communication | 3 | 3 | 100 | 29 | 48 | 60 | 3 | 6 | 50 | 58 | 76 | 76 |
| Mathematics | 2 | 2 | 100 | 43 | 56 | 77 | 3 | 4 | 75 | 85 | 97 | 88 |
| PAT Reading Comprehension | 3 | 3 | 100 | 38 | 53 | 72 | 4 | 5 | 80 | 86 | 99 | 87 |
| Burt Word Reading | 3 | 3 | 100 | 34 | 54 | 63 | 10 | 10 | 100 | 90 | 94 | 96 |
| Writing | 1 | 1 | 100 | 12 | 16 | 75 | 3 | 5 | 60 | 72 | 97 | 74 |
| Reading Age | 3 | 3 | 100 | 32 | 54 | 59 | 1 | 1 | 100 | 66 | 87 | 76 |
| Logical Problem-Solving | 2 | 4 | 50 | 32 | 47 | 68 | 6 | 8 | 75 | 89 | 102 | 87 |

Maternal qualification

The level of maternal qualification does not appear to influence children's progress from the lowest quartile at age 5 to the median or above at age 12 in terms of the social and attitudinal competencies, or the Burt Word Reading test (vocabulary). However, it does have a notable effect on children's ability to improve their performance to score at the median or above at age 12 for the other cognitive competencies. There are consistent trends evident in the table below; children of mothers with a university qualification were most likely to move from the lowest quartile, particularly for mathematics, Logical Problem-Solving, and Reading Age. Those whose mothers had no qualification or a school qualification were less likely to improve their performance.

Table 34 **Maternal qualification and movement from lowest quartile group at age 5 to above the median at age 12**

| Competency | % of Quartile 1 at age 5 moved above the median by age 12 | | | | | | | | | | | |
|---------------------------|---|--------|--------|--------|--------|--------|----------|---------|---------|--------|--------|--------|
| | N | tot | % | n | tot | % | n | tot | % | n | Tot | % |
| | M.Qual | M.Qual | M.Qual | M.Qual | M.Qual | M.Qual | M.Qual | M.Qual | M.Qual | M.Qual | M.Qual | M.Qual |
| | none | none | none | sch | sch | sch | tr/tert* | tr/tert | tr/tert | univ | univ | univ |
| Curiosity | 2 | 12 | 17 | 10 | 25 | 40 | 13 | 27 | 48 | 2 | 8 | 25 |
| Perseverance | 2 | 11 | 18 | 8 | 26 | 31 | 10 | 34 | 29 | 6 | 11 | 55 |
| Individual Responsibility | 5 | 15 | 33 | 10 | 26 | 38 | 9 | 31 | 29 | 3 | 8 | 38 |
| Social Skills with Peers | 3 | 12 | 25 | 10 | 30 | 33 | 11 | 21 | 52 | 2 | 4 | 50 |
| Social Skills with Adults | 3 | 16 | 19 | 7 | 34 | 21 | 8 | 38 | 21 | 2 | 10 | 20 |
| Communication | 5 | 14 | 36 | 12 | 24 | 50 | 8 | 27 | 30 | 2 | 4 | 50 |
| Mathematics | 1 | 13 | 8 | 1 | 25 | 4 | 3 | 23 | 13 | 4 | 5 | 80 |
| PAT Reading omprehension | 1 | 13 | 8 | 6 | 23 | 26 | 6 | 22 | 27 | 3 | 8 | 38 |
| Burt Word Reading | 5 | 13 | 38 | 4 | 23 | 17 | 6 | 21 | 29 | 3 | 8 | 38 |
| Writing | 0 | 18 | 0 | 11 | 41 | 27 | 17 | 41 | 41 | 9 | 19 | 47 |
| Reading Age | 1 | 13 | 8 | 3 | 23 | 13 | 8 | 21 | 38 | 5 | 8 | 62 |
| Logical Problem-Solving | 0 | 12 | 0 | 4 | 28 | 14 | 12 | 34 | 35 | 10 | 13 | 77 |

* tr/tert = trades/tertiary.

Looking at movement from the lowest quartile to above the median between ages 8 and 12, we see a trend for children whose mothers had a university qualification to make more progress over this time than others in the social and attitudinal competencies, as well as the cognitive competencies, other than the Burt Word Reading test and Reading Age. It was this group which had a different pattern, without the trend more evident in looking at progress from ages 5 to 12.

Changes in the competencies over time

Table 35 **Maternal qualification and movement from lowest quartile group at age 8 to above the median at age 12**

| Competency | % of quartile 1 at age 8 moved above the median by age 12 | | | | | | | | | | | |
|---------------------------|---|----------------|----------------|---------------|---------------|---------------|--------------------|-------------------|-------------------|----------------|----------------|----------------|
| | n | tot | % | n | tot | % | n | tot | % | n | tot | % |
| | M.Qual none | M.Qual none | M.Qual none | M.Qual sch | M.Qual sch | M.Qual sch | M.Qual tr/tert* | M.Qual tr/tert | M.Qual tr/tert | M.Qual univ | M.Qual univ | M.Qual univ |
| Curiosity | 2 | 21 | 10 | 14 | 41 | 34 | 11 | 38 | 29 | 13 | 28 | 46 |
| Perseverance | 2 | 21 | 10 | 9 | 53 | 17 | 3 | 38 | 8 | 3 | 14 | 21 |
| Individual Responsibility | 3 | 27 | 11 | 11 | 58 | 19 | 4 | 46 | 9 | 11 | 22 | 50 |
| Social Skills with Peers | 5 | 25 | 20 | 18 | 59 | 31 | 15 | 51 | 29 | 9 | 20 | 45 |
| Social Skills with Adults | 10 | 28 | 36 | 16 | 44 | 36 | 12 | 39 | 31 | 15 | 25 | 60 |
| Communication | 5 | 25 | 20 | 16 | 46 | 35 | 9 | 44 | 20 | 10 | 18 | 56 |
| Mathematics | 0 | 31 | 0 | 5 | 60 | 8 | 3 | 46 | 7 | 3 | 6 | 50 |
| PAT Reading Comprehension | 6 | 36 | 17 | 6 | 50 | 12 | 4 | 45 | 9 | 2 | 8 | 25 |
| Burt Word Reading | 0 | 27 | 0 | 4 | 43 | 9 | 2 | 46 | 4 | 1 | 11 | 9 |
| Writing | 3 | 29 | 10 | 12 | 46 | 26 | 21 | 52 | 40 | 6 | 13 | 46 |
| Reading Age | 3 | 22 | 14 | 3 | 46 | 7 | 6 | 44 | 14 | 2 | 14 | 14 |
| Logical Problem-Solving | 3 | 29 | 10 | 5 | 49 | 10 | 9 | 52 | 17 | 4 | 12 | 33 |

* tr/tert = trades/tertiary.

Highest quartile retention above the median between ages 5 to 12 shows much the same pattern as we saw in relation to gender and ethnicity: children's characteristics appear to make little difference. There are some apparent exceptions which could be interpreted more clearly with a larger sample: children whose mothers had no qualification appeared less likely to stay above the median for mathematics, writing, Individual Responsibility, Perseverance, and Curiosity.

Table 36 **Maternal qualification and retention of highest quartile group at age 5 above the median at age 12**

| Competency | % of quartile 4 at age 5 retained above the median by age 12 | | | | | | | | | | | |
|---------------------------|--|----------------|----------------|---------------|---------------|---------------|--------------------|-------------------|-------------------|----------------|----------------|----------------|
| | n | tot | % | n | tot | % | n | tot | % | n | tot | % |
| | M.Qual none | M.Qual none | M.Qual none | M.Qual sch | M.Qual sch | M.Qual sch | M.Qual tr/tert* | M.Qual tr/tert | M.Qual tr/tert | M.Qual univ | M.Qual univ | M.Qual univ |
| Curiosity | 1 | 4 | 25 | 14 | 19 | 74 | 11 | 17 | 65 | 7 | 10 | 70 |
| Perseverance | 1 | 4 | 25 | 6 | 13 | 46 | 6 | 14 | 43 | 6 | 8 | 75 |
| Individual Responsibility | 0 | 2 | 0 | 11 | 17 | 65 | 14 | 26 | 54 | 12 | 17 | 71 |
| Social Skills with Peers | 4 | 6 | 67 | 9 | 19 | 47 | 17 | 26 | 65 | 8 | 12 | 67 |
| Social Skills with Adults | 2 | 4 | 50 | 7 | 12 | 58 | 7 | 15 | 47 | 2 | 5 | 40 |
| Communication | 3 | 4 | 75 | 9 | 17 | 53 | 18 | 27 | 67 | 3 | 7 | 43 |
| Mathematics | 0 | 4 | 0 | 12 | 20 | 60 | 23 | 26 | 88 | 16 | 16 | 100 |
| PAT Reading Comprehension | 1 | 1 | 100 | 12 | 18 | 67 | 19 | 27 | 70 | 10 | 14 | 71 |
| Burt Word Reading | 1 | 2 | 50 | 13 | 18 | 72 | 15 | 27 | 56 | 10 | 14 | 71 |
| Writing | 0 | 1 | 0 | 4 | 7 | 57 | 8 | 10 | 80 | 1 | 2 | 50 |
| Reading Age | 1 | 2 | 50 | 10 | 18 | 56 | 18 | 27 | 67 | 10 | 14 | 71 |
| Logical Problem-Solving | 4 | 7 | 57 | 9 | 17 | 53 | 14 | 20 | 70 | 12 | 15 | 80 |

* tr/tert = trades/tertiary.

When we look at the retention of the highest quartile children above the median between ages 8 and 12, we see no differences related to maternal qualification for the social and attitudinal competencies or the Burt Word Reading test. There are suggestions of a slightly lower retention rate for children whose

mothers had no qualification or a school qualification only for mathematics, reading comprehension, and writing, and of lower retention rates for children whose mothers had no qualification for Logical Problem-Solving.

Table 37 **Maternal qualification and retention of highest quartile group at age 8 above the median at age 12**

| Competency | % of quartile 4 at age 8 retained above the median by age 12 | | | | | | | | | | | |
|---------------------------|--|----------------|----------------|---------------|---------------|---------------|--------------------|-------------------|-------------------|----------------|----------------|----------------|
| | n | tot | % | n | tot | % | n | tot | % | n | tot | % |
| | M.Qual none | M.Qual none | M.Qual none | M.Qual sch | M.Qual sch | M.Qual sch | M.Qual tr/tert* | M.Qual tr/tert | M.Qual tr/tert | M.Qual univ | M.Qual univ | M.Qual univ |
| Curiosity | 5 | 9 | 56 | 23 | 33 | 70 | 22 | 36 | 61 | 15 | 21 | 71 |
| Perseverance | 6 | 10 | 60 | 22 | 36 | 61 | 31 | 52 | 60 | 17 | 24 | 71 |
| Individual Responsibility | 4 | 4 | 100 | 12 | 20 | 60 | 26 | 41 | 63 | 13 | 19 | 68 |
| Social Skills with Peers | 7 | 11 | 64 | 14 | 23 | 61 | 31 | 41 | 76 | 12 | 21 | 57 |
| Social Skills with Adults | 4 | 6 | 67 | 12 | 17 | 71 | 21 | 36 | 58 | 18 | 20 | 90 |
| Communication | 4 | 7 | 57 | 18 | 24 | 75 | 28 | 42 | 67 | 16 | 19 | 84 |
| Mathematics | 2 | 3 | 67 | 25 | 32 | 78 | 37 | 41 | 90 | 32 | 34 | 94 |
| PAT Reading Comprehension | 3 | 4 | 75 | 24 | 30 | 80 | 43 | 47 | 91 | 29 | 32 | 91 |
| Burt Word Reading | 7 | 8 | 88 | 23 | 24 | 96 | 51 | 54 | 94 | 32 | 32 | 100 |
| Writing | 6 | 11 | 55 | 18 | 28 | 64 | 40 | 47 | 85 | 19 | 26 | 73 |
| Reading Age | 4 | 6 | 67 | 19 | 29 | 66 | 36 | 45 | 80 | 17 | 22 | 77 |
| Logical Problem-Solving | 2 | 6 | 33 | 30 | 36 | 83 | 43 | 49 | 88 | 31 | 32 | 97 |

* tr/tert = trades/tertiary.

Family income

Children's progression from the lowest quartile at age 5 to the median or above at age 12 for the social and attitudinal competencies and half the cognitive competencies was largely unaffected by family income levels.¹⁹ However, children in the very high-income bracket seemed more likely to progress above the median for mathematics; children in the low-income bracket seemed less likely to progress above the median for Reading Age; and those in the low- and middle-income brackets, less likely to progress above the median for Logical Problem-Solving.

¹⁹ We have used age 5 income levels here since they continued to show strong associations with age-12 competency levels, and the scores of children at age-12 did not reflect increases in family income between when they were aged 5 and when they were aged 12 – this is detailed in the next section.

Changes in the competencies over time

Table 38 Family income and movement from lowest quartile group at age 5 to above the median at age 12

| Competency | % of quartile 1 at age 5 moved above the median by age 12 | | | | | | | | | | | |
|---------------------------|---|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | n | tot | % | n | tot | % | n | tot | % | n | tot | % |
| | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc |
| | up to | up to | up to | >\$30- | >\$30- | >\$30- | >\$60- | >\$60- | >\$60- | >\$80K | >\$80K | >\$80K |
| | \$30K | \$30K | \$30K | 60K | 60K | 60K | 80K | 80K | 80K | | | |
| Curiosity | 6 | 20 | 30 | 14 | 37 | 38 | 4 | 10 | 40 | 3 | 7 | 43 |
| Perseverance | 6 | 31 | 19 | 11 | 31 | 35 | 5 | 11 | 45 | 4 | 11 | 36 |
| Individual Responsibility | 12 | 30 | 40 | 10 | 31 | 32 | 4 | 12 | 33 | 1 | 9 | 11 |
| Social Skills with Peers | 9 | 27 | 33 | 8 | 27 | 30 | 6 | 9 | 67 | 4 | 6 | 67 |
| Social Skills with Adults | 6 | 36 | 17 | 8 | 39 | 21 | 3 | 13 | 23 | 3 | 12 | 25 |
| Communication | 8 | 25 | 32 | 11 | 29 | 38 | 4 | 11 | 36 | 3 | 5 | 60 |
| Mathematics | 4 | 29 | 14 | 2 | 27 | 7 | 2 | 8 | 25 | 2 | 3 | 67 |
| PAT Reading Comprehension | 4 | 24 | 17 | 9 | 30 | 30 | 3 | 6 | 50 | 2 | 6 | 33 |
| Burt Word Reading | 4 | 24 | 17 | 7 | 30 | 23 | 4 | 6 | 67 | 1 | 5 | 20 |
| Writing | 3 | 23 | 13 | 7 | 33 | 21 | 3 | 7 | 43 | 1 | 4 | 25 |
| Reading Age | 1 | 24 | 4 | 11 | 30 | 37 | 2 | 6 | 33 | 2 | 5 | 40 |
| Logical Problem-Solving | 5 | 26 | 19 | 8 | 38 | 21 | 7 | 13 | 54 | 6 | 11 | 55 |

There are more suggestions of some advantage of higher family income to children's progress from the lowest quartile at age 8 above the median at age 12, particularly for Curiosity, Communication, mathematics, writing, and the Burt Word Reading test – but somewhat the reverse for the PAT Reading Comprehension test, and little difference is apparent for most of the social and attitudinal competencies.

Table 39 Family income and movement from lowest quartile group at age 8 to above the median at age 12

| Competency | % of quartile 1 at age 8 moved above the median by age 12 | | | | | | | | | | | |
|---------------------------|---|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | n | tot | % | n | tot | % | n | tot | % | n | tot | % |
| | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc |
| | up to | up to | up to | >\$30- | >\$30- | >\$30- | >\$60- | >\$60- | >\$60- | >\$80K | >\$80K | >\$80K |
| | \$30K | \$30K | \$30K | 60K | 60K | 60K | 80K | 80K | 80K | | | |
| Curiosity | 7 | 35 | 20 | 19 | 55 | 35 | 7 | 24 | 29 | 7 | 14 | 50 |
| Perseverance | 5 | 45 | 11 | 6 | 56 | 11 | 2 | 12 | 17 | 3 | 15 | 20 |
| Individual Responsibility | 12 | 53 | 23 | 10 | 70 | 14 | 2 | 14 | 14 | 5 | 19 | 26 |
| Social Skills with Peers | 20 | 55 | 36 | 17 | 63 | 27 | 5 | 16 | 31 | 6 | 19 | 32 |
| Social Skills with Adults | 17 | 53 | 32 | 21 | 52 | 40 | 6 | 14 | 43 | 9 | 19 | 47 |
| Communication | 12 | 49 | 24 | 12 | 55 | 22 | 5 | 16 | 31 | 10 | 16 | 62 |
| Mathematics | 0 | 51 | 0 | 4 | 53 | 8 | 1 | 11 | 9 | 3 | 8 | 38 |
| PAT Reading Comprehension | 6 | 50 | 12 | 8 | 58 | 14 | 1 | 8 | 12 | 0 | 6 | 0 |
| Burt Word Reading | 4 | 49 | 8 | 2 | 51 | 4 | 1 | 16 | 6 | 1 | 6 | 17 |
| Writing | 10 | 51 | 20 | 15 | 57 | 26 | 8 | 16 | 50 | 8 | 14 | 57 |
| Reading Age | 2 | 48 | 4 | 8 | 53 | 15 | 3 | 17 | 18 | 2 | 9 | 22 |
| Logical Problem-Solving | 7 | 47 | 15 | 4 | 56 | 7 | 2 | 8 | 25 | 4 | 10 | 40 |

Children whose family income was low seemed to have lower retention rates above the median at age 12 than others, if they had been in the top quartile at age 5, for the cognitive competencies other than Logical Problem-Solving and the Burt Word Reading test, and Communication.

Changes in the competencies over time

Table 40 Family income and retention of highest quartile group at age 5 above the median at age 12

| Competency | % of quartile 4 at age 5 retained above the median by age 12 | | | | | | | | | | | |
|---------------------------|--|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | n | tot | % | n | tot | % | n | tot | % | n | tot | % |
| | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc |
| | up to | up to | up to | >\$30- | >\$30- | >\$30- | >\$60- | >\$60- | >\$60- | >\$80K | >\$80K | >\$80K |
| | \$30K | \$30K | \$30K | 60K | 60K | 60K | 80K | 80K | 80K | | | |
| Curiosity | 5 | 11 | 45 | 13 | 21 | 62 | 8 | 9 | 89 | 7 | 9 | 78 |
| Perseverance | 2 | 11 | 18 | 15 | 29 | 52 | 10 | 14 | 71 | 8 | 13 | 62 |
| Individual Responsibility | 8 | 10 | 80 | 12 | 24 | 50 | 7 | 13 | 54 | 10 | 15 | 67 |
| Social Skills with Peers | 3 | 8 | 38 | 21 | 31 | 68 | 9 | 11 | 82 | 5 | 13 | 38 |
| Social Skills with Adults | 3 | 7 | 43 | 6 | 15 | 40 | 4 | 8 | 50 | 5 | 6 | 83 |
| Communication | 3 | 8 | 38 | 16 | 28 | 57 | 7 | 11 | 64 | 7 | 8 | 88 |
| Mathematics | 5 | 11 | 45 | 21 | 25 | 84 | 11 | 14 | 79 | 14 | 16 | 88 |
| PAT Reading Comprehension | 4 | 10 | 40 | 14 | 21 | 67 | 11 | 14 | 79 | 15 | 16 | 94 |
| Burt Word Reading | 6 | 10 | 60 | 13 | 22 | 59 | 10 | 14 | 71 | 11 | 16 | 69 |
| Writing | 1 | 5 | 20 | 4 | 5 | 80 | 3 | 3 | 100 | 5 | 7 | 71 |
| Reading Age | 3 | 10 | 30 | 14 | 22 | 64 | 11 | 14 | 79 | 11 | 16 | 69 |
| Logical Problem-Solving | 10 | 13 | 77 | 14 | 27 | 52 | 8 | 12 | 67 | 7 | 7 | 100 |

However, children from low-income homes who were in the top quartile at age 8 were just as likely as others to remain there, with the exception of Reading Age.

Table 41 Family income and retention of highest quartile group at age 8 above the median at age 12

| Competency | % of quartile 4 at age 8 retained the median by age 12 | | | | | | | | | | | |
|---------------------------|--|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | n | tot | % | n | tot | % | n | tot | % | n | tot | % |
| | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc | F.Inc |
| | up to | up to | up to | >\$30- | >\$30- | >\$30- | >\$60- | >\$60- | >\$60- | >\$80K | >\$80K | >\$80K |
| | \$30K | \$30K | \$30K | 60K | 60K | 60K | 80K | 80K | 80K | | | |
| Curiosity | 12 | 20 | 60 | 29 | 44 | 66 | 7 | 11 | 64 | 15 | 22 | 68 |
| Perseverance | 10 | 19 | 53 | 41 | 63 | 65 | 13 | 19 | 68 | 11 | 17 | 65 |
| Individual Responsibility | 8 | 11 | 73 | 30 | 41 | 73 | 11 | 17 | 65 | 5 | 12 | 42 |
| Social Skills with Peers | 8 | 18 | 44 | 33 | 41 | 80 | 19 | 25 | 76 | 4 | 9 | 44 |
| Social Skills with Adults | 10 | 17 | 59 | 24 | 34 | 71 | 15 | 18 | 83 | 6 | 8 | 75 |
| Communication | 15 | 26 | 58 | 42 | 57 | 74 | 17 | 21 | 81 | 13 | 17 | 76 |
| Mathematics | 14 | 17 | 82 | 37 | 44 | 84 | 19 | 20 | 95 | 23 | 25 | 92 |
| PAT Reading Comprehension | 14 | 16 | 88 | 39 | 44 | 89 | 21 | 26 | 81 | 21 | 23 | 91 |
| Burt Word Reading | 13 | 14 | 93 | 51 | 54 | 94 | 24 | 24 | 100 | 23 | 24 | 96 |
| Writing | 13 | 20 | 65 | 35 | 50 | 70 | 13 | 16 | 81 | 19 | 24 | 79 |
| Reading Age | 9 | 17 | 53 | 32 | 45 | 71 | 16 | 17 | 94 | 19 | 22 | 86 |
| Logical Problem-Solving | 18 | 22 | 82 | 38 | 47 | 81 | 22 | 24 | 92 | 26 | 28 | 93 |

What makes the difference to children who do progress from disadvantaged backgrounds – with low levels of family income and maternal qualification? We did not have sufficient numbers of children whose mothers had no maternal qualification who were scoring above the median at age 12 to analyse the

factors that might make a difference,²⁰ but we did undertake cross-tabulations comparing the experiences and opportunities of the 132 children from low-income homes (less than \$30,000) in the sample at age 12, comparing those who were performing at the median or above at age 12 with those who were not, for 2 key areas, mathematics and reading comprehension (Wylie 2003b).

There were some differences in terms of “cultural capital” and the way children spend their time. The children from low-income homes who were scoring at the median or above (the “high” achieving group) were more likely to have well-qualified mothers (partially reflecting the high proportion of sole-parents in the low-income category at age 5). They were engaged more in reading, were more likely to take part in art, music, or dance classes, and to play organised sport with their friends. They were more likely to have watched less television on a daily basis since age 5, and less likely to often play electronic or video games. Their parents were less likely to watch television most days (62 percent compared with 84 percent). Overall, they tended to have spent longer in early childhood education, and to have experienced a somewhat higher quality in their final early childhood education centre. Their families were more likely to have owned a computer for at least 4 years.

Teachers of the “high” achieving group were more likely to give high ratings to the support which children gave their peers in class, and to the level of parental support for the children in their class.

Parent and teacher expectations of children’s further educational pathways and parent expectations that their child would be likely to take up a professional career were higher for the “high” achieving group by age 12. This may reflect their levels of achievement after 7 years at school. But early parental aspirations for their child’s future education were much the same for the 2 groups. The students’ views of the careers that appealed to them were broadly similar, with somewhat more interest shown in professions by the “high” achieving group, and more interest in sports-related work by the “low” achieving group (who scored below the median at age 12).

The children in the “low” achieving group were just as likely as those in the “high” achieving group to be seen by their teachers as having strengths of being willing, trying hard. Their teachers were just as likely to think their teaching could make a difference to the individual child’s learning.

The “high” achieving group enjoyed reading more (77 percent compared with 55 percent), and to a lesser extent, working with numbers (55 percent compared with 36 percent). But the enjoyment of writing was much the same in both groups.

The students were similar in their reports of their school experiences, and their feelings about those: there did not seem to be a mismatch between home and school for the “low” achieving group in terms of a sense of being supported by their teachers and peers, belonging, or feeling fairly treated. Nor did their views of how they gauged their performance show a difference where one might expect it: the “low”

²⁰ We focused on children whose mothers had no qualification because they had lower scores than those whose mothers had a school qualification. However, this analysis of quartile movement suggests that there is more similarity than difference in the 2 groups in terms of progress over time, and that there would therefore be value in undertaking a similar analysis as the one presented below for children from low-income homes.

achieving group were just as likely as the “high” achieving group to see this in terms of effort (rather than ability, which can hinder effort). Where they differed was in terms of the pace and quality of work: 55 percent of the “low” achieving group thought they could do better work if they tried compared with 26 percent of the “high” achieving group, and 43 percent thought they usually learnt most things pretty quickly, compared with 64 percent of the “high” achieving group.

But there were some striking differences in the teacher ratings of the children’s attitudes and social skills. The “high” achieving group was much more likely to score highly on all 9 of the items in our measure of communication. These items focus on oral language, both receptive (listening) and expressive. The same trend was evident in relation to around half the items on other measures. The “high” achieving group was more likely to ask questions, think laterally, keep going when they struck a problem, finish their work, have a good concentration span, work with their peers without needing adult intervention, and make and keep friendships. Teachers were more likely to see the “low” achieving group as lacking self-confidence, particularly in relation to their achievement of their full potential in education.

Parents of the “high” achieving group were more likely to say that they used negotiation to resolve a disagreement with their child (43 percent compared with 31 percent). They were also more likely to offer encouragement if their child struck a difficulty in something they were trying to do (45 percent compared with 25 percent). The “high” achieving group was more likely to say they were listened to at home always or almost always (75 percent compared with 38 percent).

The “high” achieving group was more likely to identify the sharing of interests with friends as one of the things they enjoyed about their friendships (57 percent compared with 38 percent). There were no differences between the groups in terms of their initial experiences of puberty and reactions to it, friendship patterns other than the one above, or parental concerns.

In talking of mechanisms by which family income might influence outcomes for children, Kalil (2003) notes the difference between factors which are directly or immediately associated (or “proximal”), and factors which have an indirect association (“distal”). In focusing on reading and mathematics, the proximal factors emerge more clearly – as one would expect – and they can be categorised as mainly fitting human capital theory. If we take human capital to mean the extension of the self, through experiences of things beyond the immediate, everyday, or already known, and having habits of (and therefore feeling easy about and enjoying) asking questions, reading, and working on a problem, then the emphasis becomes more pronounced.

Relationships and processes which support the development of a communicative identity with some sense that the child can influence events through their communication (for example, negotiate with parents), are also evident.

Summary

There is more consistency, or predictability, in individual children’s scores on the cognitive competency measures between earlier ages and age 12, than on the social and attitudinal competency measures. The

consistency increases over time, reaching very high levels between ages 10 to 12 for mathematics, the PAT Reading Comprehension test, and the Burt Word Reading test. Age-5 mathematics scores are just as consistent with age-12 scores as the children's scores after their first year at school, pointing to a pattern which becomes very clear in this section of the particular importance for mathematics development of children's experience *before* school.

The strength of correlations between earlier and age-12 scores for the social and attitudinal competencies is moderate rather than strong. There is more consistency in individual children's age-8, 10, and 12 scores on the social and attitudinal competencies than with those of earlier ages. While there is more consistency in Curiosity scores, with age-5 scores just as good a guide for scores at age 12 as age-10 scores, the correlation between age-12 scores and each earlier score is weak. The lack of strong correlation in the social and attitudinal competencies over time may simply reflect the smaller number of items in each measure in comparison to the cognitive competency measures. However, that explanation does not account for the growing consistency in social and attitudinal scores from ages 8 to 12. Another possible reason is that scores on the social and attitudinal competencies reflect different individual responses and interactions between individual children, their teachers, and peers, as well as different settings. This would indicate that the social and attitudinal competencies are more influenced by context than the cognitive competencies.

The first 3 years of school appear most important for the development or consolidation of Perseverance and Social Skills with Peers habits and skills, the first 5 years of school for the development of Individual Responsibility, and the years from age 6 to age 10 for the development of Communication and Social Skills with Adults.

There are different patterns of progress for different competencies. Reading seems to be the competency which is least context-dependent, with earlier levels of performance most likely to be subsumed into age-10 performance. Performance at age 5 in mathematics, Logical Problem-Solving, and Curiosity is more likely to not be subsumed into later performance, but to be seen as making an additional contribution to the relationship of earlier performance to age-12 scores. This picture from partial correlations was confirmed by structural equation modelling of the consistency of scores between ages 8 to 12, which showed that earlier performance in the factor formed of most of the cognitive competencies (other than Reading Age and Logical Problem-Solving) makes a separate contribution from age 8 to age 12, as well as feeding into age-10 scores. The same pattern is evident in relation to the social and attitudinal factor (made up of all the social and attitudinal competencies other than Curiosity).

This modelling also showed that the social and attitudinal competencies "feed into" the cognitive competencies at the same age; the cognitive competencies feed into the social and attitudinal competencies of the next age.

We continue to see high retention among children who were in the bottom or top quartiles at age 5, for the cognitive competencies. The retention for mathematics is particularly marked. The continuity in children's performance in terms of quartile movement between ages 8 and 12 was more marked, for all the quartiles. However, there was no further increase in continuity in quartile retention between ages 10 to

12, suggesting that comparative performance at age 8 gives nearly as good a guide to children's comparative performance at age 12.

Two-thirds of the children who were performing in the top quartile at age 5 were scoring above the median at age 12 for the cognitive competencies and Curiosity. At least two-thirds of those in the top quartile at age 8 were performing above the median at age 12 for all the competencies. Between a fifth to two-fifths of the children who were performing in the lowest quartile at age 5 were performing above the median at age-12, but fewer could lift their performance to this extent between the ages of 8 and 12. Improved performance was much less likely for mathematics. However, more children from the lowest quartile at age 8 had progressed above the median by age 12 than seemed likely from our analysis at age 10, suggesting that though the windows of opportunity do seem to narrow over time, particularly by the end of the first 3 years of school, they are not closed. The opportunities – experiences and relationships – available to children can make a marked difference.

On the whole, children's characteristics of gender and ethnicity did not make marked differences to the patterns of progress for children who were in the top quartiles of earlier performance. Once a certain level of knowledge and skills had been gained, it is likely to be maintained. However, there were some different patterns in relation to maternal qualification and family income. Children whose family income was low did seem to have lower retention rates above the median if they had been in the top quartile at age 5 for mathematics, reading comprehension, and Communication, but this pattern was not evident in relation to retention from age 8. Children whose mothers had no qualification seemed somewhat less likely than others to retain their performance above the median from being in the top quartile at ages 5 and 8 for mathematics, reading comprehension, and writing.

Social differences are more apparent in patterns of progress for children who were in the bottom quartiles. There were trends from the data suggesting that boys who were in the lowest quartile were more likely than their female counterparts to progress above the median for mathematics and the Burt Word Reading test, though the girls were more likely to have moved above the median for the social and attitudinal competencies. The trends for ethnicity suggest that Māori children who scored in the bottom quartile at age 5 were less likely than their Pākehā/European counterparts to progress above the median for mathematics, and less likely to make progress from age 8 to age 12 for mathematics, reading comprehension, and writing. Children whose mother had a university qualification were most likely to move from the lowest quartile at age 5 to the median or above at age 12 for the cognitive competencies, and those whose mother had no qualification or a school qualification, least likely. Progress from the bottom quartile at age 8 to above the median at age 12 was more likely for children whose mother had a university qualification. Children whose families had very high-incomes at age 5 were more likely to progress from the lowest quartile at age 5 to above the median at age 12 for mathematics, and there was a similar trend for progress from age 8.

Comparison of children from low-income homes who were scoring above the median at age 12, and those who were not, in relation to mathematics and reading comprehension showed differences in the children's use of time and use of language which are consistent with theories of cultural capital.

Section Four

Cumulative experiences

In this section we focus on the research question:

What differences in children's competency levels at age 12 are attributable to stability or change in cumulative resources and experiences since near age 5?

We describe patterns of children's experience over time, to see what differences there are for children who have consistent experiences or reports of the same thing (e.g., watching television for substantial periods of time, having a mother in full-time employment), and those whose experiences are more varied. The factors we focus on are drawn from those with which we have found consistent associations with children's current competency levels, and which are of interest to policymakers, or continue to occur in popular thinking as potential "risk" factors.

We have developed the patterns used for the analysis from the data. Often, we found too many different patterns to use the ones we found without having to reduce them to groups with sufficient size for us to analyse.²¹ The ranges of combinations found indicate something of the fluidity of children's and adults' lives over time. We often explored associations between the competencies and the range of combinations first to decide which categories to use in the final analysis. Where we have used age-5 and 6 data, we use the "original sample", of around 240 children. For some factors which were introduced in later phases, we use data from only those phases.

These 20 "history" factors are:

Family resources

family income, maternal employment, welfare receipt

Child's time

TV watching, participation in music

²¹ For example, we originally had 14 different patterns of maternal employment status over the 7 years, which we reduced to 5 for the purposes of analysis.

Engagement in school

school attendance, homework, teacher relationship with parent, parental involvement in school, parent working with teacher to resolve problems, parental satisfaction with child's educational progress

School resources

class size, school socioeconomic decile, school ownership

Changes in daily settings

number of house-shifts, number of schools attended, changes of school between age 10 and 12, family type

Child's responses

how child copes with upsets

Relations with others

bullying

Family resources

We look here at changes in family income, maternal employment, and whether families receive welfare.

Family income

Details of current family income, and family income at age 5, and their associations with children's competencies are given in Section Six. In the previous Competent Children phase, we found that age 5 family income levels continued to have a bearing on the children's competency levels, and that the average scores of children whose families improved their income from low levels when the children were 5, were not statistically different from their counterparts whose family incomes remained low.

The categories used here were based on parents' reports of their family income levels before tax, at ages 5, 8, 10, and 12. This gave information for 448 of the study children.

- All low (below \$30,000),²² at each stage.
- Low at 5: low family income at age 5, and higher for subsequent stages.
- All middle (between \$30–60,000), at each stage.

²² Hyslop and Mare (2001) describe low-income households as having incomes between \$15–30,000. Ninety-one percent of the families of Competent Children sample live in their household without other family or non-family residents, allowing us to assume that family and household income should be the same for most of the project sample.

Cumulative experiences

- Middle at 5: middle level at age 5, and variable for subsequent stages.
- All high (\$60,000+), at each stage.
- High at 5: high level at age 5, and variable for subsequent stages.

Significant associations were found with all of the competencies other than Social Skills with Peers. The average scores of those whose family incomes continued to be low through their childhood and those whose family income increased after age 5 were very similar, other than for Communication. Their average scores tended to be lower than others for the cognitive competencies. Children whose family income was always high tended to have higher average scores than others, including those whose incomes had been high at age 5, but varied after that.

Allowing for maternal qualification reduced the associations to the indicative level for some of the competencies. The associations which remained significant are shaded in the table below. Note that it is children from groups where there is some income variability after age 5 who often have lower scores than those from groups where there is stability of income levels. This might suggest that the differences are related to changes which are associated with differences in income levels, as much as changes in income levels themselves. We checked 2 possibilities: patterns of maternal employment, and patterns of family type. However, neither of these possibilities showed the associations one would expect if they were the factors which lay behind the differences found in looking at the history of family income.

Table 42 History of family income age 5–12, and children's competency levels at age 12

| History of family income® | All low | Low at 5 then mixed | All medium | Medium at 5 then mixed | High at 5, not low before 10 | All high | Prob. F-value from ANOVA | % var. acct. for |
|--|-------------------|---------------------|-------------------|-------------------------|------------------------------|-------------|--------------------------|------------------|
| Age-12 competency ⁻ | Mean (n=37) | Mean (n=84) | Mean (n=48) | Mean (n=151) | Mean (n=33) | Mean (n=95) | | |
| Curiosity | 55.6 | 57.5 | 63.4 | 61.5 [^] | 63.6 | 69.4 | 0.0002 | 5.2 |
| Perseverance* | <i>61.0</i> | 62.5 | 71.5 | 70.4 [^] | 59.5 | 78.4 | < 0.0001 | 8.5 |
| Individual Responsibility | 69.9 | 71.7 | 77.0 | 76.3 [^] | <i>66.8</i> | 80.2 | 0.003 | 4.0 |
| Social Skills with Peers* | 67.6 | 68.2 | 74.1 | 72.1 [^] | <i>67.0</i> | 72.7 | 0.030 | 2.8 |
| Social Skills with Adults | 74.3 | 72.7 | 80.2 | 76.3 [^] | 72.2 | 81.5 | 0.006 | 3.6 |
| Communication* | <i>61.4</i> | 66.3 | 70.4 | 68.7[^] | 66.6 | 76.6 | < 0.0001 | 6.4 |
| Mathematics** | 41.1 | <i>39.5</i> | 51.6 | 50.4 | 55.0 | 63.1 | < 0.0001 | 12.3 |
| PAT Reading Comprehension | 46.5 | 46.6 [^] | 55.1 [^] | 54.0 ^{^^} | 56.0 | 63.9 | < 0.0001 | 8.2 |
| Burt Word Reading* | 72.4 | 71.3 | 76.6 | 78.1 | 78.2 | 81.8 | 0.0001 | 5.6 |
| Writing** | 48.6 | 47.9 | 50.3 | 51.6 | 51.5 | 56.3 | < 0.0001 | 7.7 |
| Reading Age (yrs, mo) | 12.1 [^] | <i>11.11</i> | 12.11 | 12.10 [^] | 12.11 | 13.5 | < 0.0001 | 8.5 |
| Logical Problem-Solving* | 70.3 | 65.2 | 68.0 | 69.8 | 72.3 | 75.8 | < 0.0001 | 8.2 |
| Composite Competency* | <i>60.9</i> | 61.1 [^] | 67.7 [^] | 66.2 ^{^^^} | 64.2 | 72.7 | < 0.0001 | 11.4 |
| Composite Cognitive Competency | 54.9 | 53.2 [^] | 59.4 [^] | 59.4 [^] | 61.5 | 67.0 | < 0.0001 | 12.8 |
| Composite Social & Attitudinal Competency* | <i>64.9</i> | 66.5 | 72.8 | 70.9 [^] | 66.0 | 76.5 | < 0.0001 | 7.0 |

* In these cases the squared model was a better fit.

** In these cases the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

^{^^^} Three fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*. The shaded associations are those that remained significant after taking maternal qualification into account.

Note that family income history, though a powerful factor in accounting for the variance in children's scores in mathematics – particularly in what is a very “noisy” environment for statistical analysis – leaves much to be explained. Though it looms large in social and educational research and becomes a frame for much analysis, it does not provide us with a full understanding of what lies behind differences in children's performance.

Maternal employment

Only 14 of the study children had mothers who did not undertake some employment between the time they were near-5, and when they were aged 12. We found 14 patterns of maternal employment (full-time, part-time, or not in paid employment) over the age 5, 6, 8, 10, and 12 phases, for the 240 mothers from the “original” sample for whom we had information for all these phases.²³ Only 19 of the children's mothers were always in full-time work, and only 23 always in part-time work.

We put the 14 patterns into 5 groups for analysis purposes. They were:

- no employment, or only employed at age 10 or 12 (14 percent, n=33);
- employment for 2-3 years (12 percent, n=29);
- all or some part-time work, no full-time work (27 percent, n=64);
- some full-time employment (40 percent, n=95); and
- all full-time employment (8 percent, n=19).

We found no associations between these categories and the children's competency levels at age 12. This is consistent with finding only 1 or 2 associations with children's competencies at age 12 and maternal employment for each of the different phases analysed separately, and with these associations not being evident for all phases, suggesting that something other than maternal employment status itself may be behind the associations found.

Most of the associations were no longer evident or were reduced to the indicative level after taking family income and maternal qualification into account. Here are the trends found in the phases analysed separately:

- indicative associations in relation to scores at age 12 for Perseverance with children whose mothers had been in full-time employment at ages 5 and 8, scoring around 6 percentage points lower than others on average;
- indicative associations in relation to scores at age 12 for writing, with children whose mothers had been in part-time employment at ages 6 and 8, scoring around 3 percentage points more than others;
- indicative associations in relation to scores at age 12 for Individual Responsibility, with children whose mothers had been in full-time employment at ages 8 and 10, scoring around 6 percentage points lower than others on average; and

²³ We have maternal employment data from age 5 for all the children in the study, but only for the “original” sample at age 6.

- a significant association in relation to scores at age 12 for the PAT Reading Comprehension test, with children whose mothers were currently in full-time employment scoring around 6 percentage points lower than others.

There does not seem to be any cumulative advantage or disadvantage for children at age 12 from their mothers' patterns of employment over the previous 7 years; there are indicative associations with specific phases, but these differ, suggesting that something other than maternal employment itself may be involved.

Welfare receipt

In the age-10 phase, we analysed patterns of family receipt of welfare over the previous 5 years, and found some associations, with children whose parents had received the Domestic Purposes Benefit (DPB) having lower scores on Perseverance, Social Skills with Peers, and Individual Responsibility. However, family income levels showed stronger associations than welfare receipt. For the present analysis, we focused on the ages 8–12, and also compared groups of those whose family had never received welfare, those who had done so for at least 2, 5, or 8 years, and those who had done so for a shorter period.

We did not find any differences within the sub-sample of those whose families had received welfare in relation to length of time. The lack of significance may be related to the small number of children whose families had received welfare for 8 years or more (18). The data showed an indicative association which was no longer notable after taking into account family income and maternal qualification, with children whose families received welfare for 8 years or more having lower mathematics scores (a difference of 8–9 percentage points after allowing for maternal qualification and family income).

The categories we used to analyse the history of welfare receipt over the 4 years between when the study children were aged 8, and when they were aged 12, for 491 children, were:

- no benefit at any of the stages when child aged 8, 10, or 12 (78 percent, n=385);
- benefit other than DPB at age 12 (5 percent, n=23);
- benefit at age 10, but not age 8 and other than DPB not at age 12 (8 percent, n=32);
- always on benefit, but not non-DPB benefit at age 12 (4 percent, n=19); and
- benefit at age 8, 10, and 12 other than non-DPB (8 percent, n=32).

In the one-factor analyses, there were significant associations with Curiosity, Perseverance, mathematics, and Reading Age, showing higher scores for children whose families had never received a benefit. However, their scores were higher compared with different groups of benefit receipt for each competency, rather than being higher compared with the same group(s) across the range of competencies, suggesting that something other than benefit receipt could be involved. Allowing for family income and maternal qualification reduced these associations to the indicative or not notable level, though the difference in mathematics scores for those whose family had never received a benefit and those whose families were currently receiving a non-DPB benefit remained significant after taking into account maternal qualification, but not family income.

Overall, cumulative experience of being in a family receiving welfare does not appear to disadvantage children. Mathematics is the only competency to show some associations which might become clearer in a larger sample.

Child's time

Television watching

We have found at each phase that children who watch television for large amounts of time tend to have lower average scores than others for some competencies, particularly the cognitive competencies. To look at the cumulative associations of television watching with children's competency levels, we first undertook a sequence of one-way ANOVA models, analysing television watching amounts at each of the ages 5, 6, 8, and 10 in relation to age-12 competency scores. This showed much stronger associations between the cognitive competencies and earlier watching patterns than with current watching patterns. There were clear consistent trends showing the highest average scores among those who watched no television, or less than an hour a day, and lowest average scores among those who watched 3 or more hours a day. These associations remained after taking into account family income and maternal qualification.

To construct categories for the cumulative patterns, we divided the amounts of time spent watching television into below 2 hours a day, and 2 hours or more a day. This gave us 15 different patterns of the children's television watching over the 5 phases of data collection between age near-5, and 12. To reduce these patterns to categories which could be analysed (both in terms of numbers in each category and to ensure each category was meaningful), we made box-plots of each of these 15 categories in relation to mathematics scores at age 12. This gave us 4 categories, as outlined below:

| | | |
|---|--|--|
| 1 | always small | Watching TV for less than 2 hours daily at each age 5, 6, 8, 10 & 12. |
| 2 | small at ages 5, 6, 8 | Watching TV for less than 2 hours per day up to age 8, then at either age 10 or at age 12 or both, watching for ≥ 2 hrs, but overall 3 or 4 ages of "small" TV watching. |
| 3 | 1 or 2 large at 5, 6, 8 while mostly small | Watching TV for ≥ 2 hrs daily at 1 or 2 of the ages 5, 6, 8 despite watching for < 2 hrs daily for ages, 10 or 12 – i.e. overall there were 3 or 4 lots of "small" TV watching. |
| 4 | 3 or more large | Watching TV for ≥ 2 hrs daily for 3 to 5 of the years 5, 6, 8, 10, 12. |

The associations found with age-12 competencies are similar to those found when looking at each earlier age's pattern separately. What this analysis is able to show which those separate analyses could not was

that watching large amounts of television at 1 or 2 phases up to the age of 8 seems to be just as disadvantageous for children's performance as consistently watching large amounts in each phase.²⁴

Table 43 History of TV watching and children's competencies at age 12

| History of TV watching® | Always small | Small at ages 5, 6&8 | One or two large at 5, 6 & 8 but rest small | Large at 3 or more ages Mean (n=77) | Prob. of F-value from ANOVA | Percent variance accounted for |
|--|--------------|----------------------|---|-------------------------------------|-----------------------------|--------------------------------|
| Age-12 competency ⁻ | Mean (n=51) | Mean (n=67) | Mean (n=44) | | | |
| Curiosity | 69.0 | 64.2 | <i>59.1</i> | 60.3 | 0.022 | 4.0 |
| Perseverance | 75.0 | 72.6 | <i>63.1</i> | 66.5 | 0.040 | 3.5 |
| Social Skills with Adults | 81.0 | 80.7 | <i>74.2</i> | 74.5 | 0.027 | 3.8 |
| Communication* | 75.1 | 73.4 | <i>64.3</i> | 67.6 | 0.005 | 5.3 |
| Mathematics** | 60.8 | 52.5 | 45.0 | <i>44.9</i> | 0.0006 | 7.2 |
| PAT Reading Comprehension | 64.1 | 53.7 | <i>47.4</i> | 49.3 ^{^^} | 0.0002 | 8.0 |
| Burt Word Reading* | 84.1 | 76.6 | <i>74.1</i> | 74.1 | 0.001 | 6.5 |
| Writing** | 55.8 | 50.4 | 48.9 | <i>47.9</i> | < 0.0001 | 9.2 |
| Reading Age (yrs, mo) | 13.6 | 12.11 | <i>12.5</i> | 12.5 | 0.002 | 6.3 |
| Logical Problem-Solving* | 74.0 | 71.3 | <i>68.2</i> | 67.3 | 0.014 | 4.4 |
| Composite Competency* | 71.7 | 68.0 | <i>62.1</i> | 63.8 ^{^^} | 0.0003 | 7.7 |
| Composite Cognitive Competency | 66.2 | 59.8 | <i>55.7</i> | 55.7 ^{^^} | < 0.0001 | 9.8 |
| Composite Social & Attitudinal Competency* | 75.4 | 73.4 | <i>66.4</i> | 69.4 | 0.012 | 4.5 |

* In these cases the squared model was a better fit.

** In these cases the square-root model was a better fit.

^{^^} Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

These associations generally remained after taking family income and maternal qualification into account. An earlier paper from the Competent Children project has discussed the reasons why television watching may be affecting children's development of literacy and mathematics, in terms of both the particular visual aspects of television and the use of language on it, and its acting as a competitor for time with reading.²⁵ (It may also be acting as a competitor for activities which involve mathematics.)

Participation in music

We found positive associations for children's competency levels in each of the 3 phases (ages 8, 10, and 12) we have asked about children's participation in music outside school. For this analysis, we looked first at whether earlier participation (at ages 8 and 10) continued to show positive associations at age 12. It

²⁴ Though it is also possible that there was some under-reporting for this group at 1 or 2 stages.

²⁵ Wylie, C. (2000). Making sense: relations between literacy, television and computer use and other uses of children's time. Paper given at NZARE conference, Christchurch, 6-9 December. Available on www.nzcer.org.nz.

did. These associations remained after accounting for family income, but were somewhat reduced after accounting for maternal qualification. As we found in analysing patterns of television watching, earlier patterns had stronger associations with age-12 competencies than with current.

We did box-plots of the associations with mathematics performance at age 12 for the 8 patterns of musical participation over the 3 study phases which were evident in the data, and then regrouped to make the 4 categories used in the table below. This showed generally consistent trends, with lower average scores for children who had never participated in music, or who were doing so for the first time at age 12. Allowing for family income and maternal qualification reduced most of the associations to an indicative level, but not the associations with mathematics, writing, Reading Age, the PAT Reading Comprehension test, and Logical Problem-Solving. Indicative contrasts between those who consistently participated in music and those whose participation varied were evident for the PAT Reading Comprehension test, but did not remain after taking into account maternal qualification.

Table 44 History of child's participation in music ages 8–12 and competencies at age 12

| History of participation in music® | None or only at age 12 | None at age 8 or just at age 8 | At age 8 and just one other age | Music at each age | Prob. of F-value from ANOVA | Percent variance accounted for |
|--|------------------------|--------------------------------|---------------------------------|---------------------------|-----------------------------|--------------------------------|
| Age-12 competency | Mean (n=185) | Mean (n=148) | Mean (n=60) | Mean (n=102) | | |
| Curiosity | 58.2 | 62.5 | 63.9 | 67.1 [^] | 0.002 | 3.1 |
| Perseverance | 64.5 | 68.5 | 76.0 | 74.6 [^] | 0.0001 | 4.2 |
| Individual Responsibility | 71.2 | 75.3 | 78.5 | 80.5 [^] | 0.0007 | 3.4 |
| Social Skills with Adults | 73.6 | 76.4 | 77.6 | 81.9 [^] | 0.002 | 2.9 |
| Communication* | 64.9 | 69.3 | 74.4 | 73.4 [^] | < 0.0001 | 4.5 |
| Mathematics** | 44.6 | 52.2 | 56.4 | 57.2 | < 0.0001 | 5.1 |
| PAT Reading Comprehension | 46.9 ^{^^} | 57.0 [^] | 55.3 | 63.0 [^] | < 0.0001 | 8.6 |
| Burt Word Reading* | 73.2 | 77.6 | 79.9 | 81.0 | 0.0001 | 4.2 |
| Writing** | 48.6 | 51.7 | 53.3 | 56.0 | < 0.0001 | 7.3 |
| Reading Age (yrs, mo) | 12.2 | 12.11 [^] | 12.10 | 13.3 [^] | < 0.0001 | 5.5 |
| Logical Problem-Solving* | 65.8 | 72.6 | 72.0 | 74.2 | < 0.0001 | 8.6 |
| Composite Competency* | 62.2 ^{^^} | 66.7 [^] | 69.3 | 70.9 ^{^^} | < 0.0001 | 7.9 |
| Composite Cognitive Competency | 55.0 ^{^^} | 60.9 [^] | 62.3 | 64.9 [^] | < 0.0001 | 8.9 |
| Composite Social & Attitudinal Competency* | 66.9 | 70.6 | 73.9 | 75.0 [^] | < 0.0001 | 4.8 |

* In these cases the squared model was a better fit.

** In these cases the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Engagement in school

School attendance

The data we have used for school attendance is teachers' overall summary in terms of good, satisfactory, or poor, rather than actual days per school year.²⁶ The numbers of students in the study whose attendance is less than good is small: 22 at age 6, increasing to 34 at age 12. When we compared previous attendance rates separately at age 6, 8, and 10 with age-12 competency levels, we found only a few indicative associations. Current attendance rates showed stronger associations, with the social and attitudinal, but not the cognitive competencies.

Because there were no associations with age-12 competencies evident with the age-6 attendance, and we would be restricted to a smaller sub-sample if we included age-6 data, we omitted this phase in developing the categories for a history of school attendance. We found 8 patterns of school attendance between ages 8 and 12, using data from 495 children, which we analysed with box-plots in relation to the mathematics and PAT Reading Comprehension test scores at age 12 to derive 4 sensible groups for analysis. These are:

- good attendance for all 3 phases (84 percent);
- good at age 8, satisfactory/ poor at 10, and good again at age 12 (5 percent);
- good at age 8, either good or satisfactory/poor at age 10, and satisfactory/poor at age 12 (6 percent);
and
- satisfactory/poor at age 8, with either kind of attendance at ages 10 and 12 (5 percent).

The significant associations found were with the social and attitudinal competencies. These show higher average scores for those whose school attendance has always been good, and others, particularly those whose attendance is currently not good. These associations largely remained significant after taking into account family income and maternal qualification.

Homework

We used teachers' reports of whether the study children had completed their homework, for ages 10 and 12. Both current homework completion and earlier completion at age 10 showed strong relationships with children's competency levels at age 12 which remained after taking family income and maternal qualification into account. Homework completion is likely to be playing a part in teachers' overall judgments of children in relation to the questions we asked them to compile the social and attitudinal competencies. Its relationship with the cognitive competencies may reflect existing levels of understanding of what has been taught, and confidence about that, as much as the time (practice) given to homework, and opportunity to interact with parents if they assist. Either interpretation makes sense of our finding that age-10 completion rates have a similar bearing on age-12 competency levels as do current completion rates.

²⁶ We have collected actual attendance records for the age-14 phase.

We found 9 patterns of homework completion over the 2 study phases (using our categories: completes homework/homework completion varies/homework is not completed). When we used box-plots to look at the associations of these 9 groups with the children's scores at age 12 for mathematics, PAT Reading Comprehension test, Perseverance, and the Composite Cognitive Competency, we found it difficult to see a smaller number of clear categories. These 9 groups show these patterns among the 491 children for whom we had data on homework completion for both phases:

Homework completed at age 10:

- Completed at age 12 (59 percent, n=289).
- Varied completion at age 12 (11 percent, n=52).
- Not completed at age 12 (3 percent, n=16).

Homework completion varied at age 10:

- Completed at age 12 (11 percent, n=53).
- Varied completion at age 12 (8 percent, n=38).
- Not completed at age 12 (2 percent, n=11).

Homework not completed at age 10:

- Completed at age 12 (3 percent, n=15).
- Varied completion at age 12 (2 percent, n=8).
- Not completed at age 12 (2 percent, n=9).

When we used these 9 groups in ANOVA analysis, we found that those who completed their homework in both phases had higher average scores, and that categories which included current completion tended to show higher average scores than those who did not complete homework. We therefore regrouped the data into 3 categories:

- Completion at both ages 10 and 12 (59 percent).
- "Mixed": Completion or varied completion at age 12 (with any level of completion at age 10) (34 percent).
- Non-completion at age 12 (with any level of completion at age 10) (7 percent).

There were significant associations which remained after taking into account family income and maternal qualification, with a linear trend for the social and attitudinal competencies, but no notable differences between the mixed and non-completion at 12 group for the cognitive competencies. This lack of difference suggests that teachers may be using current homework completion rates as one of the things they consider in rating children's social and attitudinal competencies, or, alternatively, that homework completion is a sign of engagement in school. It also suggests that consistency in homework completion may matter more for the cognitive competencies, but leaves open the question of whether either interpretation of the 2 suggested earlier in this section makes sense on its own.

The following table shows the percentage points differences among the 3 groups:

Table 45 Average percentage points differences (contrasts) for homework completion patterns ages 10–12

| Competency | Contrast between completion both 10 & 12 & not at 12 | s.e. | Contrast between completion both 10 & 12 & mixed | s.e. | Contrast mixed & not at 12 | s.e. |
|---|--|------|--|------|----------------------------|------|
| Curiosity | 18.2 | 3.2 | 9.6 | 1.8 | 8.6 | 3.4 |
| Perseverance | 42.7 | 3.1 | 19.2 | 1.7 | 23.6 | 3.3 |
| Individual Responsibility | 36.3 | 3.2 | 15.3 | 1.6 | 21.0 | 3.7 |
| Social Skills with Peers | 17.2 | 2.4 | 8.1 | 1.3 | 9.1 | 2.6 |
| Social Skills with Adults | 21.7 | 3.1 | 8.1 | 1.6 | 13.6 | 3.4 |
| Communication | 22.0 | 3.0 | 12.3 | 1.5 | 9.7 | 3.5 |
| Mathematics | 14.8 | 4.1 | 10.9 | 2.2 | not notable | |
| PAT Reading Comprehension | 10.7 | 3.7 | 8.5 | 2.0 | not notable | |
| Burt Word Reading | 8.5 | 2.7 | 4.6 | 1.5 | not notable | |
| Writing | 6.6 | 1.8 | 4.5 | 1.0 | not notable | |
| Reading Age | 2.5 | 0.6 | 1.8 | 0.3 | not notable | |
| Logical Problem-Solving | 7.0 | 2.1 | 4.0 | 1.2 | not notable | |
| Composite Competency | 19.4 | 2.0 | 9.9 | 1.0 | 9.5 | 2.3 |
| Composite Cognitive Competency | 9.1 | 2.3 | 6.6 | 1.2 | not notable | |
| Composite Social & Attitudinal Competency | 26.3 | 2.4 | 12.1 | 1.2 | 14.3 | 2.8 |

Teacher relationships with parent

Teachers' reports of the quality of their relationships with the study children's parents are related to their contact with parents, and also to their overall view of how well children are faring at school. Current teacher views of the teacher-parent relationship show significant associations with most of the social and attitudinal competencies, and mathematics, and indicative associations with the other competencies. Children whose teacher thought they had a very good or excellent relationship had higher average scores. These associations were mostly reduced to the indicative level after taking family income and maternal qualification into account.

When we looked at the associations with the children's age-12 competencies and their age-8 and age-10 teachers' reports of relationships with parents (in most cases, the teachers were different in each phase), we found significant associations between the age-8 view and the age-12 cognitive competencies, other than writing, but only 2 significant associations with the social and attitudinal competencies; and only one significant association, with the PAT Reading Comprehension test, in relation to the age-10 view of the teacher-parent relationship.

In building up a picture of these relationships over time, we found that only 13 percent of the students had a teacher-parent relationship described as very good/excellent, for all 3 phases. No student had a teacher-parent relationship that was always described as difficult, very difficult, or non-existent over the ages 8-12, and only 11 had relationships that were satisfactory in one phase, but difficult to non-existent in 2 phases. Thus, different teachers do seem to see relationships with a child's parents differently, for whatever reason. Factors involved could be to do with how a child behaves in class, whether they show

interest, differences in teacher and parent approaches and personalities, or the availability of parents to make contact with teachers, which would be dependent to some extent on changes in maternal employment. We found 7 patterns, which we used for the ANOVA analysis with the age-12 competencies, after making box-plots with some of the competencies.

As the table below shows, we found significant associations for all the competencies bar writing and the Burt Word Reading test. Children with whom all teachers said they had a very good/excellent relationship with their parents had higher average scores. For some competencies, the average scores of children whose teachers had very good/excellent relationships with the child's parents for 2 of the 3 phases were higher than others. The lowest average scores do not belong to one group in particular, but vary according to the competency. The associations found were reduced after taking into account family income and maternal qualification.²⁷

Table 46 History of teacher view of relationship with parent and competencies at age 12

| History of teacher view of relationship with parent® | All v.good/excell. | V.good./excell twice +good. or satis. | V.good./excell once +good or satis. | All good or satis. | At least one difficult/very difficult | All satis. or no relationship | At least one 'no relationship' | Prob. F-value from ANOVA | % var. acct. for |
|--|--------------------|---------------------------------------|-------------------------------------|--------------------|---------------------------------------|-------------------------------|--------------------------------|--------------------------|------------------|
| Age-12 competency ⁻ | Mean (n=65) | Mean (n=133) | Mean (n=121) | Mean (n=47) | Mean (n=19) | Mean (n=11) | Mean (n=97) | | |
| Curiosity | 69.6 | 65.1 | 60.1 | 60.6 | 56.2 | 56.8 | 57.5 | 0.0007 | 4.7 |
| Perseverance | 75.6 | 72.9 | 69.0 | 63.3 | <i>61.5</i> | 66.5 | 64.4 | 0.003 | 4.0 |
| Individual Responsibility | 79.8 | 79.2 | 74.9 | 69.8 | <i>63.2</i> | 77.3 | 71.5 | 0.0006 | 4.7 |
| Social Skills with Peers* | 75.1 | 71.9 | 72.7 | <i>64.8</i> | 66.6 | 68.0 | 68.3 | 0.002 | 4.3 |
| Social Skills with Adults | 84.5 | 78.0 | 76.2 | 74.1 | <i>67.5</i> | 75.8 | 72.7 | 0.0005 | 4.8 |
| Communication* | 74.8 | 72.0 | 68.3 | 64.5 | <i>62.2</i> | 66.8 | 66.1 | 0.002 | 4.1 |
| Mathematics** | 60.0 | 55.0 | 47.4 | <i>44.7</i> | 47.9 | 47.3 | 47.7 | 0.003 | 4.0 |
| PAT Reading Comprehension | 59.7 | 57.9 [^] | 52.8 ^{^^} | 46.7 | 54.7 | 43.7 | 51.8 [^] | 0.004 | 3.9 |
| Burt Word Reading* | 80.6 | 77.9 | 77.1 | 75.0 | 72.4 | 78.3 | 74.4 | 0.14 | 2.0 |
| Writing** | 52.4 | 52.7 | 52.5 | 49.3 | <i>49.0</i> | 55.2 | 49.8 | 0.12 | 2.1 |
| Reading Age (yrs,mo) | 13.2 | 12.11 | 12.11 | 12.1 | <i>11.9</i> | 12.4 | 12.4 | 0.0004 | 4.9 |
| Logical Problem-Solving* | 74.6 | 72.3 | 70.0 | <i>65.0</i> | 70.2 | 66.2 | 68.2 | < 0.0001 | 5.8 |
| Composite Competency* | 71.7 | 68.7 [^] | 65.7 ^{^^} | 61.7 | <i>60.8</i> | 64.1 | 63.0 [^] | < 0.0001 | 7.3 |
| Composite Cognitive Competency | 64.3 | 62.0 [^] | 58.9 ^{^^} | 54.9 | 57.7 | 57.4 | 57.5 [^] | 0.0008 | 4.6 |
| Composite Social & Attitudinal Competency* | 76.5 | 73.2 | 70.2 | 66.2 | <i>62.9</i> | 68.5 | 66.7 | < 0.0001 | 6.0 |

* In these cases the squared model was a better fit.

** In these cases the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

²⁷ Children whose mothers had a university qualification were more likely to be in the group whose relationship was difficult, but much less likely to be in the 2 groups where the teacher-parent relationship had been non-existent in one or more years.

Parents working with teachers to resolve a problem their child is experiencing

There are associations between children's age-12 competency levels, and whether they are experiencing any problems that the parent is working on with the teacher, at the significant level for the social and attitudinal competencies, and at an indicative level for 3 of the 4 literacy levels (which might reflect greater parental awareness of reading issues). These associations remained after taking family income and maternal qualification into account.

When we undertook ANOVA analysis of the relationship between earlier parental reports of working with teachers on a child's problem for each of the age-8 and age-10 phases separately, we found similar patterns, but with indicative associations with mathematics, rather than literacy.

When we looked at the patterns of responses across all 3 phases, 8, 10, and 12, we separated out the incidence of problems into academic, and social-emotional (s-em in the table below). For the 389 children for whom we have all data, and excluding the few whose parents identified a problem that they did not discuss with the teacher, and those who did not define the nature of the problem, we found that only 17 percent of the children had never had their parents working with their teachers to resolve some problem which had cropped up. In other words, it is almost the norm over a 4-year period for children to experience at least one issue, which parents and teachers feel is best resolved by working together.

A problem requiring joint teacher-parent attention had emerged in just 1 of the 3 phases for 30 percent of the study children, and in two of the phases, for 34 percent.

Problems attracting joint parent-teacher attention in all 3 phases occurred for 20 percent of the children. It was rare for the problems to always be about academic progress (11 children), with a further 19 experiencing academic problems at age 8 only, and other problems after that. Only 10 experienced social-emotional problems in all 3 phases, with a further 20 experiencing social-emotional problems at age 8, and other problems after that. Sixteen experienced both academic and social-emotional problems at age 8, and a mixture after that.

The associations with children's competencies at age 12 are significant, and relatively strong in terms of the proportion of variance they explain. Children who never experienced problems, or had only experienced them once between age 8 and age 12 had higher average scores for the 4 social and attitudinal competencies that showed significant associations. For the cognitive competencies, it was the children who had academic problems who showed lower scores than others. These associations remained after taking into account family income and maternal qualification.

Table 47 History of problems tackled by parents and teachers together and children's competencies at age 12

| History of problems worked on by parents and teachers | 1 all acad. | 2 acad. age 8 | 3 all s-em | 4 age 8 s-em | 5 both acad. & s-em age 8 | 6 all none | 7 two out of three times with no probs | 8 one out of three times with no probs | Prob. of F-value from ANOVA | % var. acct. for |
|---|-------------|---------------|-------------|--------------------------|---------------------------|-------------|--|--|-----------------------------|------------------|
| | Mean (n=11) | Mean (n=19) | Mean (n=10) | Mean (n=20) | Mean (n=16) | Mean (n=67) | Mean (n=115) | Mean (n=131) | | |
| Age-12 competency | | | | | | | | | | |
| Perseverance | 61.4 | 53.9 | 62.5 | 68.1 | <i>48.0</i> | 77.1 | 76.8 | 67.7 | < 0.0001 | 13.6 |
| Individual Responsibility | 73.2 | 63.2 | 67.5 | 69.8 | <i>55.0</i> | 82.7 | 80.5 | 74.9 | < 0.0001 | 12.5 |
| Social Skills with Peers* | 70.8 | 57.6 | 61.1 | 69.0 | 62.1 | 75.0 | 74.7 | 71.0 | < 0.0001 | 10.4 |
| Social Skills with Adults* | 78.8 | 70.2 | 71.7 | 77.9 | <i>64.1</i> | 81.7 | 80.7 | 75.6 | 0.003 | 5.5 |
| Communication | 65.0 | 59.9 | 68.8 | 72.8 | <i>56.9</i> | 72.5 | 72.8 | 68.4 | 0.001 | 5.9 |
| Mathematics** | <i>36.8</i> | 40.8 | 47.0 | 59.5 | 49.7 | 53.1 | 55.7 | 50.7 | 0.049 | 3.6 |
| PAT Reading Comprehension | 33.9 | 40.6 | 51.6 | 62.5 [^] | 55.9 | 55.6 | 58.1 | 54.2 ^{^^} | 0.0009 | 6.2 |
| Burt Word Reading* | 59.1 | 64.6 | 76.2 | 83.3 | 69.1 | 78.7 | 79.2 | 77.2 | < 0.0001 | 8.4 |
| Writing** | 42.2 | 44.1 | 51.7 | 56.2 | 48.9 | 53.9 | 52.4 | 51.8 | < 0.0001 | 7.7 |
| Reading Age (yrs, mo) | <i>10.8</i> | 11.1 | 12.5 | 13.5 | 12.4 | 12.11 | 13.1 | 12.8 | < 0.0001 | 9.5 |
| Composite Competency | 59.9 | 58.2 | 62.4 | 68.5 [^] | <i>56.7</i> | 69.9 | 69.8 | 65.8 ^{^^} | < 0.0001 | 9.6 |
| Composite Cognitive Competency | 48.2 | 52.0 | 57.4 | 66.1 [^] | 56.7 | 61.5 | 62.3 | 59.6 ^{^^} | 0.0006 | 6.5 |
| Composite Social & Attitudinal Competency | 67.7 | 61.5 | 65.8 | 70.7 | <i>56.7</i> | 75.4 | 74.9 | 70.1 | < 0.0001 | 10.2 |

* In these cases the squared model was a better fit.

** In these cases the square-root model was a better fit.

[^] One fewer in this mean.^{^^} Two fewer in this mean.The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Parental involvement in school

We have found few associations between the kind of involvement parents have in their child's school, and the child's competency scores. To look at this cumulatively, we grouped the responses at each of age 8, 10, and 12 in terms of voluntary help (in classroom or other), other forms of contact or involvement (including parent-teacher evenings where teachers report on children's progress), and no involvement. When we analysed the relationship of parental involvement at ages 8 and 10 in relation to children's competency levels at age 12, we found more significant associations than we had in analysing current involvement levels. These largely remained, with some dilution, after taking family income and maternal qualification into account. Students whose parents were involved in voluntary work had higher average scores than those who had some contact with the school other than voluntary work, but there was no distinction with those who had no contact with their child's school for the social skills with peers and adults.

We found for the 496 children for whom we had all the data that 69 percent had parents who had given voluntary help at their child's school in at least 1 phase: 18 percent of the study children had parents who gave voluntary help at their school across all 3 phases, 28 percent had parents who gave help for 2 of the

3 phases, and 23 percent had parents who gave help for 1 phase. Nine percent had only other kinds of involvement in their child's school for all 3 phases. Twenty percent had had no involvement in their child's school in at least 1 phase, and 2 percent, no involvement for 2 or 3 of the phases.

Children whose parents did voluntary work at their child's school in at least 2 of the 3 phases had higher average scores on a number of the competencies. There are consistent patterns, with the children's cognitive competency scores reflecting the degree of parental involvement over the period when the study children were aged 8 to 12. The relationships between levels of parental involvement and the social and attitudinal competencies are less consistent. These associations remained after taking into account family income and maternal qualification. Children whose parents had no qualification were under-represented in the group taking part in voluntary work at the school (11 percent); no children whose mothers had a university qualification were in the group whose parents were not involved in their school at 2 or more stages.

Table 48 History of parental involvement at school at ages 8, 10 & 12 and children's competencies at age 12

| History of parental involvement at school at ages 8,10,&12® | Voluntary help at school ages 8,10,&12 | Two ages voluntary one "other" | Two "other" plus 1 voluntary | Three "other" | One "none" | Two or three "none" | Prob. of F-value from ANOVA | % var. acct. for |
|---|--|--------------------------------|------------------------------|--------------------|-------------------|---------------------|-----------------------------|------------------|
| Age-12 competency ⁻ | Mean (n=88) | Mean (n=139) | Mean (n=115) | Mean (n=45) | Mean (n=97) | Mean (n=12) | | |
| Curiosity | 68.1 | 64.4 | 61.1 | 53.0 [^] | 59.1 | 55.7 | 0.0001 | 5.0 |
| Perseverance | 76.7 | 73.9 | 64.6 | 59.8 [^] | 64.9 | 69.8 | < 0.0001 | 6.8 |
| Individual Responsibility | 78.7 | 79.1 | 72.0 | 68.9 [^] | 72.5 | 77.9 | 0.0031 | 3.6 |
| Social Skills with Peers* | 72.7 | 72.9 | 69.9 | 65.6 [^] | 69.1 | 75.7 | 0.024 | 2.6 |
| Communication* | 73.9 | 72.2 | 67.9 | 62.6 [^] | 64.9 | 67.3 | 0.0001 | 5.0 |
| Mathematics** | 57.8 | 55.0 | 49.2 | 44.7 | 46.4 | 30.0 | < 0.0001 | 5.8 |
| PAT Reading Comprehension | 60.6^{^^} | 55.8 | 54.3 [^] | 51.6 [^] | 49.2 | 41.6 | 0.002 | 3.9 |
| Writing** | 53.7 | 53.3 | 50.7 | 50.2 | 49.5 | 48.6 | 0.013 | 2.9 |
| Reading Age (yrs, mo) | 13.3 | 13.1 | 12.7 | 12.2 [^] | 12.4 [^] | 11.7 | < 0.0001 | 5.5 |
| Composite Competency | 70.2^{^^} | 68.8 | 64.6 [^] | 60.9 ^{^^} | 63.3 | 62.7 | < 0.0001 | 6.6 |
| Composite Cognitive Competency | 63.4^{^^} | 61.8 | 58.9 [^] | 57.7 [^] | 56.6 | 50.4 | 0.0002 | 4.8 |
| Composite Social & Attitudinal Competency | 74.9 | 73.6 | 68.3 | 63.5 [^] | 67.8 | 70.8 | < 0.0001 | 6.1 |

* In these cases the squared model was a better fit

** In these cases the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Parental satisfaction with child's school progress

At each stage, we have found significant associations between parental satisfaction levels and the children's competency levels across the board, with the highest average scores for children whose parents showed satisfaction, and lowest for those parents who were not satisfied. In looking at previous levels of

satisfaction, we found continuing associations with age-12 competency scores and parental satisfaction levels at age 8 and 10, but none at age 6.

When we looked at the patterns of parental satisfaction levels for the 266 children for whom we had all the data on this question from age 6–12, we found a wide range of patterns. Although the majority of parents express satisfaction with their child’s progress in each phase analysed separately, only 34 percent of the children had parents who were always satisfied with their progress. A further 33 percent were satisfied in at least 2 of the 4 phases. Eight percent either never said they were satisfied, or showed satisfaction only once. Six percent were satisfied or gave a qualified answer when their child was aged 6 and 8, but not after that. Conversely, 13 percent were dissatisfied or gave a qualified answer when their child was aged 6 and 8, but were satisfied at ages 10 and 12.

We found significant associations with 7 of the 12 competency measures. On the whole, children whose parents have always been satisfied, or those who have become satisfied at the later stages of primary school, have higher average scores than others, suggesting that children’s achievement levels play a large role in parental satisfaction levels. These associations largely remained after taking into account family income and maternal qualification.

Table 49 History of parental satisfaction and competencies at age 12

| History of parental satisfaction® | Always yes | 6,8,10 not 12 | Early yes | Later Yes | Mostly no | Varied | Prob. of F-value from ANOVA | Percent variance accounted for |
|---|----------------|------------------|-------------------|----------------|----------------|-------------------|--------------------------------------|---|
| Age-12 competency ⁻ | Mean (n=90) | Mean (n=19) | Mean (n=15) | Mean (n=34) | Mean (n=20) | Mean (n=88) | | |
| Perseverance* | 75.1 | 61.5 | 63.8 | 77.8 | 54.7 | 66.2 | < 0.0001 | 10.4 |
| Individual Responsibility* | 79.6 | 67.9 | 74.0 | 82.4 | 66.8 | 74.5 | 0.005 | 6.3 |
| Social Skills with Peers* | 74.2 | 62.6 | 70.6 | 74.0 | 64.7 | 70.1 | 0.002 | 7.1 |
| Communication* | 74.8 | 65.8 | 65.2 | 74.8 | 63.6 | 67.3 | 0.003 | 6.8 |
| Mathematics** | 51.1 | 56.3 | 33.7 | 62.8 | 45.5 | 49.0 | 0.002 | 6.9 |
| PAT Reading Comprehension | 55.6 | 56.0 | 40.5 [^] | 61.1 | 45.9 | 53.2 [^] | 0.018 | 5.1 |
| Burt Word Reading* | 80.2 | 80.2 | 71.4 | 80.6 | 70.3 | 73.8 | 0.006 | 6.1 |
| Reading Age (yrs, mo) | 13.2 | 13.1 | 12.0 | 13.6 | 11.8 | 12.6 | 0.0001 | 9.2 |
| Composite Competency* | 69.0 | 63.7 | 60.7 [^] | 72.0 | 60.6 | 64.6 [^] | 0.0003 | 8.6 |
| Composite Cognitive Competency | 60.3 | 61.8 | 51.4 [^] | 65.3 | 55.3 | 58.1 [^] | 0.005 | 6.3 |
| Composite Social & Attitudinal Competency* | 74.7 | 65.0 | 68.0 | 76.5 | 64.2 | 69.0 | 0.0002 | 8.8 |

* In these cases the squared model was a better fit.

** In these cases the square-root model was a better fit.

[^] One fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

School resources

Class size

Longitudinal random trials of class size in the US have shown advantages for children in having very low class sizes, of around 15, for the early years of school, particularly for children from low-income homes.

In the Competent Children project, we have found only a few associations with class size in each phase, perhaps because there are very children from classes of such a low size in the study.

When we analysed the patterns of class size experienced by the 267 study children for whom we have class size data at ages 6, 8, 10, and 12, we found that only 15 of the study children had always been in a class with 25 or fewer students. We have called this a “small” class size. We have defined “medium” class size as being 26 or 27 students, and class sizes of 28 or more as “large”. Only 9 percent (n=25) of the children were always in large classes for the first 6 years of their schooling. Because of the U.S. research, we have separated out the group who experienced a mixed range of class sizes into those who were in small classes at ages 6 and 8, followed by larger classes at ages 10 and 12, which was 16 percent of this sub-sample (n=43), and those whose class size varied otherwise (69 percent, n=184).

We found no associations between class size and the social and attitudinal competencies at age 12, and some indicative associations with the cognitive competencies. On the whole, where there are associations, the group which has always experienced small class sizes has higher average scores. Having small class sizes earlier, followed by a mixture of sizes including a large class size, does not seem to confer an advantage compared to those whose class sizes have always been large, or mixed. Allowing separately for family income, maternal qualification, and current school ownership (since 60 percent of the group that had always had small class sizes were currently attending private schools) reduced some of the associations.

Table 50 History of class size in 4 levels and children’s competencies at age 12

| History of Class Size in 4 levels [®] | Always small | Small at ages 6&8 bigger at least for 1 age beyond that | Other mixed history | Always large | Prob. of F-value from ANOVA | Percent variance acct. for |
|--|--------------|---|---------------------|--------------|-----------------------------|----------------------------|
| Age-12 competency ^ˉ | Mean (n=15) | Mean (n=43) | Mean (n=184) | Mean (n=25) | | |
| Mathematics ^{**} | 67.7 | <i>48.8</i> | 49.8 | 54.0 | 0.043 | 3.0 |
| PAT Reading Comprehension | 69.6 | <i>51.8</i> | 53.2 ^{^^} | 56.0 | 0.027 | 3.5 |
| Burt Word Reading [*] | 86.8 | <i>76.7</i> | 76.1 | 77.3 | 0.034 | 3.2 |
| Logical Problem-Solving [*] | 78.9 | <i>68.6</i> | 70.3 | 68.9 | 0.008 | 4.4 |
| Composite Competency [*] | 72.9 | <i>65.8</i> | 65.9 ^{^^} | 68.3 | 0.050 | 2.9 |
| Composite Cognitive Competency | 70.1 | <i>57.8</i> | 59.0 ^{^^} | 60.5 | 0.010 | 4.3 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

^^ Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

School ownership

We have found a significant association at each earlier phase of the study, with either the Burt Word Reading test or PAT Reading Comprehension test, favouring children who attended private schools. At age 12, there were significant associations with mathematics, the PAT Reading Comprehension test, writing, and Logical Problem-Solving. These associations were reduced after taking into account family income, maternal qualification, school decile, and class size.

When we analysed age-12 competencies in relation to previous attendance at schools with different ownership, we found significant associations between ownership of the school attended when the study children were aged 6 and 8 for the Burt Word Reading test, writing, and Logical Problem-Solving, and when they were 8 for mathematics. There were significant associations between school ownership of the school attended when children were aged 10 with mathematics, the PAT Reading Comprehension test, Burt Word Reading test, and writing. These associations were reduced after taking into account family income and maternal qualification.

We found 23 different patterns of school attendance between ages 6 to 12, in terms of school ownership for the 267 children for whom we had full data. Sixty-four percent of the children had attended only state schools, 8 percent had attended only state integrated schools, and 3 percent, only private schools. We used 4 categories for the analysis of history of school ownership aged 6–12. There was only one indicative relationship with the social and attitudinal competencies, and significant associations with the PAT Reading Comprehension test, writing, and Logical Problem-Solving. Children who had attended private schools in 2 of the 4 study phases had higher average scores for these cognitive competencies. Children who had always attended state integrated schools had higher average scores for Social Skills with Peers than those who had always attended state schools or a mix of state and state integrated schools. Other than writing, the associations with the cognitive competencies were considerably reduced after taking family income and maternal qualification into account.

Table 51 History of school ownership age 6–12 and competencies at age 12

| History of school ownership® | All state | Mixed mostly state & state integrated | All state integrated | 2 or more private | Prob. of F-value from ANOVA | Percent variance acct. for |
|-----------------------------------|-----------------|---|-------------------------|----------------------|--------------------------------------|----------------------------------|
| Age-12 competency | Mean (n=170) | Mean (n=54) | Mean (n=22) | Mean (n=21) | | |
| Social Skills with Peers* | 69.7 | 70.9 | 78.7 | 72.9 | 0.024 | 3.5 |
| Mathematics** | 48.9 | 51.9 | 54.1 | 63.6 | 0.049 | 2.9 |
| PAT Reading Comprehension | 51.9^^ | 53.3 | 60.8 | 67.2 | 0.006 | 4.6 |
| Burt Word Reading* | 75.8 | 76.6 | 77.7 | 85.8 | 0.026 | 3.4 |
| Writing** | 49.6 | 50.7 | 52.2 | 59.4 | 0.0004 | 6.6 |
| Logical Problem-Solving* | 69.5 | 69.9 | 71.0 | 78.2 | 0.008 | 4.4 |
| Composite Cognitive Competency | 58.1^^ | 59.4 | 61.6 | 69.4 | 0.002 | 5.7 |

* In these cases the squared model was a better fit.

** In these cases the square-root model was a better fit.

^^ Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

After accounting for class size history, the association with social skills favouring those who always attended state integrated schools remained, in relation to those who had attended either all state schools or a mixture of state and state integrated. The association with writing remained, favouring those who had attended private schools in at least 2 of the 4 study phases. However, the other associations with the cognitive competencies were no longer evident, suggesting that it is the smaller class sizes offered by private schools which lay behind the differences seen in relation to their ownership.

School socio-economic decile

We have found associations between the cognitive competencies and Communication, and school socio-economic decile at each earlier phase, only a few at age-6, but more at later ages.

When we analysed the relationship between the age-12 competencies and each of the earlier phases separately, we found stronger associations with the socio-economic decile of the school attended at age 6 than showed with age-6 competency scores, and similar associations as those found for current competency levels for the socio-economic decile of the school attended at age 8 and age 10. The associations remained significant after taking into account family income and maternal qualification for all competencies other than reading age, and writing (in relation to age-8 school decile). Generally, students who had attended decile 1–2 schools at an earlier age had lower average scores than others, and students who had attended decile 9–10 schools at an earlier age, higher scores.

This suggested a grouping of deciles into low (1–2), medium (3–8), and high (9–10) for analysis of the children's history of school attendance in terms of socio-economic decile. We found 33 different patterns over the 6-year period, for the 243 students for whom we had all the data for each of the 4 phases. This reflects movement between schools related mainly to change of family residence, but also deliberate choices of new schools. It is also likely to reflect changes in the decile designation of schools, which were revisited at least once in this period on a national basis, after the national census in 1996, and children's shifts at age 12 to intermediates and Year 7–15 secondary schools which, because they draw on wider catchment areas, tend to have different (overall higher) decile ratings overall compared with primary schools.

Sixteen percent of this sub-sample had always attended a high-decile school. Thirty percent had always attended a medium decile school. Only 4 percent (n=9) of the children had always attended a low-decile school between the ages of 6 to 12.

We regrouped these patterns into 4 categories, as shown in the table below. The "high" category includes children whose school was high-decile from ages 6–10, then medium at age 12. The "mixed" category included all mixtures, including children who did attend a high-decile school for two of the phases, or whose latest school was high-decile.

Table 52 History of school socio-economic decile and competencies at age 12

| History of School Decile [®] | Mostly low Mean (n=18) | Mixed Mean (n=86) | Medium Mean (n=73) | High Mean (n=66) | Prob. of F-value from ANOVA | Percent variance accounted for |
|---------------------------------------|------------------------------|-------------------------|--------------------------|------------------------|--------------------------------------|---|
| Age-12 competency ⁻ | | | | | | |
| Perseverance* | <i>60.4</i> | 68.3 | 65.8 | 75.3 | 0.012 | 4.4 |
| Mathematics** | <i>24.7</i> | 47.2 | 46.2 | 64.6 | < 0.0001 | 21.3 |
| PAT Reading Comprehension | <i>34.8[^]</i> | 48.5 | 51.2 | 64.6 | < 0.0001 | 15.1 |
| Burt Word Reading* | <i>65.9</i> | 73.6 | 75.8 | 82.0 | < 0.0001 | 8.7 |
| Writing** | <i>46.5</i> | 49.0 | 48.2 | 54.1 | 0.0005 | 7.1 |
| Reading Age (yrs, mo) | <i>12.1</i> | 12.5 | 12.9 | 13.5 | 0.002 | 6.0 |
| Logical Problem-Solving* | <i>59.4</i> | 68.9 | 68.5 | 75.1 | < 0.0001 | 12.5 |
| Composite Competency* | <i>56.9[^]</i> | 65.2 | 64.1 | 71.2 | < 0.0001 | 10.4 |
| Composite Cognitive Competency | <i>45.4[^]</i> | 56.5 | 56.6 | 66.8 | < 0.0001 | 19.9 |

* In these cases the squared model was a better fit.

** In these cases the square-root model was a better fit.

[^] One fewer in this mean.

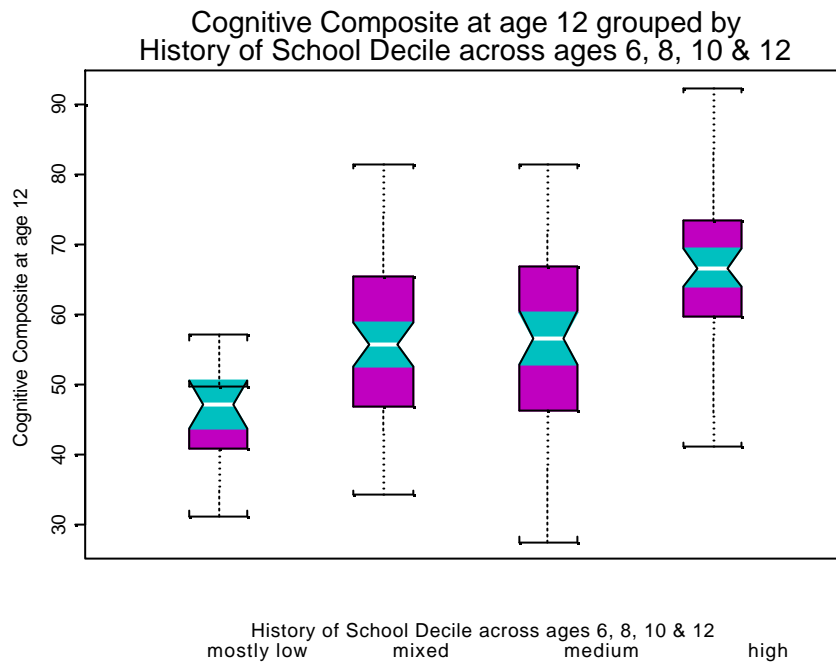
The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Children who attended a high-decile school for at least 3 of the 4 study phases between the ages 6–12 had higher average scores; and children who had always attended a low-decile school, lower average scores. Children who had mixed attendance patterns had much the same average scores as those who consistently attended medium decile schools, indicating that switching between schools of different decile, including choosing to move to a higher decile school, may not confer any advantage.

The difference related to Perseverance did not remain notable after taking into account family income and maternal qualification. Most of the other differences did remain significant. They account for large amounts of the proportion of variance in children's scores, particularly notable for mathematics and the PAT Reading Comprehension test. The following boxplot²⁸ summarises the differences found in relation to the Composite Cognitive Competency.

²⁸ See Appendix One for a description of a boxplot.

Figure 3 History of school decile and Cognitive Composite score



Changes in daily settings

Shifting house

Sixty-nine percent of the study children had moved house at least once by the time they were 12. Twenty-three percent had moved once, 15 percent, twice, 17 percent, 3 or 4 times, and 14 percent, 5 or more times (to a total of 14 shifts for one child). A number of associations were found with children's competency levels at age 12, generally favouring children who had either stayed in the same house, or moved only once or twice in relation to those who had moved 5 or more times.

Table 53 **Number of times child's family has shifted house since child's birth and children's competencies at age 12**

| Number of times of family changes of house since birth of child® | None | Once | Twice | 3 or 4 times | 5 or more times | Prob. of F-value from ANOVA | Percent variance acct. for |
|--|---------------------------|--------------|-------------|--------------------|-----------------|-----------------------------|----------------------------|
| | Mean (n=154) | Mean (n=115) | Mean (n=73) | Mean (n=86) | Mean (n=68) | | |
| Age-12 competency ⁻ | | | | | | | |
| Curiosity | 63.8 | 64.6 | 63.0 | 59.3 [^] | 56.1 | 0.018 | 2.4 |
| Perseverance | 71.8 | 73.9 | 68.3 | 65.3 [^] | 60.5 | 0.0003 | 4.3 |
| Individual Responsibility | 76.6 | 78.0 | 76.2 | 71.8 [^] | 70.1 | 0.033 | 2.1 |
| Social Skills with Peers* | 72.0 | 72.8 | 71.6 | 69.9 [^] | 65.5 | 0.014 | 2.5 |
| Social Skills with Adults* | 78.1 | 76.5 | 77.3 | 75.6 [^] | 73.7 | 0.45 | 0.7 |
| Communication* | 71.2 | 70.5 | 68.0 | 68.3 [^] | 64.0 | 0.056 | 1.9 |
| Mathematics** | 54.0 | 52.6 | 52.0 | 51.2 | 39.9 | 0.002 | 3.5 |
| PAT Reading Comprehension | 55.4 ^{^^^} | 56.4 | 55.1 | 53.0 [^] | 49.0 | 0.19 | 1.3 |
| Burt Word Reading* | 76.9 | 77.6 | 77.6 | 79.3 | 72.2 | 0.030 | 2.2 |
| Writing | 52.1 | 52.1 | 53.0 | 52.4 | 47.3 | 0.006 | 2.9 |
| Reading Age (yrs, mo) | 12.10 [^] | 12.11 | 12.8 | 12.7 [^] | 12.2 | 0.079 | 1.7 |
| Logical Problem-Solving* | 71.9 | 69.9 | 70.7 | 70.6 | 66.7 | 0.033 | 2.1 |
| Composite Competency* | 67.8^{^^^} | 67.8 | 66.7 | 65.1 ^{^^} | 60.4 | 0.0004 | 4.2 |
| Composite Cognitive Competency | 61.2^{^^^} | 60.4 | 60.5 | 60.4 [^] | 53.6 | 0.001 | 3.6 |
| Composite Social & Attitudinal Competency* | 72.3 | 72.7 | 70.7 | 68.4 [^] | 65.0 | 0.004 | 3.0 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

^{^^^} Three fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Some associations became indicative or not notable once maternal qualification and family income were taken into account, suggesting that family resources may be protective for multiple shifts of residence. Significant contrasts for mathematics remained, between those who had moved 5 or more times and others, and for Perseverance and Social Skills with Peers, between those who had not moved or moved only once, and those who had moved 5 times.

Number of schools attended

There were a few relationships between the number of schools attended by children and their competency scores. On the whole, children who had attended a single school tended to have higher average scores than others for reading and writing, and children who had attended 4 or more schools by the age of 12 tended to have lower than average scores for mathematics. These associations remained after taking into account family income and maternal qualification, though they were somewhat diluted.

Children who had attended 3 or more schools were more likely to have attended all low-decile schools, or a mixture of decile schools over the 6 years between age 6 and 12.

Transitions between schools between ages 10–12

There is growing interest in the impact of transitions between schools serving different age groups. Forty-four percent of the study children moved from primary school to 2-year intermediates between our data gathering at age 10, and at age 12. Thirty-six percent stayed at their (“full”) primary school. Other transitions were: 8 percent moved to Year 7–15 secondary schools, 5 percent moved from primary schools to composite schools, and 7 percent changed their primary school.

We found a significant association with writing, and indicative associations with mathematics, PAT Reading Comprehension test, Logical Problem-Solving, and Individual Responsibility, though the proportion of variance accounted for by patterns in transition at this stage was small.

The associations favoured children who moved from primary to composite schools (all private). These associations were no longer notable after taking into account family income and maternal qualification.

Thus the main transition at this age, from primary to intermediate school, did not appear to have a marked association with children’s competency scores. We tested this out further in 2-factor modelling, where we first accounted for age-10 PAT Reading Comprehension test scores. The contrasts favouring children who had moved from primary to composite schools were no longer present. There was one remaining contrast ($p = 0.045$), a 3 percentage points difference in score favouring children who stayed at the same school and those who moved from a primary to intermediate school. We did not analyse this result further in terms of family income and maternal qualification, but it seems likely that this result would no longer be notable once we had taken them into account, since intermediate school attendance was related to these 2 family characteristics.

Family type

The categories we used here were based on parents’ reports of their family make-up at ages 5, 8, 10, and 12, based on the 406 for whom we had data at each stage. They are:

- all stages: 2-parent biological (71 percent);
- all stages: 1-parent biological (6 percent);
- some stages 2-parent, some stages 1-parent (10 percent); and
- biological parent and partner in at least 1 stage (13 percent).

The only significant associations found were with Perseverance and mathematics. Children who were in 2-parent biological families at all stages had higher average scores than those who were in 1-parent families at all stages. This association remained significant with Perseverance after taking maternal qualification into account, but not family income at age 5. The association with mathematics became indicative after taking maternal qualification into account, and was no longer evident after taking into account family income.

Children who were in 1-parent families, and those where there was at least one stage where the parents were the biological parent and her/his partner tended to be over-represented in the low-income group, in contrast to the children who had had their original 2 parents at all stages. Differences in patterns related to maternal qualification were evident, but not so clear-cut.

Child's responses

How child copes with upsets

Current experience of being upset, and how a child coped with it, showed some associations with age-12 competency levels, more so for the social and attitudinal than cognitive competencies. These associations remained after taking family income and maternal qualification into account.

When we analysed the relationship with age-12 competency scores with children's earlier experience of upsets and how they dealt with them (at ages 8 and 10), taking each phase separately, we found only a few indicative associations. An association with Reading Age was common to both earlier phases.

Thirty-five percent of the 489 children for whom we had data for all 3 phases had not experienced anything which upset them (on parental report, at the time of our interviews). Only 3 students were upset and not coping in all 3 stages. We grouped the data into 10 categories, and examined the box-plots of these categories' association with Perseverance, Social Skills with Peers, mathematics, and the Composite Competency to decide on a smaller number of categories for analysis. The following table shows 6 categories, and the average scores for each. There are significant associations for 3 of the 6 social and attitudinal competencies, showing higher average scores for those who experience no upsetting experiences. This same pattern does not emerge with mathematics, when it was children who experienced upsets at every age but who could cope with it, at least some of the time, who had higher average scores; the children with the lowest average scores were those who were upset more than once, or currently, and who did not cope with being upset. These associations remained after taking into account family income and maternal qualification.

Table 54 History of upsets and child's response at ages 8-12, and age 12 competencies

| History of how child copes with upsets® | No upsets | No upsets at 8 or 10, coping or varies at 12 | One lot of not coping before age 12 | Not coping more than once or at age 12 | Mixed, at least one no upsets and no not coping | Upsets at every age but coping or varying | Prob. F-value from ANOVA | Percent variance acct. for |
|--|---------------------------|--|-------------------------------------|--|---|---|--------------------------|----------------------------|
| Age-12 competency ⁻ | Mean (n=170) | Mean (n=69) | Mean (n=23) | Mean (n=27) | Mean (n=175) | Mean (n=25) | | |
| Perseverance | 73.4[^] | 65.7 | 60.9 | 63.0 | 69.9 | 58.0 | 0.001 | 4.1 |
| Individual Responsibility | 77.9[^] | 70.4 | 71.3 | 74.3 | 76.7 | 64.2 | 0.004 | 3.5 |
| Social Skills with Peers* | 74.5[^] | 68.8 | 66.1 | 64.1 | 71.2 | 62.6 | < 0.0001 | 6.3 |
| Social Skills with Adults | 78.7[^] | 73.1 | 70.7 | 74.7 | 77.8 | 70.0 | 0.034 | 2.5 |
| Mathematics** | 50.6 | 52.5 | 45.9 | 36.7 | 52.1 | 59.6 | 0.007 | 3.2 |
| Burt Word Reading* | 76.9 | 77.5 | 76.8 | 66.6 | 77.7 | 80.2 | 0.022 | 2.7 |
| Writing** | 51.6 | 51.0 | 50.5 | 46.9 | 52.7 | 52.9 | 0.11 | 1.8 |
| Reading Age (yrs, mo) | 12.9 ^{^^} | 12.11 | 12.1 | 11.10 | 12.10 | 12.10 | 0.039 | 2.4 |
| Composite Competency* | 67.9^{^^^} | 64.6 | 62.4 | 60.4 | 67.0 ^{^^} | 63.3 | 0.025 | 2.6 |
| Composite Cognitive Competency | 59.8 ^{^^} | 60.3 | 57.6 | 51.1 | 60.4 ^{^^} | 63.6 | 0.009 | 3.1 |
| Composite Social & Attitudinal Competency* | 73.3[^] | 67.4 | 65.6 | 66.6 | 71.2 | 63.2 | 0.002 | 3.7 |

* In these cases the squared model was a better fit.

** In these cases the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

^{^^^} Three fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Relations with others

Bullying

We used teacher responses at age 10 and 12 to provide a picture of the patterns of bullying experience at both ages. This gave us data on 425 children. Forty-nine percent of them had had some experience of bullying in one of these phases.

However, the proportion of children who are involved in bullying consistently was not high: 14 percent, 9 percent involved as bullies or bully-victims at both ages, and 5 percent involved as victims at the earlier stage, and victims, bullies, or bully-victims at the later age. (This "turn" from victim to bully is worth noting, though it does not affect every victim; and average scores for this group were similar to those who had been victims at age 10 but who were not at age 12.)

Seventeen percent of the children had been involved in bullying at age 10, but were not at age 12, and the same proportion had some current involvement, but had not had any at the earlier phase.

The associations we found with the children's current competency levels persisted after taking family income and maternal qualification into account. Generally, children who experienced no bullying whatsoever in these 2 phases had higher average scores, and those who had been bully victims at age 10 and were still involved in bullying at age 12, lower average scores. The differences in average scores between children who had no involvement in bullying and those for whom bullying was a consistent part

of their school experience over the 2 phases were around 10 percentage points for the cognitive competencies, and a year and a half for Reading Age, and between 13 and 21 percentage points for the social and attitudinal competencies.

Table 55 History of child's involvement in bullying age 10–12 and competencies at age 12

| History of Involvement in Bullying® | Bully victim at age 10, victim, or bully at age 12 | Victim, bully, or victim at age 10 but none of these at age 12 | Victim at age 10, victim, or bully at age 12 | Bully at 10, victim, bully or victim at age 12 | Not victim, bully, or victim at 10, bully, or victim at 12 | None of these at both ages 10 and 12 | Prob. F-value from ANOVA | % var. acct. for |
|--|--|--|--|--|--|--------------------------------------|--------------------------|------------------|
| Age-12 competency ⁻ | Mean (n=23) | Mean (n=73) | Mean (n=22) | Mean (n=17) | Mean (n=72) | Mean (n=218) | | |
| Perseverance* | <i>53.8</i> | 66.5 | 66.5 | 68.0 | 62.1 [^] | 74.8 | < 0.0001 | 8.8 |
| Individual Responsibility* | <i>64.1</i> | 73.0 | 75.2 | 74.1 | 71.2 [^] | 78.7 | 0.0002 | 5.5 |
| Social Skills with Peers* | <i>56.3</i> | 69.4 | 68.3 | 68.4 | 68.4 [^] | 74.3 | < 0.0001 | 9.2 |
| Social Skills with Adults* | <i>63.8</i> | 77.7 | 78.0 | 77.9 | 73.1 [^] | 79.2 | 0.003 | 4.3 |
| Communication* | <i>59.6</i> | 69.4 | 70.3 | 70.9 | 64.5 [^] | 72.3 | 0.002 | 4.4 |
| Mathematics** | <i>45.0</i> | 50.1 | 49.1 | 41.8 | 47.2 | 55.6 | 0.014 | 3.3 |
| PAT Reading Comprehension | <i>44.6</i> | 53.5 | 48.4 | 50.2 | 50.2 | 59.2^{^^^} | 0.0006 | 5.1 |
| Burt Word Reading* | <i>70.8</i> | 76.2 | 78.0 | 72.5 | 73.6 | 80.4 | 0.002 | 4.5 |
| Reading Age (yrs, mo) | <i>11.10</i> | 12.5 | 12.4 | 12.7 | 12.3 [^] | 13.2[^] | < 0.0001 | 6.9 |
| Composite Competency* | <i>58.0</i> | 65.1 | 65.6 | 64.3 | 62.5 [^] | 69.7^{^^^} | < 0.0001 | 8.2 |
| Composite Cognitive Competency | <i>54.8</i> | 58.7 | 58.5 | 56.2 | 57.2 | 63.1^{^^^} | 0.0006 | 5.0 |
| Composite Social & Attitudinal Competency* | <i>60.2</i> | 69.5 | 70.4 | 69.7 | 66.2 [^] | 74.0 | < 0.0001 | 7.1 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^^} Three fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Summary

Longitudinal pictures of children's experience and access to resources show that behind the "snapshots" taken at each age lies sometimes considerable variability in previous experience and access to resources.

Does stability confer advantages?

Do children benefit from stability *per se*? Children who stayed in the same house or shifted once or twice only between their birth and age 12 tended to have higher average scores than those who had shifted 5 or more times. Those whose families had always enjoyed very high-incomes also had higher average scores.

There seemed to be some disadvantage to study children whose family income levels varied over time, compared with those whose family incomes remained stable, even at low levels. Yet we do not see disadvantage occurring from variation in maternal employment, or family type.

In terms of the children's own use of time, the advantage of consistency depends on the kind of use. It is advantageous to always complete homework, and to consistently watch less than 2 hours television a day on average. It is not advantageous to be watching large amounts of television consistently from the ages of 5 to 12. (Nor was this association with lower competency levels reduced by sometimes watching smaller amounts.) Children whose participation in music varied between ages 8 and 12 did not have lower average scores than those whose participation was consistent; those with the lower scores were those who had been consistent in having no participation in music.

It is an advantage to stay clear of bullying behaviour, whether as victim or bully, or both.

Only 3 of the study children were consistently upset and not coping in all 3 phases between ages 8 and 12. Children who were upset more than once over this time, or currently, and who did not cope with it, tended to have lower average scores. Children who had upsets but coped with them tended to have higher average scores for mathematics, and those who experienced no upsets during this time had higher average scores for Perseverance, Individual Responsibility, and Social Skills with Peers.

Few paths through school run entirely smoothly

Different teachers experience their relationship with a child's parents differently. Only 13 percent of the study children had relationships between parents and teachers that their teachers consistently thought were very good/excellent over the ages 8 to 12. These children, and those for whom the relationship was seen as very good/excellent for 2 of the 3 phases, tended to have higher average scores.

Parents and teachers are likely to work together at least once during the age-8 to age-12 period on a problem that an individual child is experiencing. This did not seem to affect children's cognitive competencies, unless a child consistently experienced academic problems. It did seem to affect children's age-12 scores for the social and attitudinal competencies if children experienced a problem in 2 or more of the 3 study phases.

Sixty-nine percent of the parents of the study children gave voluntary help at their child's school in at least 1 of the 3 study phases during the age-8 to age-12 period, and only 2 percent of the parents had had no involvement in their child's school for 2 or 3 of the study phases. Children whose parents did voluntary work at their school for at least 2 of the 3 phases had higher average scores, suggesting that children were receiving a consistent message about the value of school. Conversely, children whose parents had no involvement in their school in 2 or 3 of the phases had lower scores: they too were getting consistent messages, but perhaps not ones supporting their engagement in school.

Only 34 percent of the children's parents were always satisfied with their progress at school between ages 6 to 12, and only 8 percent were never satisfied, or only once satisfied. Consistency in parental satisfaction with progress is associated with higher scores, or with becoming satisfied at age 10 or 12.

Structural aspects of school

Stability of class size was useful for the few children whose classes have always been small (in this study, 25 or fewer students). Otherwise, there were no differences related to cumulative experiences of classes of different size, whether the classes were much the same in size over the years, or varied. However, the variation in class size in our sample is not large.

Children who have consistently attended state integrated schools have higher average scores for Social Skills with Peers than others, and those who have consistently attended private schools, higher average scores for writing.

Half the children have consistently attended schools in the same socio-economic decile band (low, medium, and high). Children who attended a high-decile school for at least 3 of the 4 study phases between the ages 6–12 had higher average scores; and children who had always attended a low-decile school, lower average scores. Children who had mixed attendance patterns had much the same average scores as those who consistently attended medium decile schools, indicating that switching between schools of different decile, including choosing to move to a higher decile school, may not confer any advantage.

There appears to be some advantage in stability of school: children who stayed at the same school between ages 6 and 12 tended to have higher average scores for reading and writing, and children who had attended 4 or more schools, lower average scores for mathematics. However, though there is high interest in the effects of transition between different school stages, we found no disadvantages for children who changed school between age 10 and 12.

Overall, the experience of stability or just a couple of changes in the daily settings of children's lives—their homes (and possibly neighbourhoods) and schools—appeared to give children advantages in some, but by no means all, of the competencies. But family income and maternal qualification levels appear to act “protectively” in relation to large numbers of changes in residence for some competencies and experiences.

It is interesting that mathematics performance does seem to be affected by a higher number of changes of residence and school. This is consistent with the way in which mathematics knowledge and skills develop more in a “building block” way, one level needing an earlier level to be mastered before further progress can be made.

Section Five

Contributions of early childhood education

The role of early childhood education (ECE) in children's lives, both at the time they participated in it, and later, has been a key focus for the Competent Children study. We have found that aspects of ECE continued to show associations with the study children's competency scores 5 years after they left it, when they were aged 10. These associations were mainly with children's literacy, mathematics, and Social Skills with Peers, and the aspects of early childhood education were mainly related to quality of the child's final ECE centre, length of ECE experience, and the socio-economic mix served by the child's final ECE centre. More detail is given in Wylie and Thompson (2002).

This section focuses on the research question:

Does early childhood education continue to have an impact at age 12? If so, which aspects remain important?

We analysed the following aspects of the study children's ECE experience in 2 ways. First, we used ANOVA analysis to establish whether there were still associations between the aspect and children's competency scores at age 12, which remained after taking into account family income and maternal qualification. Then, for those aspects which showed associations, we included in the models the child's age-5 score on each competency, to see whether the aspect was having an association through its contribution to the age-5 score, or whether it was also making a contribution over and above this. For most of this analysis, we use only the "original sample" children, for whom we have full material on early childhood education experience and quality, but there are some aspects for which we have data for the whole study sample.

Associations between ECE experience and children's competencies at age 12

We start with the results of the first analysis. We included in this analysis those aspects which have shown no associations throughout the study, just in case there was a " sleeper " effect. But we continued to find no associations between the children's competency levels, and parental satisfaction levels with ECE staff communication with them about their child's experience in their final ECE

centre, parental perception that the final ECE centre had some negative aspects for their child, or the level of parental involvement in the child's final ECE centre. We have found 1 or 2 associations over the years in relation to children's patterns of combinations of ECE types (whether they attended 2 or more in the same time period, for example, both kindergarten and family day care), but we found no associations with age-12 competencies.

Length of ECE experience

We have 2 kinds of data on children's length of time in ECE: their starting age, and the total length of their experience.

Starting age

We used data for all the children in the study at age 12 to analyse the association between ECE starting age and children's competencies at age 12. Twenty-eight percent of the children had started ECE before they were a year old. Sixteen percent had started ECE in their second year, and 22 percent, in their third year. Thirty-three percent had started ECE after age 3. We found significant associations with Curiosity, mathematics, and PAT Reading Comprehension test, and indicative associations with Reading Age and Logical Problem-Solving. In general, children who started ECE before they were age 2 had higher scores of around 4–5 percentage points compared with those who started after that age. The associations for mathematics and the PAT Reading Comprehension test remained after taking family income and maternal qualification into account, but not those for Curiosity, Reading Age, or Logical Problem-Solving.

Length of ECE experience

Length of experience is not synonymous with starting age, since some children who start ECE experience at the same age had breaks in that experience. Positive associations with length of ECE experience have been reported from a number of longitudinal studies, including the Christchurch study (Fergusson, Horwood, and Lynskey, 1994), and in Sweden (Andersson, 1993; Broberg et al., 1997). The US research shows more mixed findings, with positive associations linked to the quality of the ECE experience, or the school experience following it (Currie, 2000; Smith et al., 2000; pp. 30–37). In the Competent Children study, we have found associations at each phase after the completion of ECE, stronger at ages 6 and 8 than at age 10, with some dilution after taking into account family income and maternal qualification. There have been consistent associations with mathematics, Communication, and Logical Problem-Solving.

At age 12, we continued to find significant associations with mathematics and Logical Problem-Solving, but no longer with Communication. An indicative association with Social Skills with Adults emerged for the first time, with the contrast favouring children who had attended ECE for between 24–35 months over those who had attended for 48 months or more remaining indicative after taking family income and maternal qualification into account. However, there was no difference in average scores for children who

Contributions of early childhood education

had attended for between 24–35 months, suggesting that something other than length of ECE experience itself may be at work here. The 2 other associations show higher average scores for children who had 48 months or more early childhood education experience. These remained significantly different for mathematics after taking family income into account, and most remained significant after taking into account maternal qualification, with the contrasts between those who had 48 months or more ECE experience and those who had between 36–47 months becoming indicative. The contrast between having 48 months or more ECE experience and having less than 24 months remained significant after taking family income into account, but became indicative after taking maternal qualification into account.

Table 56 Total length of ECE and children's competencies at age 12

| Total length of ECE ® | <24 months | 24–35 months | 36–47 months | ≥48 months | Prob. of F- value from ANOVA | Percent variance accounted for |
|--------------------------------|---------------|-----------------|-----------------|---------------|------------------------------------|---|
| Age-12 competency ⁻ | (n=34) | (n=55) | (n=70) | (n=109) | | |
| Social Skills with Adults* | 79.9 | 71.2 | 77.0 | 80.0 | 0.020 | 3.6 |
| Mathematics** | 44.3 | 43.5 | 48.4 | 58.5 | 0.0001 | 7.4 |
| Logical Problem-Solving* | 66.0 | 68.7 | 69.6 | 73.0 | 0.007 | 4.5 |
| Composite Competency* | 64.8 | 62.9 | 66.1 | 69.0 | 0.012 | 4.1 |
| Composite Cognitive Competency | 56.0 | 56.3 | 58.5 | 62.8 | 0.004 | 5.0 |

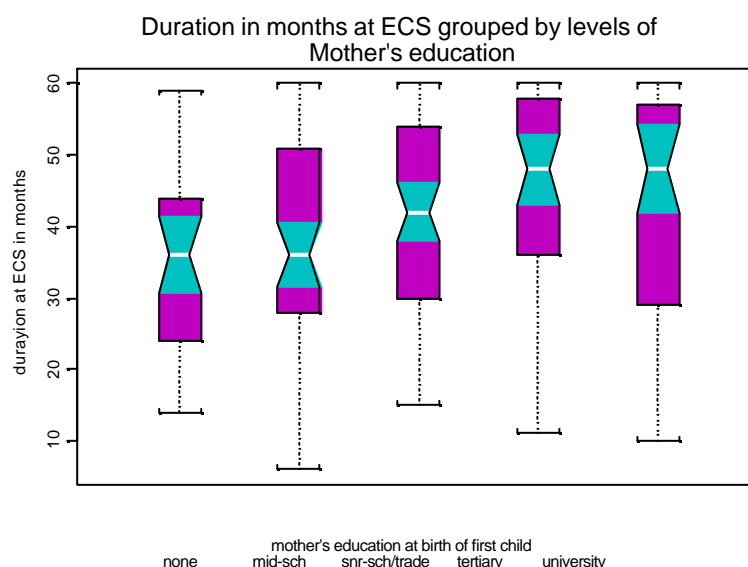
* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Children's length of ECE experience was related to their mother's qualification level, with children whose mothers had tertiary or university qualifications more likely to experience ECE for longer periods.

Figure 4 Length of ECE experience



Final ECE type

In the first phase of the study, we found that New Zealand ECE types as they were in 1993–94 had different combinations of structural quality features, often combining good quality ones with less supportive ones. This may lie behind the lack of difference we have found in relation to ECE type. Using data for all the study children, we did find in several phases that children who had attended A’oga Amata (most of which in our sample were then in their fledgling stage) had lower average scores for some competencies, but these associations did not remain when we took into account whether children’s English was their second language and maternal qualification levels.

At age 12, this trend continued. However, the associations with mathematics and the PAT Reading Comprehension test remained significant after taking into account family income and maternal qualification. Children who had attended A’oga Amata had much lower average scores than others – of around 26 percentage points for mathematics and around 18 percentage points for the PAT Reading Comprehension test. These differences were reduced by 7–9 percentage points and were at the indicative level after taking into account the child’s first language at the time they were attending their final ECE centre.

Children who had attended kindergartens had lower average mathematics scores of around 13 percentage points than those who had attended playcentre or family day care. Children who had attended playcentres had higher average scores of 3 percentage points for Logical Problem-Solving than those who had attended kindergartens, a contrast which became indicative once maternal qualification was taken into account.

Would we find similar trends if a new cohort of children were followed from their final ECE centre attendance in 2004? The greater support for A’oga amata, and their growth over the last decade suggests that a new Competent Children study would be unlikely to find the associations we have found in this study. It is unclear whether we would find the (small) contrast between playcentre and kindergarten again, since the decade has also seen the introduction of *Te Whāriki*, the ECE curriculum, and much more professional development.

Early childhood education socio-economic mix

We have consistently found that children whose final ECE centre served mainly middle-class families (as summarised by teachers) had higher average scores for the cognitive competencies. We continued to find these associations at age 12.

Table 57 ECE socio-economic mix and children's competencies at age 12

| ECE socio-economic mix [®] | Wide | Middle class | Low to middle | Low | Probability of F-value from ANOVA | Percent variance accounted for |
|-------------------------------------|-------------|--------------|--------------------|-------------|-----------------------------------|--------------------------------|
| Age-12 competency [̄] | (n=80) | (n=107) | (n=50) | (n=28) | | |
| Perseverance | <i>64.8</i> | 73.9 | 68.5 | <i>66.7</i> | 0.033 | 3.3 |
| Mathematics** | 43.8 | 62.6 | 44.1 | <i>42.0</i> | < 0.0001 | 16.3 |
| PAT Reading Comprehension | 46.2 | 63.3 | 52.1 ^{^^} | <i>44.6</i> | < 0.0001 | 14.3 |
| Burt Word Reading* | <i>71.5</i> | 81.9 | 76.5 | <i>73.4</i> | < 0.0001 | 9.1 |
| Writing | 48.2 | 53.7 | 51.0 | <i>46.3</i> | 0.0001 | 7.5 |
| Reading Age (yrs, mo) | 12.5 | 13.4 | 12.10 | <i>12.2</i> | 0.00071 | 6.3 |
| Logical Problem-Solving* | 68.0 | 75.5 | 66.2 | <i>64.9</i> | < 0.0001 | 14.3 |
| Composite Competency* | 63.5 | 70.4 | 65.5 ^{^^} | <i>61.9</i> | < 0.0001 | 7.9 |
| Composite Cognitive Competency | 54.7 | 66.1 | 56.8 ^{^^} | <i>53.0</i> | < 0.0001 | 18.0 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

^{^^} Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

The indicative association with Perseverance did not remain after taking family income and maternal qualification into account.

On the cognitive competencies, children who had attended centres serving mainly middle-class children had higher average scores. The associations with mathematics, the PAT Reading Comprehension test, and Logical Problem-Solving remained after taking family income and maternal qualification into account. The associations with the Burt Word Reading test, writing, and Reading Age became indicative.

Early childhood education quality

We found at age 8 and 10 that aspects of quality provision in the study children's final ECE centre showed associations with the children's competency levels at ages 8 and 10, particularly with mathematics and the PAT Reading Comprehension test.

These aspects of quality that showed a continuing contribution were mainly related to teacher-child interaction, opportunities to practise skills and experience completion, and exposure to the written word. Teacher-child interaction has been noted as a key component of quality care, if not the pivot (e.g. Kontos and Wilcox Hertzog, 1997; Munton, Mooney, Moss, Petrie, Clark, and Woolner, 2002; Smith, Grima, Gaffney, Powell, Masse, and Barnett, 2000).

The full range of aspects of ECE quality that were covered in our ratings of the final ECE centre attended by the "original sample" children is given in the table below. *Italics* indicates the aspects which showed associations with the children's competency scores when they were aged 12—7 years later. They are much the same set as we found when the study children were aged 10, with loss of the items showing associations at age 10: "Children can select from a variety of activities", "Children can complete activities", and "children support one another".

Three items showed associations for the first time at age 12: “Evidence of children’s artwork and creativity”, “Equipment and activities encourage fine motor skills”, and “Equipment and activities encourage gross motor skills”. We have not included these in the table below as they show inconsistent results (these are reported later in this section).

Table 58 ECE quality rating items

| Staff-child Interaction | Programme focus | Physical Environment & Resources | Self-esteem |
|--|---|--|---|
| <i>Staff are responsive to children</i> | Children can select from a variety of activities | Children move freely between in and outdoors | Children can complete activities |
| <i>Staff guide children in centre activities</i> | Children engage in imaginative play | Enough age-appropriate resources | Children support one another |
| <i>Staff ask children open-ended questions</i> | <i>The centre is “print-saturated”</i> | Good safety practices | Non-sex-stereoyped play |
| <i>Staff join children in their play</i> | Stories are read | Equipment and activities encourage fine motor skills | Tikanga Māori &/or te reo Māori evident |
| Staff model & encourage children to use positive guidance/discipline | Evidence of children’s artwork & creativity Children work on maths/science problems themselves | Equipment and activities encourage gross skills | Recognition of children’s cultures |

The quality items which continue to show positive associations with children’s competencies at age 12, after taking family income and maternal qualification levels into account, are in italics in the table. Generally they applied to all income groups in the same way. Maternal qualification levels did dilute some of the associations found, suggesting that mothers with high qualification levels may be able to choose ECE centres which offer higher quality, or that there is consistency between children’s experience in centres and home experience.

Here are the specific patterns for the items which showed positive associations with children’s competencies at age 12.

ECE staff were responsive to children

Mathematics, PAT Reading Comprehension test, and Logical Problem-Solving scores increased in line with increases in ECE centre scores for staff responsiveness to children. This is demonstrated in box-plots for mathematics and the PAT Reading Comprehension test scores.

Figure 5 ECE staff responsiveness to children and mathematics scores age 12

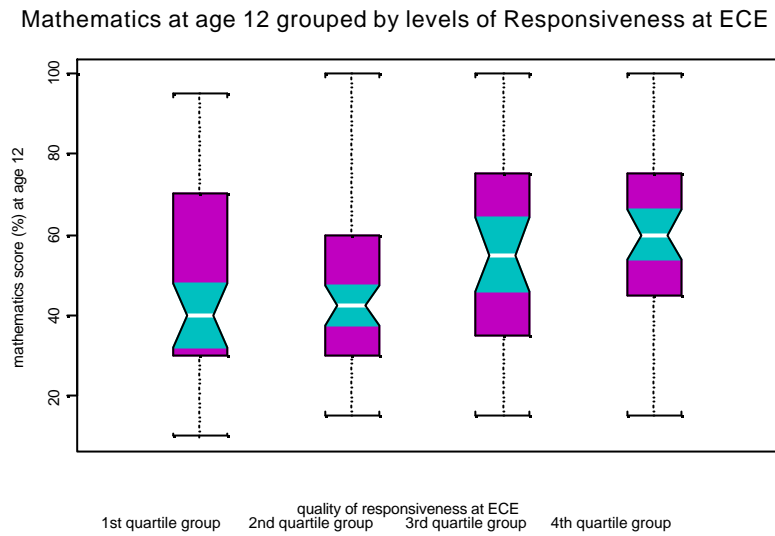
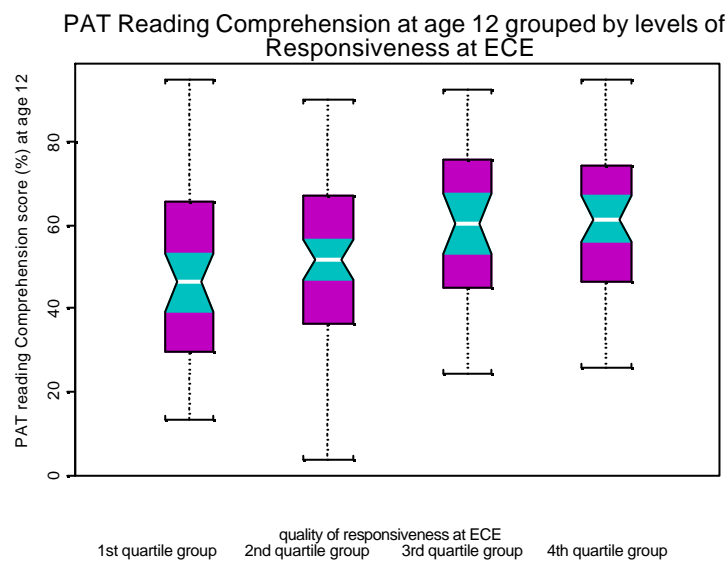


Figure 6 ECE staff responsiveness to children and PAT Reading Comprehension scores age 12



For mathematics, the size of the contrasts between different quartile groups has grown, rather than diminished, over time, and the proportion of variance explained has also increased somewhat. The same pattern was not evident in relation to the PAT Reading Comprehension test.

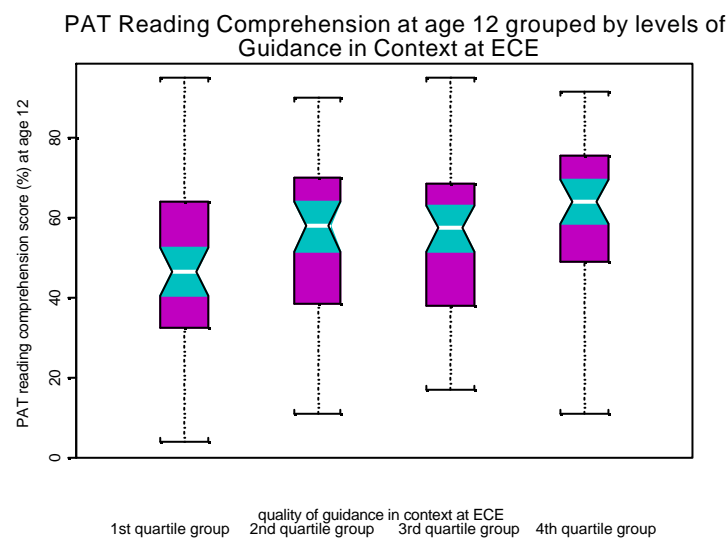
Table 59 Mean scores for the mathematics measures at ages 5, 6, 8,10, and 12 by quartile groups of ECE staff responsiveness to children

| ECE Staff were responsive to children® | 1 st quartile up to 3.5 | 2 nd quartile 3.5+ to 4 | 3 rd quartile 4+ to 4.33 | 4 th quartile 4.33+ | Prob. of F-value from ANOVA | Percent variance acct. for | Difference between highest & lowest |
|--|------------------------------------|------------------------------------|-------------------------------------|--------------------------------|-----------------------------|----------------------------|-------------------------------------|
| Competency [™] | Mean | Mean | Mean | Mean | | | |
| Age 5 Early Number Knowledge | 49.6 | 48.6 | 50.3 | 54.5 | N.S | | 4.9 |
| Age 6 Mathematics | 75.4 | 75.4 | 75.6 | 80.5 | N.S | | 5.1 |
| Age 8 Mathematics | 60.4 | 59.1 | 66.7 | 70.1 | 0.007 | 4.3 | 9.7 |
| Age 10 Mathematics | 57.7 | 60.6 | 63.8 | 70.8 | 0.005 | 4.6 | 13.1 |
| Age-12 Mathematics | 47.1 | 46.2 | 55.2 | 59.1 | 0.0014 | 5.7 | 12.9 |

Staff guide children in the context of centre activities

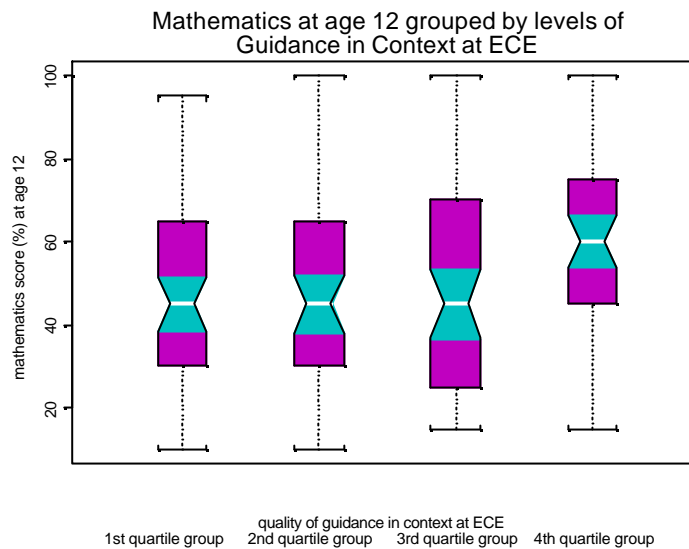
Again, the associations are with mathematics and the PAT Reading Comprehension test (at the indicative level). There is also an indicative association with Perseverance. Children's scores increased in line with their final ECE centre's score on how well staff guided children in the context of centre activities. The size and strength of the associations with the PAT Reading Comprehension test was similar to previous phases.

Figure 7 ECE staff guidance and PAT Reading Comprehension scores age 12



But for mathematics, it was children whose centre was in the top quartile for this quality item who had higher average scores.

Figure 8 ECE staff guidance and age-12 mathematics scores



Again, the associations between mathematics scores and an aspect of ECE quality have grown stronger with time.

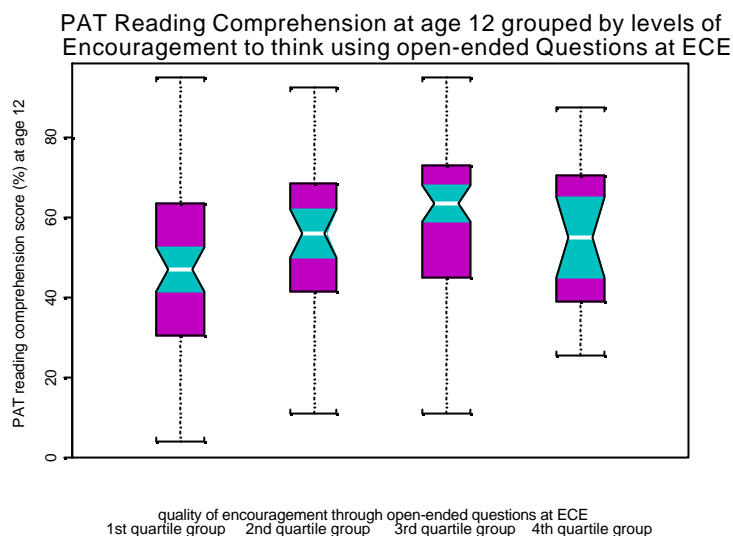
Table 60 Means for the mathematics measures at ages 5, 6, 8, 10, and 12 by quartile groups of ECE staff guided children in context of activities

| ECE staff guided children in context of activities® | 1 up to 3.4 1 st quartile | 2 3.4+ to 3.67 2 nd quartile | 3 3.67+ to 4.2 3 rd quartile | 4 4.2+ 4 th quartile | Prob. of F-value from ANOVA | Percent variance acct. for | Percentage point difference between mean score for children in centres rated in quartiles 1– and those in centres rated in quartile 4 |
|---|--|---|---|--|--------------------------------------|----------------------------------|--|
| Competency | | | | | | | |
| Age 5 Early Number Knowledge | 48.5 | 53.9 | 48.8 | 51.8 | | | 1.6 |
| Age 6 Mathematics | 76.1 | 76.5 | 75.8 | 78.5 | | | 2.4 |
| Age 8 Mathematics | 60.7 | 60.1 | 63.2 | 70.0 | 0.043 | 2.9 | 8.6 |
| Age 10 Mathematics | 58.2 | 62.0 | 61.1 | 71.6 | 0.005 | 4.7 | 11.2 |
| Age-12 Mathematics | 47.7 | 47.9 | 49.5 | 60.3 | 0.006 | 4.6 | 11.9 |

ECE staff ask children open-ended questions

The PAT Reading Comprehension test was the only competency where we found an association between the ECE quality item, staff asking open-ended questions, and age-12 competency scores. Here children whose final ECE centre scored in the lowest quartile had lower average scores; there were no statistically significant differences between the scores of children who had attended ECE centres scoring in the top 3 quartiles.

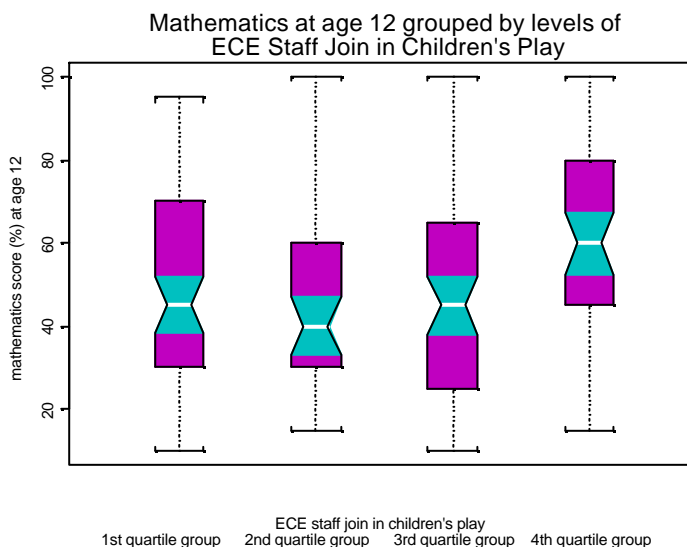
Figure 9 **ECE staff open-ended questioning and age-12 PAT Reading Comprehension scores**



ECE staff joined children in their play

The significant associations here were with mathematics and Logical Problem-Solving, with an indicative association in relation to Social Skills with Adults. Children whose final ECE centre scored in the top quartile for this aspect of quality had higher average scores than others.

Figure 10 **ECE staff joined in children’s play and age-12 mathematics scores**



Children whose ECE centre had been in the top quartile for the level of staff joining in children’s play had higher average scores than others. Again, we found that the associations between an aspect of ECE quality and the mathematics measure grew stronger rather than weaker over time.

Table 61 Means for the mathematics measures at ages 5, 6, 8,10, and 12 by quartile groups of ECE staff joined children in their play

| ECE staff joined children in their play® | 1 st quartile up to 3 | 2 nd quartile 3+ to 3.33 | 3 rd quartile 3.33+ to 4 | 4 th quartile 4+ | Prob. of F-value from ANOVA | Percent variance acct. for | Percentage point difference between mean score for children in centres rated in quartiles 1–3, and those in centres rated in quartile 4 |
|--|----------------------------------|-------------------------------------|-------------------------------------|-----------------------------|-----------------------------|----------------------------|---|
| Competency [~] | Mean | Mean | Mean | Mean | | | |
| Age 5 Early Number Knowledge | 51.7 | 48.0 | 47.8 | 54.7 | | | 5.2 |
| Age 6 Mathematics | 78.5 | 74.0 | 73.6 | 80.3 | 0.019 | 3.3 | 4.6 |
| Age 8 Mathematics | 64.1 | 61.1 | 58.7 | 70.5 | 0.016 | 3.7 | 9.1 |
| Age 10 Mathematics | 62.9 | 57.1 | 60.4 | 71.0 | 0.010 | 4.1 | 10.2 |
| Age-12 Mathematics | 51.0 | 46.4 | 46.5 | 61.5 | 0.001 | 5.9 | 13.2 |

ECE centre was “print saturated”

Children whose centre was in the bottom quartile ratings for this aspect of quality had lower average scores for mathematics, the PAT Reading Comprehension test, Reading Age, and Logical Problem-Solving. The associations with Logical Problem-Solving did not remain significant after taking family income and maternal qualification into account.

The associations with mathematics and Reading Age remained after taking family income into account, but not maternal qualification. When we looked at the interactions between different levels of maternal qualification and the quartiles for this quality aspect for mathematics, we found that while the scores of children whose mothers had no qualification increased if their final ECE centre had scored above the median for being “print saturated”, scores for children whose mothers had some qualification did not show similar trends, suggesting that maternal qualification offers a buffer if ECE centres are not high on this aspect of quality. Equally, however, ECE centres of high quality in this area can provide a buffer for other children, particularly if there is a low emphasis on printed matter in the home.

Unlike mathematics’ other associations with the children’s competencies, this aspect of quality did not show a strengthening over time.

The association with the PAT Reading Comprehension test remained after taking family income and maternal qualification into account. There was a strengthening of the association over time, with the proportion of variance in scores accounted for by this quality aspect increasing from 3.4 at age 5, to 7 at age 8, and 9 at age 12, and the difference between the lowest quartile average score and the average of the top 3 quartile scores increasing from 5 at age 5, to 12.4 at age 8, and 14.1 percentage points at age 12.

First-time associations with aspects of ECE quality

We found some significant associations with 3 aspects of ECE quality which have not shown associations in previous phases. The associations were not in a consistent direction, and did not provide

clear signals, suggesting that something other than the aspect of quality analysed may have been at work in each case.

Evidence of children's artwork and creativity

Unlike the other aspects of quality, we found that it was the top quartile which was associated with the lowest average scores for mathematics (43, compared with an average of 54 percentage points for the bottom 3 quartiles).

ECE equipment and activities encourage fine motor skills

Here the association we found was with the Burt Word Reading test, with children in the third quartile having the highest average score (a 7 percentage points difference on average).

ECE equipment and activities encourage gross motor skills

We found significant associations with Communication and Reading Age, and indicative associations with mathematics, the Burt Word Reading test, and writing. Children whose centres were either in the top and bottom quartile groups had the highest average scores.

Do aspects of ECE make separate contributions after age 5?

The second part of our analysis of the role of ECE factors at age 12 focused on whether we could see a separate contribution to age-12 scores over and above age 5 scores. To do this, we allowed first for the age 5 score in the competency, then fitted family income or maternal qualification separately, and finally the ECE factor, to see whether the ECE factor added to the proportion of variance accounted for by the model.

The 2 tables below summarising our findings with regard to mathematics and the PAT Reading Comprehension test scores at age 12 include all the ECE factors which were identified in the first part of the analysis as having significant associations, or which emerged in this second part of the analysis as having some associations with age-12 competency levels, and identify those that continued to show significant associations in bold italics, and those showing indicative associations, in italics only.

We found that some ECE factors did make a separately identifiable contribution, over and above the age-5 scores, to age-12 scores, more so for mathematics than for the PAT Reading Comprehension test scores. This may be because ECE gives children additional opportunities to manipulate objects, work with puzzles, and try new experiences with adults encouraging them that may be less available to children in their homes than reading, simply because most parents are more comfortable with reading than with mathematics.

Contributions of early childhood education

The ECE factors making an additional contribution are more likely to be quality factors, and for mathematics, the early childhood education socio-economic mix, rather than the quantum of early childhood education experience.

Table 62 **ECE factors showing significant associations with age 12 mathematics scores, and their associations after accounting for age 5 competency scores**

| Mathematics scores at age 12↓ | After accounting for family income (age 5) | After accounting for maternal qualification |
|-------------------------------|--|---|
| | Starting age at ECE | <i>Starting age at ECE</i> |
| | Length of ECE experience | Length of ECE experience |
| | Patterns of ECE attendance | <i>Patterns of ECE attendance</i> |
| | <i>[children who attended 2 or more concurrently had higher average scores, of around 4 percentage points]</i> | |
| | ECE type | ECE type |
| | [lower average scores for children who attended A'oga Amata, plus for those attending kindergartens] | |
| | <i>ECE socio-economic mix</i> | <i>ECE socio-economic mix</i> |
| | ECE staff responsiveness | <i>ECE staff responsiveness</i> |
| | <i>ECE staff guide children</i> | <i>ECE staff guide children</i> |
| | <i>ECE staff asked children open-ended questions</i> | <i>ECE staff asked children open-ended questions</i> |
| | Staff join children's play | Staff join children's play |
| | ECE "print-saturated" | ECE "print-saturated" |
| | Evidence of children's artwork & creativity | Evidence of children's artwork & creativity |
| | Equipment & activities encourage gross motor skills | Equipment & activities encourage gross motor skills |
| | <i>Children can complete activities</i> | <i>Children can complete activities</i> |
| | [children at or above the median had higher average scores of around 6 percentage points] | |

Table 63 **ECE factors showing significant associations with age 12 PAT Reading Comprehension scores, and their associations after accounting for age 5 competency scores**

| PAT Reading Comprehension scores at age 12↓ | After accounting for family income (age 5) | After accounting for maternal qualification |
|---|---|---|
| | Starting age at ECE | <i>Starting age at ECE</i> |
| | <i>ECE type</i> | <i>ECE type</i> |
| | ECE socio-economic mix | ECE socio-economic mix |
| | ECE staff responsiveness | ECE staff responsiveness |
| | ECE staff guide children | ECE staff guide children |
| | <i>ECE staff asked children open-ended questions</i> | <i>ECE staff asked children open-ended questions</i> |
| | ECE “print-saturated” | <i>ECE “print-saturated”</i> |
| | Evidence of children’s artwork & creativity | Evidence of children’s artwork & creativity |
| | Tikanga Māori evident | <i>Tikanga Māori evident</i> |
| | [children in the top quartile had higher average scores, of around 7 percentage points] | |

Summary

The early childhood education experience of the Competent Children study children continued to make a contribution to their mathematics and Reading Comprehension scores, 7 years later. Much of this contribution is “soaked up” in the children’s scores at age 5, when the children were at the end of their early childhood education experience, but some could be identified as also making an additional contribution over and above age 5 scores.

There is a wider range of ECE aspects which show relationships with age-12 mathematics scores than with their age-12 PAT Reading Comprehension test scores, perhaps because more reading activities occur in homes, or perhaps because the kinds of activities and interactions provided by ECE staff were supportive of mathematics performance because they gave practice in patterns and puzzle-solving.

The proportion of variance in scores, and the size of the difference between children with different levels of early childhood education experience increased rather than decreased with time. Both these patterns suggest that the ECE contribution is related to ways of working and thinking, rather than simply providing knowledge at a certain level.

The particular ECE quality aspects which continued to show associations were focused around staff-child interaction, with the addition of having a “print-saturated” environment for PAT Reading Comprehension test scores. The centrality of staff-child interaction found in this study for long-term outcomes is consistent with other large-scale research, on concurrent and short-term relations between ECE quality and outcomes for children, for example, the English *Effective Provision of Pre-school education [EPPE] project* (EPPE symposium at EECERA, 2003), the US Cost, Quality, and Outcomes study (Peisner-

Feinberg, and Burchinal, 1997), and the US NICHD Study of Early Child Care (NICHD Early Child Care Research Network, 2002).

Differences in competencies related to gender and family characteristics

In this section, we report the results of our analysis of the relationships between the competency measures, and gender, and family characteristics of income, maternal qualification, and ethnicity.

Gender

Summarising all available data from recent NEMP studies, international comparisons, and secondary level qualifications, the Ministry of Education (2003, p. 25) notes that “The average performance of boys and girls varied according to the assessment area, with girls generally achieving higher than boys in reading, arts and languages and boys achieving higher than, or as well as, girls in mathematics and science.”

In the Competent Children project, we have found no significant differences at age 5, and few at age 6. By age 8, only mathematics and fine motor skills scores did not show some difference related to gender. This pattern continued at age 10, when boys’ average scores were lower for all the competency measures other than mathematics, where there was no gender difference, and Curiosity, where boys had higher scores on average.

At age 12, we found no gender differences in Curiosity, mathematics, the Burt Word Reading test, or Logical Problem-Solving. The size of the differences between girls’ and boys’ performance was small for the PAT Reading Comprehension test and writing – about 4 percentage points. The size of the difference was more marked for the social and attitudinal competencies.

Differences in competencies related to gender and family characteristics

Table 64 Student's gender and children's competencies at age 12

| Gender® | Female | Male | Prob. of F-value from ANOVA | Percent variance accounted for |
|--|--------------|--------------|-----------------------------|--------------------------------|
| Age-12 competency ⁻ | Mean (n=235) | Mean (n=261) | | |
| Perseverance | 75.7 | 63.2 | < 0.0001 | 8.1 |
| Individual Responsibility | 82.4 | 68.7 | < 0.0001 | 12.2 |
| Social Skills with Peers* | 73.6 | 68.5 | < 0.0001 | 3.2 |
| Social Skills with Adults* | 80.2 | 73.4 | < 0.0001 | 3.5 |
| Communication* | 73.0 | 65.7 | < 0.0001 | 4.3 |
| PAT Reading Comprehension | 56.7 | 52.1 | 0.015 | 1.2 |
| Writing | 53.6 | 49.8 | < 0.0001 | 3.5 |
| Reading Age (yrs, mo) | 13.0 | 12.5 | 0.0002 | 2.7 |
| Composite Competency* | 69.1 | 63.6 | < 0.0001 | 5.0 |
| Composite Cognitive Competency | 61.1 | 58.5 | 0.028 | 1.0 |
| Composite Social & Attitudinal Competency* | 74.5 | 66.9 | < 0.0001 | 6.4 |

* In these cases the squared model was a better fit.

The mean scores are percentages, not raw scores. The higher scores for each competency are in **bold** type.

These differences remained after taking family income and maternal qualification into account, with the exception of Curiosity. Here we found an interaction effect, with gender differences apparent for some levels of maternal qualification, but not others. Girls whose mothers had no qualification had higher scores for Curiosity than boys whose mothers had no qualification, and vice versa for those whose mothers had a tertiary qualification other than a university degree. This is the first time in the Competent Children study that we have found such an interaction, so it may simply be a random occurrence.

Fergusson and Horwood (1997), analysing their longitudinal Christchurch Health and Development Study data, found that boys' lower scores for cognitive measures, school certificate grades, and their greater likelihood of leaving school without a qualification were attributable to their lower levels of attention and conduct, as rated by teachers. This finding is consistent with the patterns evident in our data (see later sections). Teachers' views also show some mismatch between the behaviour of some boys, and the kind of behaviour which allows children to make the most of the way school work is organised.²⁹ Alton-Lee and Praat (2000, pp. 273–275) cite research suggesting that the resistance of some boys to the structures of school life may have its origins in identification of masculinity with competitive demonstrations of strength. However, Smith (2003) notes that different gender patterns of responses to school structure and activities are not a recent experience in Britain, and concludes, as others have in analysing the recent concern shown by some about apparent gender gaps in formal achievement, that other gaps related to family resources are larger, and that a focus on a gender gap ignores the actual spread of scores among boys and girls, and the differences that exist among boys. Thus, for example, we

²⁹ In the previous Competent Children project report, *Competent Children at 10*, we checked that the gender of the teacher was not affecting their rating by comparing the proportions of study boys and girls given the same rating by male and female teachers in the study. It did not appear to be doing so, other than in terms of rating overall achievement levels.

Differences in competencies related to gender and family characteristics

found a small but significant gender difference in overall levels of achievement at age 12 at the top end as judged by teachers (37 percent of girls compared with 29 percent of boys were seen as making very good/excellent progress overall), but not at the lower end (12 percent of girls and 15 percent of boys were making less than average or medium progress).

Ethnicity

Eighty-one percent of the study sample (n=393) were categorised by their parents when they were near age 5 as Pākehā/European, 11 percent as Māori (n= 52), 5 percent as Pasifika (n=25), and 3 percent as Asian (n=14).³⁰

There is some overlap between ethnicity and maternal qualification levels in this sample. Where there are similar proportions of mothers with school or trade/tertiary qualifications, including teaching diplomas, in each of these 4 groups, the mothers of Māori children were more likely to have no qualification (31 percent), and less likely to have a university qualification (4 percent). None of the mothers of Pasifika children in the study had a university qualification.

In this sample,³¹ there were similar proportions of high-income families in each of the 4 main ethnic groups, but differences at the very high and low ends of the income spectrum.

Table 65 **Child ethnicity and family income**

| Child's ethnicity | < \$30,000 | \$30–60,000 | \$60–80,000 | > \$80,000 |
|-------------------|------------|-------------|-------------|------------|
| | % | % | % | % |
| Pākehā/European % | 13 | 30 | 19 | 36 |
| Māori % | 23 | 33 | 21 | 17 |
| Pasifika % | 20 | 44 | 24 | 12 |
| Asian % | 14 | 14 | 21 | 43 |

In previous phases of the Competent Children project, we have found that apparent differences in average competency scores between children of different ethnic backgrounds were largely accounted for by these differences in family income and maternal qualification, but with some differences remaining significant in mathematics and literacy. We continue to find the same pattern at age 12. Our findings with respect to Pasifika and Asian students in the sample should be treated with caution, given the small numbers of each.

³⁰ Where parents gave us 2 ethnic groups, we used the non-Pākehā/European group for analysis.

³¹ It was not possible to directly compare family income within ethnic groups for our sample with 2001 Census data, since the latter does not provide direct statistics for family income associated with Māori children.

Differences in competencies related to gender and family characteristics

Table 66 Ethnicity and children's competencies at age 12

| Ethnicity [®] | Pākehā Mean (n=393) | Māori Mean (n=52) | Pasifika Mean (n=25) | Asian Mean (n=14) | Prob. of F-value from ANOVA | % var. acct. for |
|--------------------------------|---------------------------|-------------------------|----------------------------|-------------------------|-----------------------------------|---------------------|
| Age-12 competency [~] | | | | | | |
| Mathematics** | 53.3 | 37.4 | 36.0 | 55.7 | < 0.0001 | 7.0 |
| PAT Reading Comprehension | 56.3 ^{^^^} | 44.5 [^] | 39.9 | 59.1 | < 0.0001 | 5.6 |
| Burt Word Reading* | 77.6 | 70.3 | 75.4 | 81.2 | 0.025 | 1.9 |
| Writing | 52.3 | 46.8 | 48.3 | 54.7 | 0.0005 | 3.6 |
| Reading Age (yrs, mo) | 12.10 [^] | 11.11 | 12.4 | 13.2 | 0.003 | 2.9 |
| Logical Problem-Solving* | 71.0 | 65.0 | 65.9 | 75.1 | 0.001 | 3.3 |
| Composite Competency* | 66.8^{^^^} | 64.0 [^] | 59.5 | 66.4 | 0.011 | 2.3 |
| Composite Cognitive Competency | 61.0 ^{^^^} | 52.0 [^] | 52.0 | 63.9 | < 0.0001 | 6.6 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^^} Three fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

After taking family income and maternal qualification into account, Pākehā/European and Asian children had higher average scores in mathematics than Māori and Pasifika children; Pākehā/European children had higher average scores than Pasifika children for the PAT Reading Comprehension test. The differences in the Burt word reading test and Logical Problem-Solving were no longer significant. The differences in average writing score and Reading Age between Pākehā/European and Māori children remained significant after taking family income into account, but became indicative when taking maternal qualification into account.

Language spoken at home

Ninety-eight percent of the parents said that English was spoken in their home. Samoan was spoken in 4 percent of the homes, Māori in 2 percent, a European language in 2 percent, and a Pasifika language other than Samoan in another 2 percent of the homes. Ninety percent of the homes were monolingual, with 2 languages spoken in 10 percent of the homes, and 3 languages in 2 homes.

The language(s) spoken at home are not an exact mirror of the children's first language. Most of the study children were reported by their parents to have spoken English as their first language before they went to school (95 percent). Two percent spoke Samoan, 1 percent each spoke Māori, a European language, or an Asian language.

We included the language spoken at home, as reported by parents, in a 2-factor model with children's ethnicity to see if this was accounting for some of the differences. Only 7 of the sample spoke no English at home (3 Pasifika, 3 Asian, and 1 Pākehā/European families), and 49 spoke English and another language (21 percent of the Māori families, 68 percent of the Pasifika families, 43 percent of the Asian families, and 3 percent of the Pākehā/European families); the rest spoke only English at home.

Māori was spoken in 17 percent of the Māori children's homes, and 1 percent of the Pākehā/European children's homes. Samoan was spoken in 72 percent of the Pasifika children's homes [most of our sample came from A'oga Amata], in 2 percent of the Māori children's homes, and 1 percent of the

Differences in competencies related to gender and family characteristics

Pākehā/European children's homes. Other Pasifika languages were spoken in 4 homes: 2 in the homes of Pākehā/European children, and one each in Māori and Pasifika children's homes. Fifty-seven percent of the Asian children heard an Asian language in their home.

The language spoken at home made no difference to the ethnic-related differences reported here, for this sample. When we analysed the language spoken at home on its own, we found only a few indicative associations once we took family income and maternal qualification into account. Children whose families spoke only English had higher average scores for mathematics than those who spoke English and another language at home, and for the PAT Reading Comprehension test (around 7 percentage points on each). Children whose families spoke only English had a higher average Reading Age than those whose families spoke only another language at home.

Maternal qualification

Maternal qualification is the family characteristic that we have found in the Competent Children study to have the strongest associations with children's cognitive competency levels. Below are the associations found at age 12. They remain significant after including family income at age 5 in the model. The scores for the cognitive competencies generally follow a consistent path: lowest for those whose mother has no qualification, and highest for those whose mother has a university qualification. The shaded areas indicate the groups with which significant contrasts exist. Within the social and attitudinal competencies, they tend to be *either* differences in average scores between those whose mothers have no qualification and others, or between those whose mother had a university qualification and others (though not all others for every competency). Within the cognitive competencies, we see differentiation at *both* ends of the maternal qualification spectrum.

Differences in competencies related to gender and family characteristics

Table 67 Maternal qualification at the birth of her first child and children's competencies at age 12

| Maternal qualification [®] | None | Mid-school | Senior school | Trade | Tertiary | Univ | Prob. of F-value from ANOVA | Percent variance accounted for |
|--|-------------|-------------------|---------------|--------------|--------------------|-------------|-----------------------------|--------------------------------|
| Age-12 competency ⁻ | Mean (n=67) | Mean (n=126) | Mean (n=19) | Mean (n=114) | Mean (n=67) | Mean (n=83) | | |
| Curiosity | <i>52.8</i> | 61.9 | 66.4 | 60.5 | 65.2 [^] | 69.4 | < 0.0001 | 6.7 |
| Perseverance | 64.2 | 67.2 | 73.7 | 67.7 | 67.2 [^] | 79.4 | 0.0001 | 5.3 |
| Individual Responsibility | 72.8 | 72.4 | 77.1 | 76.0 | 73.4 [^] | 81.7 | 0.016 | 2.9 |
| Social Skills with Adults | 74.0 | 75.3 | 79.4 | 76.5 | 73.7 [^] | 82.7 | 0.013 | 3.0 |
| Communication* | <i>61.3</i> | 67.7 | 69.7 | 69.3 | 69.6 [^] | 76.1 | < 0.0001 | 5.7 |
| Mathematics** | 34.5 | 47.9 | 48.4 | 49.1 | 56.2 | 67.0 | < 0.0001 | 16.5 |
| PAT Reading Comprehension | 40.2 | 50.4 [^] | 55.1 | 53.8 | 59.7 [^] | 67.4 | < 0.0001 | 15.2 |
| Burt Word Reading* | 70.9 | 74.6 | 75.7 | 78.0 | 79.1 | 82.6 | < 0.0001 | 6.3 |
| Writing | 46.6 | 49.8 | 50.4 | 52.3 | 53.5 | 56.4 | < 0.0001 | 8.7 |
| Reading Age (yrs, mo) | 12.0 | 12.5 | 12.10 | 12.8 | 13.0 [^] | 13.5 | < 0.0001 | 6.6 |
| Logical Problem-Solving* | 64.9 | 67.7 | 71.9 | 70.7 | 71.5 | 77.4 | < 0.0001 | 11.4 |
| Composite Competency* | 59.6 | 64.3 [^] | 67.3 | 66.0 | 67.4 ^{^^} | 73.8 | < 0.0001 | 12.3 |
| Composite Cognitive Competency | 50.4 | 57.2 [^] | 59.0 | 59.5 | 63.0 [^] | 69.0 | < 0.0001 | 18.5 |
| Composite Social & Attitudinal Competency* | 65.8 | 69.1 | 72.9 | 70.3 | 70.0 [^] | 77.1 | 0.0001 | 5.2 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.^{^^} Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*. The areas shaded are the groups for whom significant contrasts exist.

Children from the highest “resourced” group in terms of maternal qualification were 3 times more likely to score at or above the median than those from the lowest resourced group.

Table 68 Proportions of children in relation to their mother's qualification, scoring at or above the study median for reading comprehension and mathematics, at age 12

| Maternal qualification | % of group, median or above for Reading comprehension age 12 | % of group, median or above for mathematics age 12 |
|------------------------|--|--|
| None (n=68) | 21 | 25 |
| School level (n=152) | 44 | 45 |
| Tertiary/trade (n=185) | 51 | 54 |
| University (n=86) | 73 | 81 |

Generally, there is an overlap between levels of maternal qualification and earlier levels of income, but the 2 characteristics are not completely synonymous.

Differences in competencies related to gender and family characteristics

Table 69 Family income levels age 5 in relation to maternal qualification levels

| Qualification | < \$30,000 % | \$30–60,000 % | \$60–80,000 % | > \$80,000 % |
|----------------|-----------------|------------------|------------------|-----------------|
| None | 47 | 38 | 6 | 1 |
| School | 33 | 45 | 10 | 9 |
| Tertiary/trade | 21 | 49 | 15 | 15 |
| University | 9 | 31 | 23 | 33 |

In this phase, we also analysed the relation between paternal education levels, and the children's current competency levels. The information we have on paternal education levels comes largely from the children's mothers, unless the father was the person we interviewed, and was not available for all children in the study (one reason why we have used maternal qualification throughout this study to look at the relationship between parental education and children's performance and experiences). At age 12 we had information on the paternal qualification levels for 390 of the children.

Paternal qualification also shows significant relationships with children's competency levels. Allowing for family income and maternal qualification levels did erode some of these differences, particularly for maternal qualification levels. However, paternal qualification levels were making a separate contribution to mathematics, PAT Reading Comprehension test, Reading Age, and Logical Problem-Solving scores, with significant contrasts remaining between those whose fathers had a university education, and those who had none, and between the former and those who had a trades qualification. These are shaded in the table below.

Table 70 Paternal qualification when child was 5 and children's competencies at age 12

| Paternal qualification when child was 5 [®] | No qual. Mean (n=55) | Mid School Mean (n=82) | Senior school Mean (n=9) | Trade Mean (n=89) | Tertiary Mean (n=46) | University Mean (n=109) | Prob. of F-value from ANOVA | Percent variance acct. for |
|--|----------------------|------------------------|--------------------------|-------------------|-------------------------|-------------------------|-----------------------------|----------------------------|
| Age-12 competency ⁻ | | | | | | | | |
| Curiosity | 56.0 | 61.6 | 71.5 | 61.0 | 67.4 [^] | 66.4 | 0.007 | 4.1 |
| Perseverance | 64.8 | 73.1 | 75.7 | 65.2 | 76.1[^] | 75.7 | 0.0009 | 5.2 |
| Communication* | 65.9 | 68.9 | 76.1 | 67.5 | 73.8 | 73.9 | 0.018 | 3.5 |
| Mathematics** | 36.5 | 51.6 | 56.7 | 46.6 | 56.5 | 66.1 | < 0.0001 | 16.7 |
| PAT Reading Comprehension | 41.3 ^{^^} | 51.1 | 55.9 [^] | 50.9 [^] | 62.1 | 67.4 | < 0.0001 | 18.4 |
| Burt Word Reading* | 68.5 | 77.8 | 80.7 | 76.0 | 79.5 | 82.9 | < 0.0001 | 8.7 |
| Writing | 45.6 | 51.9 | 50.4 | 51.1 | 53.8 | 56.3 | < 0.0001 | 10.6 |
| Reading Age (yrs, mo) | 11.10 | 12.7 | 13.1 | 12.5 | 13.4 [^] | 13.6 | < 0.0001 | 11.0 |
| Logical Problem-Solving* | 65.0 | 68.8 | 74.3 | 69.0 | 72.6 | 76.4 | < 0.0001 | 11.4 |
| Composite Competency* | 60.9 ^{^^} | 67.0 | 70.2 [^] | 64.6 [^] | 69.9 [^] | 71.8 | < 0.0001 | 9.8 |
| Composite Cognitive Competency | 50.6 ^{^^} | 59.2 | 62.7 [^] | 57.8 [^] | 63.4 | 68.5 | < 0.0001 | 19.6 |
| Composite Social & Attitudinal Competency* | 67.6 | 72.1 | 76.1 | 69.2 | 74.3 [^] | 74.0 | 0.030 | 3.2 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*. The shaded columns show the categories for whom the differences in average scores were significant.

The erosion of associations after taking into account maternal qualification is not surprising, given the overlap of parental qualification levels. The next table shows the matching of parental levels of qualification for those who have 2 parents: it is particularly marked for the children whose mothers have a

Differences in competencies related to gender and family characteristics

university qualification – 70 percent of this group also have fathers with a university qualification. Almost half the tertiary-educated mothers are with a partner who also has a tertiary or university education; 43 percent of the mothers with no qualification are with a partner who also has no qualification.

Table 71 Paternal qualification by maternal qualification

| Maternal qualification [®] | None (n=49) % | Mid school (n=93) % | Senior school or trade (n=106) % | Tertiary (n=53) % | University (n=74) % |
|-------------------------------------|---------------------|---------------------------|---|-------------------------|---------------------------|
| Paternal qualification [™] | | | | | |
| None | 43 | 16 | 10 | 8 | 1 |
| Mid school | 22 | 33 | 23 | 17 | 7 |
| Senior school | 0 | 3 | 3 | 0 | 3 |
| Trade | 27 | 22 | 31 | 28 | 8 |
| Tertiary | 6 | 10 | 12 | 21 | 11 |
| University | 2 | 16 | 21 | 26 | 70 |

Family income

Our sample comes from the Wellington region, which has a higher average family income than New Zealand as a whole. The next table shows both the current and earlier family incomes for the study children. These are in the dollar amounts for each period, rather than translated into current dollar values.

Of particular note is the gradual decline in the proportion of families whose incomes are less than \$30,000, and at the other end of the income spectrum, an increase in those whose incomes are over \$80,000. This reflects the increase in the proportion of mothers taking up full-time employment over the life of the study, and to reflect salary increases, whether as a result of inflation, promotion, or increments related to satisfactory service.

Table 72 Family incomes for children in the study ages 5 to 12

| | up to \$30,000 | >\$30–60,000 | >\$60–80,000 | >\$80,000 | n |
|-----------|----------------|--------------|--------------|-----------|-----|
| Age 5 | 148 | 232 | 75 | 76 | 531 |
| ('93-'94) | 28% | 44% | 14% | 14% | |
| Age 6 | 72 | 119 | 48 | 48 | 287 |
| ('94-'95) | 25% | 41% | 17% | 17% | |
| Age 8 | 115 | 204 | 74 | 116 | 509 |
| ('96-'97) | 23% | 40% | 15% | 23% | |
| Age 10 | 94 | 186 | 86 | 116 | 482 |
| ('98-'99) | 20% | 39% | 18% | 24% | |
| Age 12 | 70 | 152 | 96 | 162 | 480 |
| ('00-'01) | 15% | 32% | 20% | 34% | |

Differences in competencies related to gender and family characteristics

Linear correlations³² between family income when the study children were age 5 and later ages are:

- age 5 and age 6: $r=0.86$
- age 5 and age 8: $r=0.81$
- age 5 and age 10: $r=0.70$
- age 5 and age 12: $r=0.60$

Breaking that down into the 4 income brackets used here shows greatest consistency in the top income bracket.

Table 73 Family income, age 5 and age 12 compared

| At age 5 | At age 12 | n | % age 5 in each income group by age 12 |
|------------------|------------------|------------|--|
| 1. Up to \$30K | 1. Up to \$30K | 46 | 35 (same) |
| | 2. >\$30K to 60K | 56 | 43 |
| | 3. >\$60K to 80K | 19 | 15 |
| | 4. >\$80K | 9 | 7 |
| Total | | 130 | |
| 2. >\$30K to 60K | 1. Up to \$30K | 18 | 9 |
| | 2. >\$30K to 60K | 76 | 37 (same) |
| | 3. >\$60K to 80K | 58 | 28 |
| | 4. >\$80K | 54 | 26 |
| Total | | 206 | |
| 3. >\$60K to 80K | 1. Up to \$30K | 3 | 4 |
| | 2. >\$30K to 60K | 9 | 13 |
| | 3. >\$60K to 80K | 14 | 21 (same) |
| | 4. >\$80K | 41 | 61 |
| Total | | 67 | |
| 4. >\$80K | 1. Up to \$30K | 1 | 1 |
| | 2. >\$30K to 60K | 6 | 9 |
| | 3. >\$60K to 80K | 4 | 6 |
| | 4. >\$80K | 57 | 84 (same) |
| Total | | 68 | |

Differences in family income reflect differences in both the number of parents in the family, and parental employment patterns. Few 1-parent families or those where parents were reliant on casual labour or were unemployed had incomes of more than \$60,000. Sixty-seven percent of the 2-parent families where both parents were employed had incomes of more than \$60,000, compared with 53 percent of those with one parent employed.

³² Using the mid-points of the income ranges.

Differences in competencies related to gender and family characteristics

Table 74 Current family income levels in relation to parental employment

| Parental employment | < \$30,000 | \$30-60,000 | \$60-80,000 | > \$80,000 |
|---|------------|-------------|-------------|------------|
| | % | % | % | % |
| 2-parent, both employed full-time | 1 | 28 | 25 | 42 |
| 2-parent, 1 employed full-time | 10 | 35 | 20 | 33 |
| 1-parent, employed full-time | 51 | 42 | 4 | 4 |
| Parent/s not employed or in casual employment | 29 | 71 | 0 | 0 |

There are also some differences in other family characteristics. None of the low-income families had a university-educated mother, and at the other end of the income spectrum, few very high-income families had mothers with no qualification. However, mothers who had school or tertiary/trades qualifications were found in proportional numbers to their numbers in this study sample for all the income levels.

Table 75 Family income at age 12 and maternal qualification levels

| Family income at age 12 → | \$30,000 or less (n=70) | \$30,001–\$60,000 (n=152) | \$60,001–\$80,000 (n=96) | \$80,001 + (n=162) |
|---------------------------|----------------------------|------------------------------|-----------------------------|-----------------------|
| Maternal qualification | % | % | % | % |
| None (14%) | 26 | 18 | 10 | 4 |
| School (31%) | 26 | 41 | 32 | 22 |
| Tertiary/trades (37%) | 39 | 32 | 48 | 36 |
| University (17%) | 0 | 7 | 9 | 37 |

Proportion of income spent on housing

To give us some idea of disposable income, we asked the parents of the study children to tell us approximately how much of their family income after tax was spent on housing. For this cohort, most of whom bought houses before the current upward surge in house prices, housing was generally becoming more affordable. Fifty-nine percent of the families were now spending a quarter or less of their after-tax income on housing, compared with 40 percent when the children were aged 10, and 37 percent when they were aged 6.

Sixteen percent were paying around a third of their income, 11 percent around a half, and 3 percent, more than half. Eight percent did not know, and 1 percent did not answer this question.

The higher the income, the lower the proportion spent on housing. Seventy-three percent of the very high-income families were paying a quarter or less of their income on housing, declining to 41 percent of low-income families. Twenty-four percent of the low-income families were spending more than half of their income on housing, declining to 5 percent of the very high-income families.

Income-related differences in children's competencies at age 12

At each phase, we have analysed the relationship of family income with children's competency levels by looking at previous levels as well as current levels. This is because we have found stronger associations

Differences in competencies related to gender and family characteristics

between family income levels at age 5, than with current levels. At age 10 we added an analysis of income changes over the 5 years between the child at age near-5 and at age 10. This added weight to the relative importance of family income levels in early childhood. It showed that early low-income had persistent effects, even when family income rose. And family income did rise for many families, as mothers returned to employment, or increased their paid work hours.

The table below shows lower average scores for children from low-income homes and others, with some consistently increasing trends evident for the cognitive competencies and Communication, though the differences between the top 3 income groups were not significant. Allowing for maternal qualification eroded most of the contrasts shown, but not for mathematics, the Burt Word Reading test, writing, Reading Age, and Logical Problem-Solving. The results for the age-5 family income are given first.

Table 76 Family income at age 5 and children's competencies at age 12

| Family income at age 5® | Family Income up to 30K Mean (n=133) | Family Income >30K–60K Mean (n=214) | Family Income >60K–80K Mean (n=67) | Family income >80K Mean (n=70) | Prob. of F-Value from ANOVA | Percent variance accounted for |
|--|--------------------------------------|-------------------------------------|------------------------------------|--------------------------------|-----------------------------|--------------------------------|
| Age–12 Competency [~] | | | | | | |
| Curiosity | 57.3 | 61.8 [^] | 66.9 | 68.3 | 0.0002 | 4.1 |
| Perseverance | 62.9 | 70.2 [^] | 72.9 | 74.6 | 0.0005 | 3.6 |
| Communication* | 65.0 | 68.8 [^] | 71.6 | 75.6 | 0.0003 | 3.8 |
| Mathematics** | 40.0 | 51.3 | 58.5 | 64.2 | < 0.0001 | 12.1 |
| PAT Reading Comprehension | 46.0 [^] | 54.5 ^{^^} | 59.6 | 64.1 | < 0.0001 | 8.4 |
| Burt Word Reading* | 71.5 | 77.7 | 80.4 | 81.5 | < 0.0001 | 5.7 |
| Writing | 48.1 | 51.2 | 53.9 | 56.7 | < 0.0001 | 7.3 |
| Reading Age (yrs, mo) | 11.11 [^] | 12.10 [^] | 13.2 | 13.5 | < 0.0001 | 8.2 |
| Logical Problem-Solving* | 67.1 | 69.4 | 74.4 | 75.7 | < 0.0001 | 7.0 |
| Composite Competency* | 61.4 [^] | 66.5 ^{^^^} | 69.5 | 71.6 | < 0.0001 | 8.2 |
| Composite Cognitive Competency | 53.7 [^] | 59.6 ^{^^} | 64.2 | 67.3 | < 0.0001 | 12.6 |
| Composite Social & Attitudinal Competency* | 66.5 | 71.1 [^] | 73.0 | 74.5 | 0.001 | 3.3 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Three fewer in this mean.

^{^^^} Four fewer in this mean

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Another perspective on the association of family income levels with competency levels comes from comparing proportions of those scoring at or above the study median score, and those below. Given the patterns in the table above, we have used the age 5 family income levels as a basis for comparison. We have focused on the 2 foundations of education: reading and mathematics. These show the difference between the income groups more starkly. Children from low-income homes are half as likely as those from high-income homes to score at or above the study median.

Differences in competencies related to gender and family characteristics

Table 77 Proportions of age-5 family income groups scoring at or above the study median for reading comprehension and mathematics, at age 12

| Family income group at age 5 | % of income group, median or above for reading comprehension age 12 | % of income group, median or above for mathematics age 12 |
|------------------------------|---|---|
| Low-income | 36 | 32 |
| Medium-income | 52 | 51 |
| High-income | 66 | 71 |

Current family income shows associations with the same set of competencies, and the same pattern of children from low-income homes having lower average scores than others. These reduce to an indicative or no longer notable level after allowing for maternal qualification, with the exception of contrasts with the very high-income group in average mathematics, Reading Age, and Perseverance scores.

What is new is that there is a significant difference in the average scores of the study children for mathematics, the PAT Reading Comprehension test, Burt Word Reading test, and writing from the very high-income homes and those in the middle- and high-income brackets, after allowing for maternal qualification.

Table 78 Family income at age 12 and children's competencies at age 12

| Family income at age 12 [®] | Family income up to 30K Mean (n=70) | Family income >30K-60K Mean (n=152) | Family income >60K-80K Mean (n=96) | Family income >80K Mean (n=162) | Prob. of F-value from ANOVA | Percent variance acct. for |
|--|---|---|--|---------------------------------------|-----------------------------|----------------------------|
| Age-12 competency ⁻ | | | | | | |
| Curiosity | 55.9 | 59.7 | 63.8 [^] | 67.0 | < 0.0001 | 4.4 |
| Perseverance | 61.1 | 66.9 | 69.1 [^] | 75.1 | < 0.0001 | 4.8 |
| Communication [*] | 64.0 | 67.8 | 69.5 [^] | 73.2 | 0.0006 | 3.5 |
| Mathematics ^{**} | 41.6 | 48.4 | 47.8 | 59.5 | < 0.0001 | 7.4 |
| PAT Reading Comprehension | 49.2 ^{^^} | 51.8 [^] | 51.7 | 61.1[^] | < 0.0001 | 5.1 |
| Burt Word Reading [*] | 73.5 | 76.1 | 75.2 | 80.6 | 0.002 | 3.1 |
| Writing | 49.4 | 49.7 | 50.3 | 55.3 | < 0.0001 | 6.4 |
| Reading Age (yrs, mo) | 12.2 [^] | 12.7 | 12.8 [^] | 13.3 | 0.0001 | 4.4 |
| Logical Problem-Solving [*] | 67.2 | 68.8 | 69.6 | 73.9 | 0.0001 | 4.3 |
| Composite Competency [*] | 61.1 ^{^^} | 64.7 [^] | 65.8 [^] | 70.3[^] | < 0.0001 | 6.9 |
| Composite Cognitive Competency | 55.2 ^{^^} | 57.8 [^] | 57.8 | 64.9[^] | < 0.0001 | 8.2 |
| Composite Social & Attitudinal Competency [*] | 65.4 | 69.2 | 71.3 [^] | 73.9 | 0.0002 | 4.0 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

We also did an analysis using the available income per person in the child's household. As we did at age 10, we estimated this by allowing broadly for income tax and adjusting for the percentage of after-tax

Differences in competencies related to gender and family characteristics

income spent on housing, then dividing this income by the number of people in the household.³³ There are significant contrasts between children from households with the lowest amount per person and others, and consistent trends, with scores rising with available income per household member, but without significant contrasts between the top 3 income levels.

Table 79 Available income per person and children's competencies at age 12

| Available income per person in the household at age 12 [®] | Up to \$4664 | \$4665 to \$7257 | \$7258 to \$9087 | \$9088 or more | Prob. of F-value from ANOVA | Percent variance acct. for |
|---|--------------------|--------------------|--------------------|----------------|-----------------------------|----------------------------|
| Age-12 competency ^ˉ | Mean (n=112) | Mean (n=109) | Mean (n=124) | Mean (n=92) | | |
| Curiosity | 56.0 | 64.3 [^] | 66.1 | 64.0 | 0.0003 | 4.3 |
| Perseverance | 60.8 | 70.4 [^] | 72.5 | 73.4 | < 0.0001 | 5.2 |
| Communication* | 64.3 | 70.7 [^] | 71.8 | 72.3 | 0.002 | 3.3 |
| Mathematics** | 42.2 | 51.1 | 55.5 | 56.3 | < 0.0001 | 5.7 |
| PAT Reading Comprehension | 48.2 ^{^^} | 53.1 | 56.8 ^{^^} | 60.9 | 0.0001 | 4.6 |
| Burt Word Reading* | 72.9 | 77.2 | 78.0 | 79.5 | 0.010 | 2.6 |
| Writing | 48.7 | 50.4 | 52.3 | 55.6 | < 0.0001 | 5.4 |
| Reading Age (yrs, mo) | 12.2 | 12.10 [^] | 12.11 | 13.1 | 0.003 | 3.2 |
| Logical Problem-Solving* | 66.5 | 71.7 | 70.7 | 73.3 | 0.0002 | 4.5 |
| Composite Competency* | 61.3 | 67.1 [^] | 68.3 ^{^^} | 69.1 | < 0.0001 | 6.0 |
| Composite Cognitive Competency | 54.9 ^{^^} | 59.6 | 61.5 ^{^^} | 63.9 | < 0.0001 | 6.1 |
| Composite Social & Attitudinal Competency* | 65.5 ^{^^} | 72.1 [^] | 73.1 | 72.6 | 0.0003 | 4.3 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

After accounting for family income at age 5, the available income at age 12 per person had at most an indicative association, suggesting (as we found at age 10) that early low-income levels have more of an effect than current levels, where the latter are higher. There was no difference in the median mathematics scores for students from the low-income group at age 5, whatever their family income level at age 12, and conversely, no difference for students from the high-income group at age 5, whether their family income at age 12 remained high or had slipped over time. This is consistent with the analysis of the history of family income levels in Section Four.

After accounting for maternal qualification, most of the associations were reduced to the indicative level, but the associations for Curiosity, Perseverance, mathematics, and writing remained significant.

³³ The midpoint of each income bracket used in the interview schedule was used for each bracket up to \$80,000, and a midpoint of \$85,000 used for incomes over that sum. For those who spent up to 25 percent of family income on housing, 25 percent was used as the figure, and for those who spent more than 50 percent, 60 percent was used as the figure in the estimation. The 4 groups used in this analysis are the 4 quartiles that resulted.

Summary

Although gender and ethnicity have some associations with children's competency scores, the associations with family income and maternal qualification are more marked, and much stronger. There are overlaps between family income and maternal qualification, but maternal qualification is not synonymous with family income levels, and of the 2 factors, it is the stronger. Paternal qualification levels also make a separate contribution to children's cognitive scores. The higher the level of maternal qualification, the more likely it is that fathers will have the same level of qualification.

Family income levels when the study children were age 5 continued to show significant associations with the children's competency levels, 7 years later. Children from homes that were then low-income were only half as likely as those from high-income homes to score at or above the study median score at age 12 for mathematics and the PAT Reading Comprehension test. Current family income levels had more consistently increasing associations with children's age-12 competency levels.

In Section Ten, we cross-tabulate the material on children's activities, experiences, and views, and parents' activities and concerns, to see if we can shed more light on why maternal qualification and family income matter for children's competency levels, or the kinds of differences that lie behind these social categories.

Section Seven

Family composition and parents

We spoke to the mothers of 89 percent of the study children, to the fathers of 9 percent, and other relatives of 2 percent. The fathers we spoke with were more likely than the mothers to be in sole-parent families (30 percent compared with 15 percent of the mothers), or from 2-parent families with one step-parent (20 percent compared with 9 percent of the mothers).

Family composition

At age 12, 94 percent of the study children lived in the same house as their birth mother, and 77 percent in the same house as their birth father, according to their parents.³⁴

In all, 29 percent did not live with one of their birth parents. Parents reported that half of these saw their non-resident parent regularly. Five percent of the children were in shared-custody situations. Ten percent had regular access to their non-resident parent, and 3 percent, sometimes had access. Five percent had only rare access, and 2 percent had no access at all. Two percent of the children had lost a parent through death.

The children who did not live with both birth parents gave a somewhat more sanguine picture of connection with their other parent when we asked if they spent time with their other partner in their home. Nineteen percent said they did. Nine percent spent time with their father and his partner, 6 percent with their father only, 2 percent with their mother and her partner, and 1 percent with their mother only. Four percent of the children mentioned shared parenting arrangements. Five percent mentioned either spending every weekend or most weekends with their other parent, or school holidays. Six percent said they spent some weekends with their other parent. Two percent mentioned regular visits during the day, and 1 percent, some irregular visits. Two children also spent some time with other relatives in a third house. Whether children were with one parent or with a step-parent made no significant difference to the kind of contact they had with their non-resident parent, though the quality of the relationship was more likely to

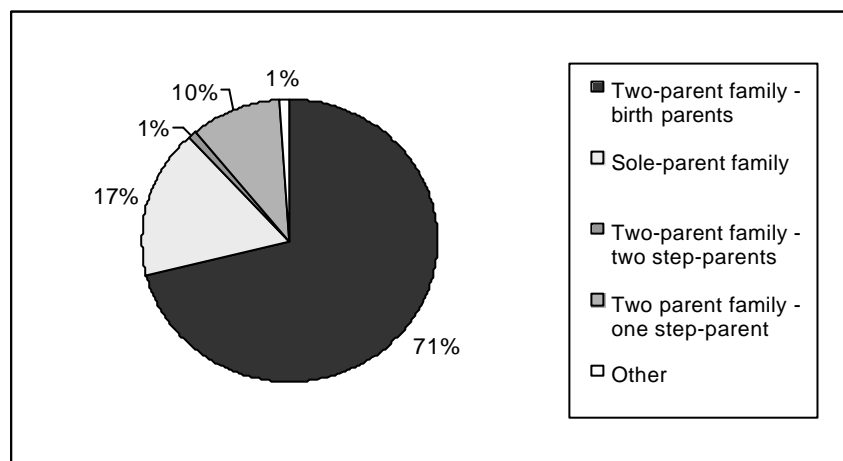
³⁴ We got a very similar picture from the study children when we asked them. “Who are the adults who live with you at home?” Seventy-two percent said their mother and father, 13 percent said their mother only, 9 percent, their mother and her partner, 2 percent each their father only, or their father and his partner, and 1 percent lived with other relatives.

be variable for children living in sole-parent households (21 percent compared with 4 percent of those living with a step-parent, on the resident parent report).

Seventeen percent of those who did not live with their birth parent or who were not in shared custody were said by their resident parent to get on well with their non-resident parent. Children whose parents shared their custody, or whose non-resident parent had regular access to them were more likely to get on well with them (85 percent compared with 49 percent of those who saw their non-resident parent sometimes or rarely/intermittently).

At the age of 12, most of the study children remained in their original 2-parent family, as shown in the graph below.

Figure 11 Family composition when study children aged 12



Our sample has a somewhat larger proportion of 2-parent families than the Wellington region or New Zealand as a whole, 82 percent compared with 73 percent of families with dependent children in the Wellington region, and 71 percent for New Zealand.³⁵

Children in this sample whose mother had no qualification, and Māori children, were more likely to be in 1-parent families (22 and 27 percent respectively). Seventy-one percent of the low-income families were 1-parent.

Eighty-three percent of the 1-parent families were headed by women, and 17 percent by men (n=14).

Seventeen percent of the study children were the only children in their household. Thirty-six percent had 1 sibling, 29 percent, 2 siblings, 11 percent had 3 siblings, and 4 percent had 4 or more siblings, with 1 of the study children having 10 siblings. Five percent had half-siblings. The average number of biological siblings was 1.62 (s.d. 1.09).

³⁵ 2001 Census figures for families with dependent children living in private occupied dwellings.

Household size showed a consistent relationship with family income, rising from an average of 4.09 (s.d. 1.47) in the household for low-income families, to an average of 4.81 (s.d. 1.03) for the very high-income families in the study. Maternal qualification levels were unrelated to family size. Pasifika households tended to be larger: an average of 5.56 (s.d. 1.56), compared with around 4.6 for the others. Household size was much the same for all the 2-parent families, whether they were biological or blended (around 4.7–4.8), and was 3.57 (s.d. 1.12) for 1-parent families.

Income sources and welfare receipt

A sizeable minority of the children's families had 2 or more sources of income (38 percent). Eighty-five percent of the families earned income through wages or salary, and 26 percent through self-employment. Nine percent earned income through rentals, interest, or a family trust. Thirteen percent received some welfare benefit, a decrease from the 17 percent at age 10. Eight percent received the Domestic Purposes Benefit (DPB): 61 percent of these also earned some money through wages or salary. Four percent of the children's families were reliant on an invalid or disability benefit, and 1 percent an unemployment benefit or ACC compensation. Two-thirds of this group also had another family income source. Eight percent of the parents interviewed mentioned family support (an income supplement for low-income earners). Seven percent of families which were not currently receiving a state benefit had received one in the last 2 years.

The next table gives the sources of income in relation to family income levels. Those on low-incomes include 59 percent earning wages or salary, with over half receiving state benefits. Self-employment is lowest for the low-income group. Income from interest/family trust/rentals is highest for the very high-income group.

Table 80 Sources of income in relation to family income levels

| Income level → | \$80,001+ (n=162) | \$60,001–80,000 (n=96) | \$30,001–60,000 (n=152) | \$30,000 or less (n=70) |
|-------------------------------|----------------------|---------------------------|----------------------------|-------------------------------|
| Source ↓ | % | % | % | % |
| Wages/salary | 86 | 96 | 89 | 59 |
| Self-employment | 36 | 27 | 22 | 7 |
| Interest/family trust/rentals | 16 | 10 | 3 | 1 |
| Unemployment benefit | 0 | 0 | 0 | 7 |
| DPB | 0 | 0 | 3 | 51 |
| Invalid/disability | 1 | 6 | 5 | 4 |
| ACC | 2 | 0 | 2 | 1 |
| Family support | 0 | 1 | 11 | 30 |

Numbers add to more than 100% for each group because of families with more than one source of income.

In contrast to relations between income level and income source, there are no significant differences evident in looking at income source and maternal qualification: similar proportions of each maternal qualification level are found for each kind of income source. This is a somewhat different picture from the US research literature on welfare receipt, indicating that some of the associations which have been

found there with welfare receipt may owe themselves to other differences in characteristics, rather than welfare receipt itself.

In previous rounds of the Competent Children study, we have found little association between the main source of family income and children's competency scores, once family income itself has been taken into account. In this round, we separated out the DPB group into 2, one reliant solely on the benefit, and the other also receiving money from wages or salary. This does mean that the former group is small (16 children), so the results should be used with caution. While we do find that this group has lower scores on some of the competencies, they do not differ from every other kind of income source. For example, after taking into account family income and maternal qualification, the associations we found in relation to Curiosity and Perseverance showed some disadvantage for children whose family income is limited to the DPB, in relation to children whose families' income came from both wages/salary plus self-employment.

Table 81 Family income source at age 12 and children's competencies at age 12

| Family income source at age 12 [®] | Wages | Self-empl | Wages+ s.e. | DPB alone | DPB+ other source | Other benefit | Prob. of F-value from ANOVA | Percent variance acct. for |
|--|----------------------|-------------|-------------|-------------|-------------------------|-------------------|-----------------------------|----------------------------|
| Age-12 competency [¯] | Mean (n=284) | Mean (n=40) | Mean (n=77) | Mean (n=16) | Mean (n=25) | Mean (n=52) | | |
| Curiosity | 62.3 [^] | 63.8 | 67.0 | 49.2 | 58.2 | 58.4 | 0.007 | 3.2 |
| Perseverance | 70.3 [^] | 68.8 | 72.3 | 53.5 | 66.0 | 65.3 | 0.026 | 2.6 |
| Individual Responsibility | 75.8 [^] | 73.4 | 77.7 | 60.6 | 79.0 | 72.5 | 0.025 | 2.6 |
| Social Skills with Peers [*] | 72.0 [^] | 70.6 | 70.8 | 62.5 | 72.5 | 67.0 | 0.059 | 2.2 |
| Reading Age (yrs, mo) | 12.8 [^] | 13.1 | 13.1 | 12.4 | 13.6[^] | 12.1 | 0.003 | 3.7 |
| Logical Problem-Solving [*] | 70.1 | 74.4 | 71.3 | 73.5 | 69.1 | 67.0 | 0.045 | 2.3 |
| Composite Competency [*] | 66.4 ^{^^^^} | 68.0 | 68.2 | 58.4 | 66.2 | 63.2 [^] | 0.026 | 2.6 |
| Composite Social & Attitudinal Competency [*] | 71.2 [^] | 71.0 | 72.9 | 58.9 | 70.2 | 67.2 | 0.017 | 2.8 |

* In these cases the squared model was a better fit. [^] One fewer in this mean. ^{^^^^} Four fewer in this mean. The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Parental employment

Seventy-seven percent of the parents we interviewed were in regular employment: 43 percent full-time, and 34 percent, part-time. Seven percent had casual or short-term work.

The next table shows parental employment patterns in relation to gender.³⁶ The majority of men are in full-time employment; women have more variable patterns of employment. There has been a gradual rise in the proportion of mothers in full-time employment, from 19 percent when the children in the study had yet to start school, to 32 percent at age 10, and now to 41 percent when the study children are age 12.

³⁶ The parents interviewed were asked to provide employment-related information for their partners as well as themselves.

Table 82 Parental employment by gender

| | Women (n=489) % | Men (n=425) % |
|----------------------------|-----------------------|---------------------|
| Full-time employment | 41 | 89 |
| Regular part-time job | 30 | 0.5 |
| Two regular part-time jobs | 6 | 1 |
| Casual/short-term work | 6 | 4 |
| No employment | 17 | 6 |
| On leave from employment | 0 | 0.2 |

Mothers in 2-parent families were more likely to be working full-time than those in 1-parent families (41 percent compared with 29 percent). Otherwise, patterns of employment (and not being in employment) were similar across different family types.

Thirty-nine percent of the mothers' work involved shift work, irregular or long hours, weekend work, or travel, and 7 percent held more than one job. The pattern for irregular hours was similar for the fathers – unlike previous phases. Thirty-six percent worked long or irregular hours, etc. (compared with 65 percent at age 10). Three percent of the fathers held 2 or more jobs, much the same when the study children were younger.

The next table gives the average hours worked by the mothers and fathers of the study children. Note that the traditional 40-hour working week is not the reality for many of the fathers employed full-time. Fifty-six percent of them worked more than 40 hours a week on average, as did 29 percent of the mothers employed full-time. The fathers also tended to work longer hours than mothers for combinations of part-time and casual work.

Table 83 Average parental work hours by employment status

| | Women (n=489) % | Men (n=425) % |
|----------------------------|-----------------------|---------------------|
| Full-time employment | 40.8 (s.d. 8.9) | 47.84 (s.d. 10.01) |
| Regular part-time job | 18.4 (s.d. 7.0) | 20* |
| Two regular part-time jobs | 26.5 (s.d. 9.4) | 38.33+ (s.d. 7.64) |
| Casual/short-term work | 10.21 (s.d. 9.4) | 23.7^ (s.d. 14.14) |

* 1 father, + 3 fathers, ^ 7 fathers

Maternal employment status was unrelated to their education levels, but education levels were related to the kind of work mothers were doing. Thus university-qualified mothers were most likely to be undertaking management or professional work (57 percent), compared with 33 percent of trades/tertiary-qualified mothers, 17 percent of school-qualified mothers, and 7 percent of mothers with no qualification.

Of the 16 percent of parents interviewed who were not in paid employment, 6 percent would like to be doing some paid work, and 2 percent were unsure, or would like paid employment sometimes. The main barrier to paid work was the availability of work, followed by the need for retraining, the age of the child

or other children, and the need for childcare or afterschool care. Poor salary levels and health were also mentioned.

We reported the associations between patterns of maternal employment for the previous 7 years and children's competency levels at age 12 in Section Four. As in previous phases of the Competent Children study, we found little association between children's competencies and maternal employment (whether full-time, part-time, or not employed). Children whose mothers were in full-time employment scored on average 6 percentage points lower than those whose mothers worked part-time on the PAT Reading Comprehension test, and this difference remained after taking family income and maternal qualification into account.

Childcare out of school hours

Ninety-four percent of the parents interviewed looked after their 12-year-old children before and after school, on school holidays, or when they were sick. Grandparents and relatives were also called on by 29 percent. Seven percent used a paid caregiver, 6 percent friends, and another 6 percent, an OSCAR programme (out of school care). Four percent of the children were looked after by their siblings, and 2 percent could take care of themselves. This pattern is much the same as when the children were aged 8 and 10, although out of school care use was higher at age 10 (10 percent), and the use of siblings is new. There was no relationship between patterns of who looked after the child on these occasions, and family composition.

Family income and maternal qualification were related to use of paid care for children. Twelve percent of highest-income children would have a paid caregiver in these situations, compared with 1 percent of low-income children. None of the low-income children would use out of school care (OSCAR). Children whose mother had a university qualification were more likely to have a paid caregiver for such times (17 percent). OSCAR use rose from 2 percent for children whose mothers had no qualification, to 9 percent of those with a university qualification. Low-income children were less likely to be looked after by grandparents or other relatives (17 percent).

Mothers in full-time employment were most likely to use a range of different kinds of support.

Table 84 **Maternal employment and childcare at age 12**

| Age-12 maternal employment status [®] | Full-time (n=195) % | Part-time (n=142) % | Not in paid work (n=80) % |
|--|---------------------------|---------------------------|------------------------------------|
| Childcare⁻ | | | |
| Child's grandparents/other relatives | 46 | 21 | 11 |
| Paid caregiver | 13 | 4 | 0 |
| School-related programme/school care/OSCAR | 10 | 5 | 0 |
| Friend(s) | 9 | 6 | 1 |
| Siblings | 7 | 1 | 0 |

It is the mother's pattern of employment that determines the use of others to help care for children when parents cannot: there are no differences among fathers in terms of whether they are employed full, or part-time, though there is less use of others where fathers are not employed.

Parental occupations

In this phase of the Competent Children project, we switched from using the Elley-Irving socio-economic scale to the more widely used NZ Standard Classification of Occupations. The next table shows the range of occupations undertaken by parents of the Competent Children sample. Proportions given are for those in employment. Fathers of the study children were much more likely than mothers to be in administrative or managerial or trade work; the mothers were more likely to be working as professionals (including teachers and nurses), technicians and associated professionals, and clerks.

Table 85 Parental occupations when study children aged 12

| Occupational category ↓ | Maternal (n=401) % | Paternal (n= 397) % |
|---|--------------------------|---------------------------|
| Legislators, administrators, & managers | 6 | 24 |
| Professionals | 29 | 26 |
| Technicians & associate professionals | 23 | 13 |
| Clerks | 19 | 3 |
| Service & sales | 14 | 5 |
| Agriculture & fishery | 2 | 3 |
| Trades | 1 | 17 |
| Plant & machine operators & assemblers | 2 | 6 |
| Elementary occupations | 4 | 2 |

We did not analyse the relationship between parental occupations and children's competency levels at age 12. Previous phases of the Competent Children project showed associations with maternal and paternal occupations which remained after taking family income into account, but most were no longer significant after taking maternal qualification into account.

Parental health and general happiness

Eighty percent of the parents interviewed said their own health was very good or excellent. Eighteen percent had some health concerns, and 1 percent said their health was poor. Family characteristics were unrelated to reports of parental health.

There was a small relationship between parental and children's health: 9 percent of children whose parents' health was less than very good or excellent also had some health issues, compared with 2 percent of those whose parents said they had very good or excellent health.

Eighty-nine percent of the parents said they were generally happy. Ten percent qualified their answer, and 1 percent said they were generally unhappy. There were no differences related to family characteristics or parental gender. However, parental happiness was related to their own health: 93 percent of those who described their health as excellent/very good also described themselves as generally happy, compared with 69 percent of those who described their health as less than excellent/very good.

Parental happiness was related to teacher reports of their child's happiness. Thirty percent of the children whose parents said they were unhappy or whose happiness was qualified were said by their teachers to be generally unhappy or to have varying happiness, compared with 12 percent of those whose parents said they were happy.

Informal support for parents

Most parents could easily call on some help if they needed it. As when the children were aged 10, friends were more easily called on than family or neighbours.

Table 86 Informal support for parents

| Frequency [®] Caregiver [™] | Yes % | No % | Varies % |
|--|----------|---------|-------------|
| Friends | 80 | 13 | 7 |
| Family | 61 | 35 | 4 |
| Neighbours | 56 | 36 | 8 |

There were no differences in informal support parents could call on related to family income or composition. Parents where the mother had a university qualification were less likely to have family they could easily call on for help (42 percent).

Parental use of leisure

We asked the parents to tell us how often they did the range of leisure activities included in the table below. Watching television, reading, and talking with friends headed the list.

Table 87 Parental leisure activities

| Frequency® | Often/ most days | Once or twice a week | Less than once a week | Never |
|--|---------------------|----------------------------|-----------------------------|-------|
| Activity | % | % | % | % |
| Watch television | 74 | 17 | 6 | 2 |
| Read a newspaper | 66 | 23 | 8 | 3 |
| Talk with friends | 59 | 35 | 5 | 1 |
| Read a book | 58 | 17 | 20 | 5 |
| Play sport/take exercise | 41 | 31 | 15 | 14 |
| Write a letter/e-mail | 30 | 22 | 31 | 16 |
| Use the Internet | 28 | 21 | 19 | 32 |
| Shopping | 20 | 58 | 20 | 3 |
| Read a magazine | 18 | 31 | 40 | 11 |
| Home decorating/maintenance | 14 | 19 | 51 | 16 |
| Voluntary work | 12 | 25 | 33 | 31 |
| Garden | 8 | 29 | 50 | 14 |
| Make things – a hobby/craft | 8 | 16 | 35 | 41 |
| Play computer/video games | 5 | 13 | 16 | 66 |
| Go to art/music/dance activities | 4 | 12 | 41 | 44 |
| Go to a meeting for school/church/voluntary organisation | 4 | 23 | 57 | 16 |

There were some differences in parental leisure activities related to parental and family characteristics, but none in relation to television watching and shopping – two “mass society” activities.

Leisure use and gender

There were only a few gender differences in the ways that the parents interviewed spent their time: fathers were more likely to read magazines at least once a week (65 percent compared with 48 percent of the mothers), and to play computer or video games (33 percent compared with 17 percent of the mothers). This is an interesting contrast with the gender differences evident for the study children described in the next section, though the 2 activities where there is a gender difference for parents are consistent with 2 of those found for the children.

Leisure use and maternal qualification levels

As one would expect, maternal qualification levels were related to how often parents read books. Sixty-six percent of parents where the mother had a university qualification read books often, compared with 47 percent of those where the mother had no qualification. At the other end of the spectrum, 12 percent of the latter group never read a book, compared with 2 percent of those with a university qualification; and 18 percent read a newspaper less than once a week or never, compared with 5 percent of those with a university qualification.

Internet use was also related to maternal qualification. Only 13 percent of the parents where the mother had a university qualification never used the Internet, rising to 60 percent of those where the mother had no qualification. Related to this, patterns of letter or e-mail writing showed similar trends.

While patterns of going to art/music/dance activities often or at least once or twice a week are similar among all the maternal qualification levels, never participating in these activities follows maternal qualification levels, from 20 percent of parents where mothers have a university qualification, to 69 percent of those where mothers have no qualification. The experience of making things through a hobby or craft was also related to maternal qualification (30 percent of the parents where the mother had a university qualification never did this, rising to 68 percent of those where the mother had no qualification).

While there were similar proportions of parents who did voluntary work, gardened, or played sport/took exercise among all maternal qualification levels, parents where the mother had no qualification were more likely to never undertake these (44, 26, and 22 percent respectively).

Leisure use and family income levels

Patterns of parental use of leisure showed fewer relationships with family income than with maternal qualification. The differences that did exist were similar, with the exception of no differences related to sport/exercise:

- a higher proportion of parents from low-income homes reading less than once a week or never (40 percent compared with 23 percent of others);
- fewer parents from low-income homes reading a newspaper often/most days (39 percent compared with 70 percent of others);
- use of the Internet reflecting levels of family income (rising from 14 percent of parents in low-income homes using it often or most days, to 38 percent of parents in very high-income homes), with a similar pattern for writing letters or e-mail;
- Parents in low-income homes least likely to garden (21 percent said they never did); and
- Parents in low-mid-income homes less likely to do home decorating or maintenance (20 percent said they never did, compared with 12 percent of those in high-very high-income homes).

Parental use of leisure and family composition

Only 2 differences in use of parental leisure were related to kind of family. Parents in 1-parent families were less likely to read a newspaper often (49 percent), and parents in new 2-parent families were more likely to never spend time on voluntary work (53 percent).

It seems likely that some of the differences between parents related to income and maternal qualification reflect differences in available money to support the more expensive leisure options, and, in relation to home-related leisure use particularly, differences in whether the home is owned or rented (we did not ask this). Other differences do reflect differences in the role of literacy in everyday life, and in relation to maternal qualification, but not family income, different levels of cultural capital, with a greater incidence of some 'high' cultural activities among mothers with high levels of qualification.

Leisure use and ethnicity

There were some ethnic differences. The parents of Pākehā/European children were more likely to say they read a book often (62 percent compared with 43 percent of others). However, there was no difference related to reading a newspaper. Māori and Pākehā/European parents were more likely to often talk to friends than Pasifika or Asian parents (60 percent compared with 41 percent). However, ethnicity was unrelated to whether parents had friends they could call on easily if they needed help.

Parental enjoyment of reading

Eighty-four percent of the children's parents whom we interviewed said they liked reading, and 11 percent did if they had time. Five percent said they did not like reading. Enjoyment of reading was similar for both mothers and fathers interviewed. Enjoyment of reading was related to maternal qualification, with 12 percent of those parents where the mother had no maternal qualification saying they did not enjoy reading. Parents where the mother had a university qualification were most likely to enjoy reading (93 percent, declining to 80 percent of those with a school or no qualification). There was no association with family income or gender. Interestingly, there was no association between a parent's enjoyment of reading, and their child's enjoyment of reading.

Māori and Pasifika parents were more likely to say they did not like reading (15 and 12 percent respectively).

Parental time spent watching television

The average time spent watching television among parents was 1.92 hours (s.d. 1.19), with a range from none (2 percent) to 8 hours a day. Fourteen percent said they watched television only occasionally.

The mothers and fathers interviewed had similar averages. The higher the mother's qualification level, the less television was watched: from a mean of 1.28 hours (s.d. 0.70) where the mother had a university qualification, to a mean of 2.75 hours (s.d. 1.38) where the mother had no qualification. There was a similar trend in relation to levels of family income: the higher the income, the less television watched on average. Māori parents had a higher average number of hours spent watching television (2.38 hours (s.d. 1.27)).

Parental television watching time showed associations with quite a few of the children's competencies. However, there is a considerable overlap between parental time spent watching television and family income and maternal qualification levels, so that most associations lose their significance once those 2 key aspects have been taken into account.

Do mothers and fathers see things differently?

We found few gender differences in the study parents' perspectives on their child's school progress, their concerns about their child, their own involvement in the school, or their own activities with the child. Mothers were more likely to say they would get cross and get their way if there was a disagreement with the child (39 percent compared with 22 percent of the fathers). Fathers were less likely to talk to their child about school (74 percent compared with 88 percent of the mothers). Mothers were more likely to hear about school work from their children (38 percent compared with 20 percent of the fathers), and about bullying or social problems (21 percent compared with 9 percent of the fathers). Mothers were more likely to share shopping with their 12-year-old (43 percent compared with 22 percent of the fathers). These different patterns may reflect differences in employment hours, since mothers were less likely than fathers to be employed full-time.

Summary

Seventy-one percent of the children continued to live with both their birth parents. Half of those who did not saw their non-resident parent regularly. Children whose parents shared their custody or whose non-resident parent had regular access to them were more likely to get on with them. Eighty-three percent of the study sample had at least 1 sibling, with a third having 1, and just under a third, 2 siblings.

Seventy-seven percent of the parents we interviewed were in regular employment: 43 percent full-time, and 34 percent part-time. Seven percent had casual or short-term work. There has been a gradual rise in the proportion of mothers in full-time employment, from 19 percent when the children in the study had yet to start school, to 32 percent at age 10, and now to 41 percent when the study children are age 12. Mothers in 2-parent families were more likely to be working full-time than those in 1-parent families. Otherwise, patterns of employment (and not being in employment) were similar across different family types. They were also similar across different levels of maternal qualification. However, maternal qualification levels were reflected in the kind of work undertaken.

Fathers of the study children were much more likely than mothers to be in managerial or trade work; the mothers were more likely to be working as professionals (including teachers and nurses), technicians and associated professionals, and clerks.

Fifty-six percent of the children's fathers worked more than 40 hours a week on average, as did 29 percent of the mothers employed full-time. Use of others to help care for children when parents cannot is mainly related to maternal employment, though there is less use of others where fathers were not employed. The use of paid care for children (by a caregiver or through an OSCAR programme) was related to family income and maternal qualification levels, with more use with higher levels of income and qualification.

Most parents could easily call on some help if they needed it, more so from friends than family or neighbours. Family characteristics were unrelated to the availability of help from others.

Most family income was earned through wages or salary. Self-employment was a source for 26 percent of the children's families. Thirteen percent received a welfare benefit. While family income levels are related to family sources of income, maternal qualification is not.

Eighty-nine percent of the parents were generally happy, and 80 percent in very good or excellent health. Parental happiness was related to their health, and to teacher reports of their child's happiness.

Watching television, reading, and talking with friends headed the list of parents' leisure activities. In contrast to the gender differences between the study children's use of leisure time, there were only a few gender differences for their parents, and leisure activities. Maternal qualification was the family characteristic most associated with differences in the use of leisure time, followed by family income. The differences that existed were related to the use of literacy, and participation in "high culture"; mothers with no qualification or in low-income homes were also less likely to do voluntary work, or garden.

Most parents liked reading. Enjoyment of reading was related to maternal qualification levels. Interestingly, there was no association between parental and child enjoyment of reading. Though most parents watched television most days, the higher the level of maternal qualification and family income, the less amount of time went to television viewing.

There were indications that children may talk more with their mothers about school than their fathers. This may be related to the lower proportion of mothers in full-time employment, and therefore having more time available to spend with children. Otherwise, there were few gender differences related to interaction with children, or involvement in their activities.

Section Eight

Activities and interests

Leisure activities

We asked the study children how often they did each of 14 activities. We chose the activities on the basis of what children said they did at age 10, previous associations found with their competency levels, information from the focus groups, our own experience, and information from other research studies.³⁷

At age 12, the study children's spare time activities fell into 4 groups in terms of overall frequency. Watching television and doing homework headed the list of activities which they said they often did (more than 2 days a week). Sport, reading, computer use, and spending time with friends are the next most frequent group of activities. Housework, playing electronic games, and talking to friends on the phone or Internet follow. The final group of activities are more occasional, and some of the children never experienced them: reading magazines, newspapers, or comics, taking part in art/music/dance classes, or working for money outside the home.

Table 88 12-year-old leisure activities

| Frequency→ | Often | 1–2 days a week | Occasionally | Never |
|--|-------|--------------------|--------------|-------|
| Activity→ | % | % | % | % |
| Watch television | 77 | 11 | 11 | 1 |
| Do homework | 72 | 21 | 7 | 1 |
| Play sport | 55 | 24 | 15 | 6 |
| Hang out with friends | 52 | 28 | 19 | 1 |
| Read a book (not for school) | 49 | 18 | 26 | 7 |
| Use the computer | 48 | 28 | 13 | 11 |
| Talk to friends on the phone/Internet | 43 | 22 | 30 | 5 |
| Play electronic/video/computer/ playstation games | 38 | 22 | 30 | 10 |
| Do housework/tidy up | 32 | 36 | 29 | 3 |
| Read a magazine | 16 | 17 | 42 | 24 |
| Go to art/music/dance classes | 14 | 20 | 8 | 58 |
| Read a newspaper | 12 | 18 | 46 | 24 |
| Work for money outside home | 9 | 8 | 7 | 76 |
| Read a comic | 7 | 5 | 32 | 56 |

³⁷ With hindsight, we should have included working on a hobby or interest – making or creating things.

There are some gender differences in these patterns that are likely to be related to the gender differences in performance on the Competent Children project measures, though the size of the performance differences is not large.

Girls were more likely than boys to:

- read a book other than for school (62 percent of girls did so often, compared with 37 percent of boys; 11 percent of boys said they never read a book other than for school, compared with 3 percent of the girls);
- read a magazine (34 percent of boys said they never read a magazine, compared with 13 percent of girls);
- often talk to friends on the phone or Internet (56 percent of girls compared with 31 percent of boys);
- do their homework often (78 percent of girls compared with 67 percent of boys); and
- go to art/music/dance classes often, or 1 or 2 days a week (48 percent of girls compared with 21 percent of boys).

Boys were more likely than girls to:

- play electronic/video/computer/playstation games often (54 percent of boys compared with 20 percent of girls);
- play sport often (65 percent of boys compared with 43 percent of girls); and
- read comics (56 percent of boys compared with 31 percent of girls).

Boys and girls were just as likely to:

- use a computer;
- do housework;
- hang out with friends;
- work for money outside home; and
- read newspapers often, or on 1 or 2 days a week, but boys were more likely to never read a newspaper (29 percent compared with 20 percent of girls).

On the whole, the frequency with which children reported these activities was unrelated to maternal qualification or family income. There are 3 notable exceptions.

The proportion of 12-year-old children who often *read* a book rises from 29 percent of those whose mother has no qualification to 45 percent of those whose mother has a school qualification, and 50 percent of those whose mother has a tertiary/trade qualification, to 70 percent of those whose mother has a university qualification.

Thirty-seven percent of those whose mothers have no qualification only used a *computer* occasionally or never, compared with 26 percent of those whose mothers have a school or tertiary/trade qualification, and 8 percent of those whose mothers have a university qualification.

Nineteen percent of those whose mothers have no qualification often took part in art/music/dance classes, compared with 34 percent of those whose mothers have a school or tertiary/trade qualification, and 43 percent of those whose mothers have a university qualification.

Māori children were less likely to say they read often in their spare time (27 percent compared with 49 percent overall). Pasifika and Asian children were more likely to read a newspaper at least 1 or 2 days a week (60 percent and 50 percent compared with 27 percent of Pākehā/European children, and 29 percent of Māori children). While the proportions of children who often used a computer at home were similar for all these ethnic groups, Māori and Pasifika were more likely to never or only occasionally use a computer out of school: 38 percent and 44 percent compared with 21 percent of Pākehā/European children, and no Asian children.

Frequency of activities is linked to their enjoyment – with the exception of homework.³⁸

Table 89 **Activities most enjoyed by 12-year-olds**

| Activity | Age 12 (n=496) % |
|---|------------------------|
| Playing sports | 69 |
| Hanging out with friends | 68 |
| Watching television | 60 |
| Playing electronic/video/computer/playstation games | 50 |
| Using the computer | 49 |
| Reading a book (not for school) | 45 |
| Talking to friends on the phone/Internet | 42 |
| Going to art/music/dance classes | 23 |
| Reading a magazine | 22 |
| Doing homework | 14 |
| Reading a comic | 9 |
| Reading a newspaper | 8 |
| Working for money outside home | 7 |
| Doing housework | 6 |

There were also some gender differences related to the activities they *enjoyed most*.

Boys were more likely to name as one of the activities they enjoyed most:

- playing electronic games (67 percent compared with 31 percent of girls);
- watching television (67 percent compared with 53 percent of girls); or
- reading a comic (13 percent compared with 4 percent of girls).

Girls were more likely to name:

- hanging out with their friends (74 percent compared with 63 percent of boys);

³⁸ The question we asked came directly after their report of the frequency of activities, and was “Which of these activities do you enjoy the most?”, with the children listing as many activities as they wanted.

- talking with friends on the phone/Internet (55 percent compared with 30 percent of boys);
- reading a book (not for school) (51 percent compared with 41 percent of boys);
- reading a magazine (30 percent compared with 14 percent of boys); or
- going to art/music/dance classes (35 percent compared with 13 percent of boys).

Enjoyment of reading and watching television showed some variation related to maternal qualification. The highest levels of enjoyment of reading a book were found among the children whose mothers had a university qualification (59 percent, decreasing to 34 percent of those whose mothers had no qualification). Conversely, children whose mothers had a university qualification were somewhat less likely to mention watching television as an activity they enjoyed most (49 percent compared with 62 percent of others). They were also less likely to mention reading magazines (13 percent compared with 23 percent of others). The children whose mothers had no qualification were more likely to mention homework as an activity they enjoyed (24 percent), but less likely to mention art/music/dance classes, reflecting their lower participation in such classes (10 percent compared with 33 percent of those whose mothers had a university qualification).

There is more homogeneity of the activities which are enjoyed most in relation to family income. However, children from the highest-income homes (\$80,000 or more) were less likely to mention electronic games (40 percent compared with 52 percent of others), and those from the lowest-income homes (\$30,000 or less), less likely to mention art/music/dance classes (11 percent).

Pākehā/European children were less likely to name watching television as one of their favourite activities (58 percent compared with 70 percent of non-Pākehā/European), and less likely to mention homework (10 percent compared with 27 percent of non-Pākehā/European). A trend which might have been significant with a larger sample was for fewer Māori children to mention reading books as an activity they enjoyed most (33 percent, $p = 0.07$).

Home equipment

A quarter of the children shared their room. Two-thirds of the study children had a desk in their room. Radios were the most common media found in children's bedrooms.

Table 90 **Equipment in the child's bedroom at age 12**

| Equipment | At age 12 (n=496) % |
|-----------------|---------------------------|
| Radio | 84 |
| CD/tape player | 70 |
| Desk | 66 |
| Television | 24 |
| Computer | 9 |
| Phone | 9 |
| Video | 6 |
| Internet access | 3 |

Girls were slightly more likely to have audio equipment in their bedroom: a radio (88 percent compared with 81 percent of boys), or a CD or tape player (77 percent compared with 65 percent of boys); boys, a television (38 percent compared with 20 percent of girls).

Children whose mothers had no qualification were less likely to have a desk in their bedroom (54 percent), but most likely to have a television (44 percent compared with 11 percent of those whose mothers had a university qualification). They were also more likely to have a video player in their bedroom (13 percent).

Children from high and very high-income homes were more likely to have a computer in their bedroom (14 percent compared with 5 percent of others), and Internet access (6 percent compared with 1 percent of others). In contrast, televisions were most likely to be in the bedrooms of children from low-income homes (38 percent, declining to 17 percent of children from very high-income homes). There was a similar pattern for video players.

Māori children were less likely to have a desk in their bedroom (48 percent). Asian children were more likely to have a computer (43 percent) or Internet access (29 percent) in their bedroom.

Television watching

Just over a fifth of the 12-year olds were watching more than 3 hours television a day, possibly because their tastes were shifting away from children's programmes to longer programmes, with a third watching adult soap operas. Cartoons remained popular, but there was a shift away from children's cartoons, and a slight decrease in other cartoons. Adult adventure programmes were watched by more children, but were still a minority taste.

Table 91 Children's 3 favourite TV programmes at ages 8, 10, and 12

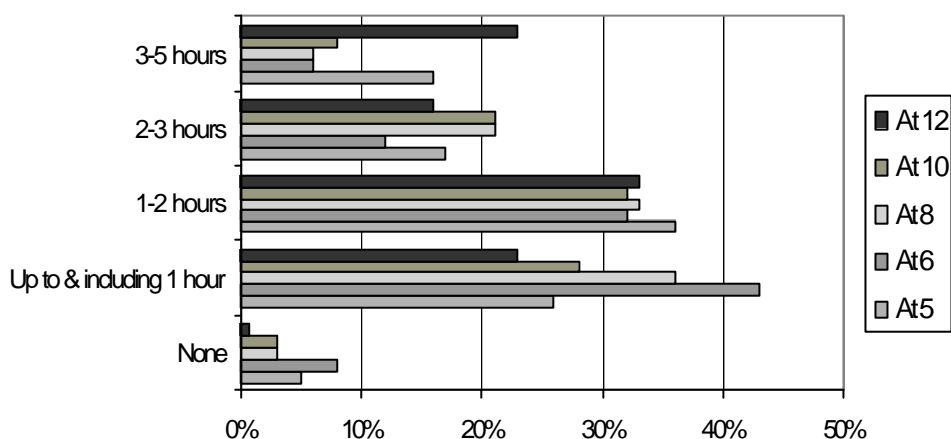
| Programme | Age 8 | Age 10 | Age 12 |
|--|--------------|--------------|--------------|
| | (n=523) % | (n=507) % | (n=496) % |
| Cartoons—unspecified/adult | 52 | 60 | 50 |
| Adult sitcoms/family viewing | 22 | 33 | 34 |
| Adult soap operas | 14 | 23 | 33 |
| Cartoons—children's adventure/sci-fi | 31 | 41 | 30 |
| Adult adventure/sci-fi/crime/mystery/horror | 7 | 8 | 14 |
| Cartoons—children's/family viewing | 57 | 36 | 10 |
| Adult/family entertainment | 8 | 9 | 9 |
| News/documentaries/dramas/wildlife | 7 | 8 | 8 |
| Sports and sports related | 4 | 6 | 8 |
| Real life | — | — | 7 |
| Children's programmes (made for TV) | 9 | 11 | 5 |
| Movies/videos children's family viewing | 8 | 4 | 4 |
| Adult movies | 6 | 1 | 4 |
| Adult drama | — | 2 | 4 |
| Children's adventure sci-fi/horror unspecified | 9 | 4 | 3 |
| Movies/videos unspecified | 2 | 2 | 3 |
| None | 2 | 1 | 3 |

When asked to name their 3 favourite television programmes, boys' preferences were clearly for cartoons (59 percent mentioned cartoons or adult cartoons, such as *The Simpsons*, compared with 39 percent of girls), and children's adventure or science fiction cartoons (49 percent compared with 9 percent of girls). Girls' main preferences were for adult soap operas (57 percent compared with 12 percent of the boys), and sitcoms (45 percent compared with 25 percent of the boys). A small proportion of boys mentioned sports (15 percent compared with 1 percent of girls), and 11 percent of the girls mentioned real life programmes, compared with 4 percent of the boys.

There were some differences related to family resources. Children whose mothers had no qualification were more likely to nominate children's adventure or science fiction cartoons (44 percent), and less likely to nominate situation comedies for family viewing (25 percent), news or documentaries (2 percent), or real life programmes (2 percent).

The average time spent watching television a day by the study children at age 12 was 2.45 hours, up somewhat from 2.20 hours at age 10.

Figure 12 Children's daily TV watching



The amount of television watched was much the same for both boys and girls, with some small differences at the extremes. Nine percent of the girls reported that they watched no television, or only irregularly, compared with 2 percent of the boys, and 6 percent of the boys watched 5½ hours a day on average, compared with 2 percent of the girls. Boys were more likely to watch television before school: 19 percent compared with 8 percent of girls.

Average hours of television watching did reflect maternal qualification, with the highest average among children whose mothers had no qualification, 3.04 hours a day, compared with 2.02 hours a day for those whose mothers had a university qualification. There was also some relation with family income, with an average of 2.72 hours a day for children from low-income homes, compared with 2.19 hours a day for those from the highest-income homes. There were no gender differences in the average amount of television watched.

Pasifika and Māori children had the highest average hours watching television a week (2.97 and 2.68 hours respectively, compared with 2.41 for Pākehā/European and 1.66 for Asian children). Pasifika children were more likely to watch television before school (32 percent compared with 14 percent overall). Preferences in television programmes were similar, with Māori students somewhat less likely to name sitcoms or family viewing among their 3 favourite programmes (21 percent compared with 34 percent overall), and Asian students more likely to name news or documentaries (29 percent compared with 8 percent overall).

Children who had a television in their room were more likely to watch television for 2 hours or more a day (66 percent compared with 39 percent of those without a television in their room). Children who enjoyed reading were less likely to watch 4 or more hours a day (19 percent compared with 37 percent of those who had mixed views about reading, and 35 percent of those who disliked reading).

Fourteen percent of the children usually watched television before school, and 20 percent watched it sometimes before they went to school. Twenty-two percent of the children whose mothers had no qualification usually watched television before school.³⁹

Children who watched television before school tended to have higher average hours spent on television: 3.42 hours (s.d. 1.65) for those who usually watched television before school, 2.84 (s.d. 1.32) for those who sometimes watched it before school, and 2.11 hours (s.d. 1.33) for those who never watched television before breakfast. Children who watched television before they went to school were more likely to have a television set in their bedroom (34 percent compared with 19 percent of those who did not watch television before school).

In earlier phases of the study, we found some associations between the amount of television watched by children, and their mathematics and literacy scores. There was a stronger association between previous levels of television use and current scores, than between current television use and current scores. At age 12, we found associations between children's television watching and their competency levels for only mathematics and writing. These favoured children who watched only an hour of television or less a day, after taking family income and maternal qualification levels into account. In Section Five, we reported the cumulative patterns of television use and their associations with children's competency levels.

Computer use

Ninety percent of the study children had computers in their homes at age 12. Computer ownership was associated with maternal qualification: ranging from 99 percent of the children whose mothers had a university qualification to 71 percent of those whose mothers had no qualification.

³⁹ Just over half the children got up after 7am on school days (56 percent). Forty-three percent were awake between 6–7am, and 2 percent, before 6am. Children who watched television before school were not earlier risers than others.

However, most did not spend a lot of time using computers. The average time was 3.8 hours a week among those who had a computer at home. It was lowest for those whose mother had no qualification, 3.22 hours, and highest among those whose mothers had a university qualification, 4.15 hours. On average, boys spent more time on the computer than girls: 4.26 hours a week, compared with 3.34 hours for girls. Of the group that spent 15 hours a week or more using a computer, 73 percent were boys. Average use did not vary by family income. Pasifika and Māori children reported somewhat higher average hours using the computer (4.67 and 4.19 hours respectively, compared with 3.75 hours for Pākehā/European, and 2.14 hours for Asian children in the study).

Unlike the time spent watching television, time spent on the computer was unrelated to children's enjoyment of reading.

We found some associations between the amount of time spent using a computer at home, and children's competency scores. These remained after taking into account family income, but largely disappeared when we took maternal qualification into account, leaving only some differences between children who did not use a computer and others.

The study children were making more use of the computer than they were at age 10 for homework, e-mail, and to access the Internet. They were less likely to use CD ROMs, play educational games, or use it for desktop publishing or to create graphics. There was also a slight decline in its use for word processing *per se* (some of this may now be taking place within the category of projects or homework).

Table 92 **Children's computer activities and children's computer use at age 10 and 12**

| Activity | Age 10 (children's report) (n=402) % | Age 12 (children's report) (n=444) % |
|-------------------------------------|--|--|
| Play games | 87 | 85 |
| Internet | 21 | 68 |
| Homework/project | 31 | 64 |
| Word processing | 45 | 38 |
| Use e-mail | 4 | 30 |
| Use CD ROMs for information/project | 23 | 14 |
| Graphics | 25 | 13 |
| Educational games | 18 | 6 |
| Desktop publishing | 9 | 4 |
| Use digital camera/scanner | – | 3 |
| Listen/play music | – | 3 |
| Child helps adults/siblings | – | – |
| Interactive learning CD ROMs | – | – |

Also mentioned were writing programs (2 percent), and nothing (1 percent).

The main difference in the ways in which boys and girls used the computer at home was that girls were more likely to word process (40 percent compared with 28 percent of the boys), and more likely to use the Internet for e-mail (48 percent compared with 32 percent of the boys), on-line chat (25 percent compared with 19 percent of the boys), and seeking information for homework or projects (50 percent

compared with 41 percent of boys). Boys were more likely to use the Internet to download games or music (29 percent compared with 14 percent of the girls), and for surfing (36 percent compared with 26 percent).

Maternal qualification was associated with only 2 differences in patterns of computer use for those who had a computer in their home. Forty-eight percent of those whose mothers had a university qualification used e-mail, compared with 10 percent of those whose mothers had no qualification. Seventy-two percent of them used it for homework or projects, compared with 47 percent of those whose mothers had no qualification.

What difference does computer use make to children's competency levels? We analysed each of the activities we asked about, contrasting the average scores of those who said they used the computer this way,⁴⁰ and those who did not, within the group who had access to a home computer. We did find quite a few associations with all of these uses, but few which remained significant after taking family income and maternal qualification into account. What this tells us is that the activities which do continue to show a significant association are ones which would be likely to do so for any child. However, the other activities are ones which are still worth noting, as they tell us something about the kinds of activities which are more likely to be done by children who have the advantages of high levels of maternal qualification or family income, and which underpin the differences between children which emerge statistically as associated with these 2 key family resources.

The computer activities that did remain significant, particularly for mathematics and Communication, were:

Playing games on the computer

Those who played computer games had higher average scores for mathematics (10 percentage points) and Logical Problem-Solving (6 percentage points).

Word processing

Those children who used their home computer for word processing had higher average scores for Social Skills with Adults (7 percentage points), and Communication (5 percentage points).

E-mail

Those children who used their home computer for e-mail had higher average scores for Communication (6-7 percentage points).

Graphics

Those children who used their home computer for graphics had higher average scores for Communication (7 percentage points) .

⁴⁰ As with our other information on children's activities at home, we do not know how often children do these things, so we cannot quantify the amount of time put into particular practices, or the level at which something might be done.

Homework/projects

Those who used their home computer for homework or projects had higher average scores for mathematics (6–7 percentage points) and writing (3 percentage points).

Three-quarters of the students said they had Internet access at home. Most of these were able to use the Internet on their own (80 percent of those with home Internet access). The table below shows the main uses to be seeking information for school work, and e-mail.

Table 93 **Internet activities at age 12**

| Activity | Age 12 with home access to Internet (n=374) % |
|---|--|
| Seeking information for homework/projects | 59 |
| E-mail | 52 |
| Surfing | 41 |
| Games | 34 |
| Download games/music | 29 |
| Chat on-line | 29 |
| News group | 4 |
| Design/make web pages | 4 |
| Do not use the Internet | 4 |
| Download pictures & video clips | 3 |

Also mentioned were downloading pictures and video clips (2 percent).

The mean number of children’s uses of the Internet at age 12 was 2.62 (s.d. 1.35).

Again, availability of the Internet depended on family resources. Ninety percent of the children whose mothers had a university qualification had Internet access on their home computer, compared with 57 percent of those whose mothers had no qualification. However, reported uses of the Internet did not differ by maternal qualification.

Children who could access the Internet at home reported higher amounts of time using the computer out of school hours, with 36 percent using it for more than 3 hours a week, compared with 15 percent of those who could not access the Internet on their home computer.

Being able to access the Internet by themselves also led to somewhat more time being spent by children on the computer: an average of 4.19 hours (s.d. 4.10) a week compared with those who could not (average 3.12 hours a week (s.d. 4.78)). Thirty-six percent of the children who could access the Internet on their own download games/music, chat on-line, and play games. Only 18 percent used a home computer for only one activity, compared with 48 percent of those who could not use the Internet on their own. However, being able to access the Internet on their own was not related to whether children used the computer for at least 4 activities.

Reading

Just under half the children said they often read a book other than for school, and 45 percent said reading was one of the out-of-school activities they enjoyed most. When we asked whether they enjoyed reading, 64 percent of the study children said they did, 24 percent said they enjoyed it sometimes, and 12 percent said they did not enjoy reading. Enjoyment of reading was highest among those whose mothers had a university qualification (78 percent). Girls were more likely to say they enjoyed reading (72 percent compared with 56 percent of boys). Fifteen percent of the boys did not enjoy reading, compared with 9 percent of the girls.

We asked the children to respond to a list of 12 kinds of reading (including nothing), and say what they read out of school. None of the children said they read nothing at all out of school. Most read some fiction. Many were reading a range of material, with different purposes of pleasure and information, and genres within those purposes. Within information, for example, a substantial minority of the age 12 children were accessing manuals, non-fiction, newspapers, and advertising through junk mail.

Table 94 Children's reading at home at age 12

| Reading material | Age 12 (n=496) % |
|--|------------------------|
| Fiction | 85 |
| Instruction books/manuals/recipes/puzzle books | 61 |
| Material set for homework | 61 |
| Magazine | 52 |
| Non-fiction | 49 |
| Junk mail | 45 |
| Newspaper | 42 |
| Encyclopaedias/dictionaries | 35 |
| Internet material/CD ROMs | 35 |
| Comics/joke books | 27 |
| Bible/religious/spiritual books | 13 |

The mean number of different kinds of material read was 5.03 (s.d. 2.49), with a range of 20 percent reading only 1 or 2 kinds of material, up to 19 percent reading 7 or more of the 11 kinds they were asked about. There were no differences in the range of reading material reported from this list in relation to maternal qualification or family income. The only specific difference was that children whose mothers had no qualification were less likely to read fiction (79 percent compared with 94 percent of those whose mothers had a university qualification). Pasifika and Asian students reported reading a higher average number of the different kinds of material we asked about (5.8 and 5.43 respectively), with Pākehā/European children reporting 5.02 kinds of material, and Māori students, 4.23 kinds. Pasifika students were most likely to say they read religious or spiritual material at home (52 percent compared with 13 percent overall).

There were no gender differences in the average number of different kinds of reading material. Boys were more likely to say they read Internet material or CD ROMs (40 percent compared with 29 percent

of girls). Girls were more likely to read fiction (91 percent compared with 79 percent of boys),⁴¹ and religious or spiritual material (15 percent compared with 10 percent of boys).

Those who enjoy reading have the highest proportion of those who read fiction, non-fiction, a daily newspaper, comics (which may surprise some), and religious or spiritual material: suggesting reasonably omnivorous appetites. Enjoyment of reading does not seem to make any difference in relation to reading for school or practical purposes.

In this phase of the Competent Children study, we did not analyse children's competencies in terms of particular kinds of reading, but used enjoyment of reading as an overall indicator of the role of reading in the children's lives. There were marked associations, which were reduced a little after taking family income and maternal qualification into account, but still remained. For all the competencies other than Individual Responsibility and Social Skills with Peers, the contrasts which remained were between the average scores of the children who enjoyed reading, and those who did not, or whose view was qualified.

Table 95 **Enjoyment of reading and children's competencies at age 12**

| Enjoyment of reading® | No/ not really Mean (n=60) | Qualified yes Mean n=121 | Yes Mean (n=315) | Prob. of F-value from ANOVA | Percent variance acct. for |
|---|-------------------------------------|-----------------------------------|---------------------------|-----------------------------------|----------------------------------|
| Age-12 competency ⁻ | | | | | |
| Curiosity | 52.4 | 59.5 | 64.9[^] | < 0.0001 | 4.9 |
| Perseverance | 55.8 | 63.1 | 74.0[^] | < 0.0001 | 9.4 |
| Individual Responsibility | 65.9 | 70.4 | 78.8[^] | < 0.0001 | 6.3 |
| Social Skills with Peers* | 65.1 | 69.5 | 72.5[^] | 0.0009 | 2.8 |
| Social Skills with Adults* | 68.5 | 73.7 | 79.2[^] | < 0.0001 | 5.0 |
| Communication* | 58.5 | 65.1 | 72.6[^] | < 0.0001 | 8.3 |
| Mathematics** | 37.1 | 45.3 | 55.7 | < 0.0001 | 8.1 |
| PATReading Comprehension | 40.8 | 44.8 ^{^^} | 60.5^{^^} | < 0.0001 | 15.5 |
| Burt Word Reading* | 66.8 | 72.4 | 80.6 | < 0.0001 | 11.1 |
| Writing | 45.1 | 48.9 | 53.9 | < 0.0001 | 9.7 |
| Reading Age (yrs, mo) | 11.2 | 12.3 | 13.2^{^^} | < 0.0001 | 15.0 |
| Logical Problem-Solving* | 63.6 | 67.6 | 72.7 | < 0.0001 | 7.2 |
| Composite Competency* | 56.6 | 62.2 ^{^^} | 69.5^{^^^} | < 0.0001 | 14.7 |
| Composite Cognitive Competency | 49.9 | 55.2 ^{^^} | 63.3^{^^} | < 0.0001 | 14.7 |
| Composite Social & Attitudinal Competency* | 61.0 | 66.9 | 73.7[^] | < 0.0001 | 9.4 |

* In these cases the squared model was a better fit. ** In this case the square-root model was a better fit.

[^] One fewer in this mean. ^{^^} Two fewer in this mean. ^{^^^} Three fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

⁴¹ Smith (2003; p. 285) cites one study of 300 English students and teachers which found little difference among the boys and girls in terms of their enjoyment of different methods of working in English, in contrast to teacher perceptions that such differences existed.

Children talking about their reading

Most of the children said they spoke to someone at home about what they were reading (72 percent). Fifty-four percent spoke with their mother, and 25 percent, with their father. Thirteen percent mentioned a sibling, and 3 percent, a relative or other adult. Boys were less likely to talk to someone at home about what they were reading (32 percent did not, compared with 23 percent of girls).

Children whose mothers had no qualification were least likely to say they talked to someone at home about their reading (41 percent). Children who enjoyed reading were most likely to talk to their mother, father, or a sibling. Sixty-three percent said they spoke to their mother about their reading, compared with 44 percent of those who said they had mixed feelings about reading, and 27 percent of those who did not enjoy reading.

Parental reports gave a more nuanced picture. Forty-six percent said their child talked to them about what they were reading, and 23 percent said they did sometimes. Thirty-one percent said their child did not talk to them about what they were reading. The proportion of those who did talk to their parents (regularly) was in fact consistent across maternal qualification levels.

But there was a relationship with maternal qualification in terms of the remaining children. The proportion of those whose parents reported that they did not talk to them about their reading increased from 20 percent of children of mothers with a university qualification not talking to parents about what they were reading, to 44 percent of those whose mothers had no qualification. The trend was reversed with those who sometimes talked to their parent about what they were reading, from 30 percent of children whose mother had a university qualification, to 9 percent of those whose mothers had no qualification.

After taking family income and maternal qualification into account, children who did not talk to their parents about what they were reading had lower average scores than those who did for all the competencies other than Curiosity, Social Skills with Peers, and Social Skills with Adults. There was a further distinction favouring those who usually talked to their parents about what they were reading over those who talked only sometimes, for the PAT Reading Comprehension test, Reading Age, and Logical Problem-Solving.

Public library use

Three-quarters of the children said they visited the public library. Most went with their family (61 percent). Fifteen percent went by themselves, and 13 percent, with friends. Five percent went with their school. Public library use was lowest among those whose mothers had no qualification (62 percent), and those who did not enjoy reading (45 percent). Thirty-one percent of boys said they did not go to the public library, compared with 19 percent of girls. However, those who did go, visited the library as frequently as the girls. Pasifika children in the study were more likely to take books home from the library once a week or more often (42 percent compared with 17 percent overall); since we did not specify a public library, this probably included reading material taken home from the school library.

Forty-four percent of those who did visit libraries went at least once every 3 weeks, slightly down from the 51 percent at ages 8 and 10.

Table 96 Frequency of visits to public library—children’s responses at ages 8,10, and 12

| Frequency | Visit to public library age 8 (n=434) % | Visit to public library age 10 (n=423) % | Visit to public library age 12 (n=372) % |
|---------------------------|---|--|--|
| Irregular/do not know | 33 | 29 | 33 |
| Once a month | 16 | 18 | 21 |
| Once a fortnight | 15 | 19 | 18 |
| Once a week or more often | 27 | 19 | 16 |
| Once every 3 weeks | 9 | 13 | 10 |

In previous phases of Competent Children we found positive associations between use of a public library and children’s competency levels, consistent with Caygill (1993), who found advantages for children who read library books in the 1990 IEA reading study, for standard 3 and form 4 students. At age 12, we found after taking family income and maternal qualification into account that children who did not use public libraries tended to have lower scores than others on all the competencies other than Social Skills with Peers and Logical Problem-Solving. In our sample, children who used the library on a fortnightly basis had higher average scores.

Writing at home

Half the children said they enjoyed writing. A third enjoyed it sometimes, and 17 percent did not enjoy writing. Girls were somewhat more likely to enjoy writing than boys (58 percent compared with 45 percent). Twenty-five percent of the boys did not enjoy writing at age 12, compared with 9 percent of the girls.

Enjoyment of writing was not associated with maternal qualification. It was associated with enjoyment of reading: 60 percent of those who enjoyed reading also enjoyed writing, compared with 34 percent of those whose views on reading were mixed, and 30 percent of those who did not enjoy reading.

The main kinds of writing that children did at home are given below. One reason for some of the differences evident between age 12 and earlier ages may be that parents reported on children’s writing activities for ages 6, 8, and 10. The home writing done by half or more of the children is largely informative and as part of relationships with others, related to word knowledge, or copying existing material.

Table 97 Children’s home writing activities at ages 6, 8,10, and 12

| Writing activity ⁴² | Age 6 (n=297) % | Age 8 (n=521) % | Age 10 (n=505) % | Age 12 (n=496) % |
|--|-----------------------|-----------------------|------------------------|------------------------|
| Does word puzzles/crosswords | – | 76 | 79 | 61 |
| Writes to family/friends | – | 82 | 70 | 51 |
| Copies material | 80 | 82 | 76 | 49 |
| Writes e-mails | – | – | – | 49 |
| Writes short imaginative stories under 2 pages | – | 60 | 60 | 42 |
| Keeps a journal/diary | 3 | 34 | 41 | 31 |
| Writes reports (factual writing) | – | 40 | 57 | 29 |
| Writes poems/plays | – | 47 | 47 | 24 |
| Writes long imaginative stories over 2 pages | – | 20 | 20 | 19 |
| Writes lists | 90 | 21 | – | – |

– = not asked.

Girls did more writing at home than boys. They averaged 4.23 of the activities we asked about, and boys, 3.13. Girls were more likely to:

- write letters to family or friends (68 percent compared with 36 percent of boys);
- write stories of 1–2 pages (50 percent compared with 34 percent of boys);
- keep a journal or diary (51 percent compared with 14 percent of boys);
- write poems or plays (33 percent compared with 16 percent of boys); and
- write e-mails (57 percent compared with 42 percent of boys).

However, boys were just as likely as girls to write reports and longer stories, do word puzzles or crosswords, or copy material.

Girls had higher average marks for 6 of the 8 features of writing we marked, other than choice of vocabulary and form, where boys performed much the same as girls.

Children whose mothers had no qualification were less likely to write reports (15 percent), or e-mails (32 percent). However, they were more likely than those whose mothers had a tertiary, trade, or university qualification to keep a journal or diary (43 percent compared with 26 percent). There were no ethnic differences in the average number of writing activities reported by the study children. Pasifika students were more likely to keep a journal or diary (52 percent compared with 31 percent overall).

Children who enjoyed writing were most likely to write letters, write stories (short and long), keep a journal or diary, or write poems or plays. The kinds of writing that were unrelated to enjoyment were either for communication, or reporting.⁴²

⁴² There was also no distinction in relation to doing word puzzles or crosswords, an activity which was included in this question at earlier ages as a mark of children using writing to denote their understanding, but which makes less sense to include at this age as children are able to use writing for a wider range of expression and communication.

Three percent of the children did not do any of these kinds of writing at home. Twenty-seven percent did 1 or 2 kinds of writing, and 15 percent did 6 or more of the 9 writing activities we asked about. The average number of writing activities was 3.67 (s.d. 1.74). Children whose mothers had no qualification had a lower average of different kinds of writing, 3.32. There was no difference related to family income. Girls had a higher mean, 4.23 compared with 3.13 for the boys. Asian and Pasifika children had slightly higher means (4.08) than Māori (3.76) or Pākehā/European children (3.6).

Children who enjoyed writing tended to score higher than those who did not or whose enjoyment was qualified, on a number of the competency measures, with these associations remaining after taking into account family income and maternal qualification. However, there is no advantage in enjoying writing for children's scores on the literacy measures other than for writing itself, nor for mathematics.

Table 98 **Enjoyment of writing and children's competencies at age 12**

| Enjoyment of writing® | No/ not really Mean (n=85) | Qualified yes Mean (n=162) | Yes Mean (n=249) | Prob. of F-value from ANOVA | Percent variance acct. for |
|---|-------------------------------------|-------------------------------------|--------------------------|-----------------------------------|----------------------------------|
| Age-12 competency ⁻ | | | | | |
| Perseverance | <i>60.6</i> | 69.4 [^] | 71.9 | 0.0002 | 3.4 |
| Individual Responsibility | <i>68.8</i> | 76.1 [^] | 76.7 | 0.004 | 2.2 |
| Social Skills with Peers* | <i>66.0</i> | 71.0 [^] | 72.4 | 0.0007 | 2.9 |
| Social Skills with Adults* | <i>72.3</i> | 76.7 [^] | 78.0 | 0.035 | 1.4 |
| Communication* | <i>64.2</i> | 69.5 [^] | 70.5 | 0.017 | 1.6 |
| Writing | <i>48.3</i> | 51.9 | 52.6 | 0.003 | 2.3 |
| Composite Competency* | <i>62.6</i> | 66.6 ^{^^} | 67.1^{^^} | 0.009 | 1.9 |
| Composite Social & Attitudinal Competency* | <i>65.2</i> | 70.7 [^] | 72.1 | 0.0007 | 2.9 |

* In these cases the squared model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

^{^^^} Three fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Mathematics at home

At age 12, 45 percent of the study children said they enjoyed working with numbers. Thirty-six percent enjoyed it sometimes, and 19 percent did not enjoy working with numbers. Enjoyment of working with numbers was unrelated to maternal qualification. It showed some relation with enjoyment of reading, with 50 percent of those who enjoyed reading also enjoying working with numbers, compared with 41 percent of those who had mixed views about reading, and 25 percent of those who did not like reading. Sixty-one percent of those who enjoyed working with numbers also enjoyed writing, compared with 39 percent of those who had mixed views of working with numbers, and 47 percent who did not enjoy working with numbers.

Boys were more likely to say they enjoyed working with numbers (50 percent compared with 39 percent of the girls). However, there were similar proportions of boys and girls who did not enjoy working with numbers.

We found some associations between enjoyment of working with numbers and children's competencies, which largely remained after taking into account family income and maternal qualification. These associations favour those who enjoy working with numbers. There are no associations with measures of reading and writing.

Table 99 **Enjoyment of numbers and children's competencies at age 12**

| Enjoyment of numbers® | No/ not really Mean (n=95) | Qualified yes Mean (n=180) | Yes Mean (n=221) | Prob. of F-value from ANOVA | Percent variance acct. for |
|---|-------------------------------------|-------------------------------------|--------------------------|--------------------------------------|----------------------------------|
| Age-12 competency ⁻ | | | | | |
| Curiosity | 57.2 | 59.8 [^] | 65.9 | 0.0002 | 3.5 |
| Perseverance | 61.3 | 68.3 [^] | 73.1 | < 0.0001 | 3.9 |
| Individual Responsibility | 70.3 | 74.7 [^] | 77.6 | 0.009 | 1.9 |
| Social Skills with Peers* | 67.6 | 71.1 [^] | 72.1 | 0.036 | 1.3 |
| Social Skills with Adults | 73.1 | 75.9 [^] | 78.7 | 0.032 | 1.4 |
| Communication* | 66.0 | 67.8 [^] | 71.5 | 0.009 | 1.9 |
| Mathematics** | 42.9 | 50.1 | 55.1 | 0.0003 | 3.3 |
| Logical Problem-Solving* | 66.4 | 71.2 | 71.3 | 0.0009 | 2.8 |
| Composite Competency* | 61.8 | 65.6 ^{^^} | 68.5^{^^} | < 0.0001 | 4.4 |
| Composite Cognitive Competency | 55.8 | 59.8 ^{^^} | 61.4^{^^} | 0.002 | 2.5 |
| Composite Social & Attitudinal Competency* | 65.9 | 69.6 [^] | 73.1 | 0.0001 | 3.6 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

^{^^^} Three fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

The table below compares the children's reports of their mathematical activities at home, with parental reports from earlier ages. As with writing activities, the study children tend to give a less optimistic picture of the level of their activities than do their parents, and this may account for the apparent decline in most of the activities asked about between the ages of 10 and 12.

Table 100 Children’s home mathematics activities at ages 6, 8, 10, and 12

| Mathematics activity | When child aged 6 (n=297) % | When child aged 8 (n=521) % | When child aged 10 (n=505) % | When child aged 12 (n=496) % |
|---|--------------------------------|--------------------------------|---------------------------------|---------------------------------|
| Play card games* | 11 | 95 | 94 | 78 |
| Play computer games/uses computer for number activities | 52 | 72 | – | 76 |
| Play board games | 89 | 97 | 95 | 74 |
| Use a ruler to measure length or height | – | 75 | 84 | 73 |
| Work out halves and quarters | – | 77 | 87 | 61 |
| Use calculator for complicated computation | – | – | – | 59 |
| Do times-tables up to 10 | – | 43 | 78 | 50 |
| Work out other fractions and proportions | – | – | 45 | 47 |
| Use scales to weigh things accurately | – | – | 58 | 46 |
| Do times-tables over 10 | – | – | 50 | 44 |
| Use a calculator for simple multiplication/division | – | 43 | 76 | 40 |
| Use a calculator for simple addition/subtraction | – | 80 | 93 | 37 |
| Use computer for making graphs | – | – | – | 25 |
| Use computer for calculations | – | – | – | 14 |

* Information volunteered by parents at age 6; specifically collected from parents at ages 8 and 10.

– = not asked.

On the children’s own report, the main maths activities at home are embedded in games, or use of a ruler. Least common are activities which use calculators or computers. Half of them said they did the times-table up to ten – perhaps taking our question to mean not that they *could* do this, but that they did in fact do the times-table at home, since their answer to whether they did times-tables over 10 was very similar, 44 percent.

Unlike reading and writing, there were few gender differences related to the maths activities we asked about that students could have done at home. Girls were more likely to use a calculator for simple addition or subtraction (43 percent compared with 32 percent of boys) and for simple multiplication and division (45 percent compared with 36 percent of boys). However, boys were more likely to identify more complex use of geometry (45 percent compared with 25 percent of girls) and statistics (5 percent compared with 1 percent of girls) in other activities they did at home that involved numbers or patterns.

Children whose mothers had no qualification were less likely to use a calculator for simple multiplication or division (29 percent), or to use a computer (since they were less likely to have one at home) for games or making graphs.

Asian students were more likely to work out fractions and proportions (79 percent compared with 47 percent overall), play games on the computer (100 percent compared with 76 percent overall), and use the computer to make graphs (71 percent compared with 25 percent overall). Māori students in the sample were somewhat less likely to mention activities involving numbers or patterns that they did at home, other than the ones we asked about (79 percent compared with 91 percent overall). Asian students in the sample were more likely to mention activities involving simple geometry (57 percent compared with 32 percent overall), simple algebra (50 percent compared with 23 percent overall), and simple measurement

(86 percent compared with 57 percent overall). However, they were no more likely than others to say they enjoyed working with numbers: most gave a qualified yes (64 percent compared with 34 percent overall).

One twelve-year-old did not do any of the 14 mathematics activities we asked about. Seven percent did only 1 or 2, and 22 percent did 10 or more.

Ninety percent of the children said they also did other things with numbers and patterns. Unfortunately, we did not specifically ask them to think only of mathematics activities that they did at home, so some of their answers may reflect what was happening at school. In response to an open-ended question, just over half reported that they did some simple measurement (such as counting money, or in sewing or construction). Between around a quarter and a third used some other aspect of mathematics at the simple level, with geometry and algebra more likely to be used by the twelve-year-olds at an advanced level than number, measurement, or statistics.

Table 101 **Other mathematics activities**

| Mathematics activity | Age 12 (n=496) % |
|-----------------------------|---------------------------------|
| Simple measurement | 57 |
| Advanced geometry | 35 |
| Simple statistics | 30 |
| Simple geometry | 32 |
| Simple number | 29 |
| Advanced algebra | 28 |
| Simple algebra | 23 |
| Advanced number | 13 |
| Other | 8 |
| Advanced measurement | 4 |
| Advanced statistics | 3 |

Children whose mother had no qualification were less likely to mention activities involving advanced algebra (19 percent).

Interests

Club membership

Seventy-nine percent of the study children belonged to some club or group when they were twelve – slightly down on the 85 percent at age 10. Forty-seven percent of the children belonged to 1 club, 25 percent to 2, and 7 percent to 3 or 4 clubs. Sports club membership continued to dominate. There were slight increases in the proportion of children who belonged to performing arts and church clubs. Perhaps linked to these increases, or to children’s changing interests and the availability of service clubs, membership of children’s service clubs had dropped from 21 percent at age 10, to 13 percent at age 12.

Table 102 **Children’s club membership at age 12**

| Club type ⁻ | At age 12 (n=496) % |
|--------------------------|---------------------------|
| Sports | 67 |
| None | 21 |
| Performing arts | 18 |
| Church | 15 |
| Children’s service clubs | 13 |
| Ethnic/cultural | 3 |
| Collectors/hobby | 3 |

Boys in the study were somewhat more likely to belong to a club or group: 84 percent compared with 73 percent of the girls. Most of these clubs or groups were sports-related for boys (77 percent compared with 55 percent for girls). Twenty-seven percent of the girls took part in performing arts groups, compared with 11 percent of boys.

Children from low-income homes were less likely to belong to a club or group (63 percent). Children whose mothers had no qualification were less likely to belong to clubs or groups (66 percent), particularly service clubs (3 percent compared with 13 percent overall). They were less likely to attend lessons outside school (25 percent compared with 47 percent overall, and 63 percent of children of university-qualified mothers). This was particularly noticeable in relation to performing arts or music (13 percent compared with 48 percent of children whose mothers were university-qualified). All but 3 of the 23 children who attended remedial lessons had mothers with a school or trade/tertiary qualification.

Parents of Pasifika children in the study were more likely to mention church clubs or groups amongst those their child belonged to (64 percent), and parents of Asian children in the study, ethnic/cultural groups (36 percent).

Family income was related to the kind of group or club children belonged to. Low-income children were less likely to belong to sports clubs (50 percent), or service clubs (4 percent). Very high-income children were less likely to belong to church groups.

In this phase of the Competent Children project, we did not analyse club membership in relation to children’s competencies, since the only association we have found in previous phases for both belonging to a club at all, and for specific kinds of clubs, was in relation to performing arts membership.

Lessons outside school

Forty-seven percent of the study children attended lessons or coaching outside school, slightly down from the 51 percent at age 10. Thirty-six percent had lessons of 1 kind only, 10 percent had 2, and one percent had 3 kinds of lessons outside school. Participation in lessons outside school reflected family income levels: from 49 percent of those in very high-income homes, declining to 31 percent of those in low-income homes.

Here, performing arts dominate (30 percent), followed by sports (18 percent, slightly down on the 23 percent at age 10). Five percent were attending remedial school-related subjects, and 2 percent, school subjects for “gifted” students. Three percent had lessons in the fine arts, and 2 percent, classes related to a particular culture or ethnic group.

Girls were more likely to have lessons in the performing arts: 56 percent compared with 39 percent of the boys. While girls and boys were equally likely to attend sports lessons, performing arts lessons were the main reason for girls having an overall higher participation in lessons (39 percent of girls compared with 21 percent of boys). The higher the level of maternal qualification and family income, the more likely was it that study children would attend lessons outside school. Asian children in the study were also more likely to attend lessons outside school than children from other ethnic backgrounds.

Table 103 **Family characteristics and children’s lessons outside school**

| Lessons outside school | % |
|---------------------------------|----|
| <i>Income %</i> | |
| Very high | 57 |
| High | 49 |
| Medium | 43 |
| Low | 31 |
| <i>Maternal qualification %</i> | |
| None | 25 |
| School | 44 |
| Tertiary/trades | 50 |
| University | 63 |
| <i>Ethnicity %</i> | |
| Pākehā/European | 48 |
| Māori | 37 |
| Pasifika | 40 |
| Asian | 71 |

Family characteristics also showed some relations with the *kinds* of lessons that children took part in. The higher the family income, the more likely it was that children would undertake lessons in any of the categories other than cultural. Maternal qualification was unrelated to whether children took sports lessons, or classes related to a particular culture or ethnicity. The higher the level of maternal qualification, the more likely it was that children would undertake music or performing arts lessons (rising from 13 percent of the children whose mothers had no qualification, to 48 percent of those whose mother had a university qualification), or school subjects for gifted children (rising from none of those whose mothers had no qualification to 4 percent of those whose mothers had a university qualification). Taking remedial school subjects was most likely for children whose mothers had either a school or tertiary/trades qualification.

Music

Forty-nine percent of the study children played a musical instrument or took part in a musical group, according to their parents. Ten percent engaged in 2 different musical activities, and 1 percent, in 4.

Forty-one percent played an instrument, and 11 percent sang in a choir. Nine percent played in an orchestra or cultural group. Choir and orchestra or cultural group membership occurred in similar levels at all family income levels. Playing an instrument ranged from 48 percent of very high-income children, to 30 percent of the low-income children. The likelihood of playing a musical instrument was related to maternal qualification: rising from 25 percent of those whose mother had no qualification, to 59 percent of those whose mothers had a university qualification. There was a similar trend in relation to playing in an orchestra.

Pasifika and Asian parents were more likely to report that their children played a musical instrument or participated in a musical group (72 and 79 percent respectively). Asian children were more likely to play an instrument (79 percent), and Pasifika children, to sing in a choir (32 percent).

Just under half the children also played a musical instrument or took part in a musical group. Girls were again more likely to do this: 57 percent compared with 42 percent of boys.

Extracurricular activities

Most of the children also took part in school activities outside the classroom. Sport was the main kind of extracurricular activity for the study children, as reported by their teachers. Seventeen percent were said to have no extracurricular activity at all. Fifty-nine percent of the study children were reported by their teacher to take part in one extracurricular activity, 27 percent in 2, and 14 percent in 3 or more extracurricular activities.

Table 104 Children's extracurricular activities at school (teachers' report)

| Activities | Age 12 (n=496) % |
|--------------------------|------------------------|
| Sports | 64 |
| Cultural/performing arts | 32 |
| Voluntary/service | 20 |
| None | 17 |
| Computer use | 13 |
| Games | 10 |
| Other | 3 |

There were some interesting differences in girls' and boys' extracurricular activities at school, as reported by the teacher. These are consistent with gender differences in curriculum strengths. Both were just as likely to take part in sports, or take part in none of the activities on offer.

Table 105 Extracurricular activities at school and gender

| | Male (n=263) % | Female (n=232) % |
|--------------------------|----------------------|------------------------|
| Sports | 65 | 63 |
| Cultural/performing arts | 24 | 41 |
| Computer use | 19 | 6 |
| Voluntary/service | 16 | 25 |
| Games | 15 | 4 |

There were no differences in extracurricular activity reported by maternal qualification or ethnicity. There were trends for children from low-income homes to be less likely to play sport (50 percent), and more likely to take part in no extracurricular activity (27 percent), $p = 0.06$. School decile was unrelated to extracurricular activity participation. It was related to school type, though some of this may reflect different teacher knowledge of student activity. Thirty-four percent of the students attending secondary schools were not engaged in any extracurricular activity as far as their teachers were aware; voluntary service was highest for students in the full primary schools (31 percent), and sports activity highest for students at composite schools (88 percent). School ownership was also reflected in different patterns, with more of the study students at private schools engaged in sports (77 percent) and cultural activities (46 percent), but fewer of these students engaged in voluntary or service activity (10 percent). There were no decile-related differences, although decile 9–10 school students were least likely to have no extracurricular activities (11 percent).

Money

Only 2 percent of the study children had no money of their own at the age of 12. The main sources were the family, through chores (47 percent), regular pocket money (40 percent), and irregular money (35 percent). Four percent mentioned an allowance. Children whose mothers had no qualification were more likely to report irregular money from their family (47 percent compared with 26 percent of those whose mothers had a university qualification).

Twenty-four percent had a job outside the home. Most of these had regular work on most weeks (18 percent). Six percent had irregular work, including 1 percent who worked only in school holidays. The main kind of work was delivering newspapers (15 percent), a source which ceased for Wellington region school children in 2002 when the 2 Wellington newspapers amalgamated, and delivery was made by vehicle. Three percent of the age-12 children earned money through cleaning, and 1 percent each through retail work, office work, or feeding pets. One baby-sat. Maternal qualification was not related to whether the study children had a job at age 12, though those with university-educated mothers had slightly lower average work hours per week (2.82 compared with the average work hours of 3.13 (s.d. 2.56) a week for those working regular hours. There were no differences in the average competency scores for children who worked outside the home (whatever the time they spent working each week), and those who did not work at all outside the home.

Saving was the most frequent use of money earned or given (76 percent). Thirty-five percent bought food, 32 percent bought games or toys, 25 percent clothes or make-up, and 14 percent each bought possessions such as stereos, or spent money on entertainment. Ten percent of the age-12 children spent money on their family, and 7 percent on their friends. Eight percent spent their money on sports, and 6 percent on other activities. There were some gender differences in how children at age 12 spent their own money. Boys were more likely to spend it on games or toys (48 percent compared with 15 percent of girls), and on sport (12 percent compared with 3 percent of girls). Girls were more likely to spend it on clothes or makeup (37 percent compared with 13 percent of boys), on family (15 percent compared with 5 percent of boys), and on friends (11 percent compared with 4 percent of boys). There were no differences in spending pattern related to maternal qualification.

Summary

Use of leisure

When they were 12, most of the study children watched television and did homework on at least 2 days a week. Sport, reading, computer use, and spending time with friends are the next most frequent group of activities. Housework, playing electronic games, and talking to friends on the phone or Internet follow. The final activities are more occasional, and some of the children never experienced them: reading magazines, newspapers, or comics, taking part in art/music/dance classes or working for money outside the home. With the exception of homework, children usually enjoyed most the activities they did more frequently, with between 60–69 percent listing playing sports, hanging out with friends, and watching television among their favourite activities.

Girls were more likely to read, talk with friends, do homework, and go to art/music/dance classes, and enjoy most hanging out with friends, talking with them, and reading. Boys were more likely to play electronic games and sport, and read comics, and enjoy playing electronic games and watching television.

Children's use of their leisure time at age 12 was unrelated to their level of family income. Levels of maternal qualification were reflected in the time given to reading, computer use, and participation in art/music/dance classes.

The role of television

A quarter of the children had a television in their bedroom; fewer than 10 percent had a computer or phone in their bedroom, and therefore somewhat more available for private use. Almost twice as many boys had a television set in their bedroom as girls, and 4 times as many of the children whose mothers had no qualification compared with those whose mothers had a university qualification. The latter were more likely to have a desk in their bedroom. These differences in what was readily available to children for their private use indicate differences in values, and in readiness to actively steer children away from activities which are not known to be associated with academic achievement.

At age 12, the study children were watching more television on average than they had at age 10, perhaps because their tastes were shifting to longer, adult programmes, with a third now watching adult soap operas. Gender played a role in programme preferences. Boys were more likely to prefer cartoons, and girls, adult soap operas and sitcoms. Boys did not watch more television on average, but their taste for cartoons may be why they had a higher rate of watching before school.

Television played a bigger part in the lives of children whose mothers had no qualification, from low-income homes, or who were Māori or Pasifika, and a smaller part in the lives of children who enjoyed reading. We found more associations between the children's competencies and their cumulative time spent watching television (reported in Section Four), than with current time use, but it was evident in relation to mathematics and writing scores.

The role of computers

By age 12, 90 percent of the study children had a computer in their home. The average time spent using a computer at home was not long, 3.8 hours a week. Boys spent somewhat more time on the computer than girls. Access to a home computer and the time spent on it was related to maternal qualification levels. The latter accounted for most of the differences found for some competency scores in relation to time spent on the computer.

Homework, e-mail, and accessing the Internet were the main uses of computers made by the study children at age 12. Boys were more likely to download games or music, and surf the Internet; girls were more likely to word process, seek information for homework or projects, or use e-mail and on-line chatrooms.

Family characteristics of income or ethnicity were not associated with differences in computer use, but maternal qualification was: the higher the level of maternal qualification, the greater use of e-mail, and use of the computer for homework or projects.

Three-quarters of the study children had Internet access at home, and most could use the Internet on their own. Use of the computer rose with access to the Internet, and being able to use that alone. The main use of the Internet was to seek information for school work, and e-mail.

Computer activities that showed significant associations with children's competencies, particularly mathematics and Communication were playing games, word processing, e-mail, graphics, and for homework or projects.

The role of reading

Around two-thirds of the study children enjoyed reading, and 45 percent put reading among their favourite out-of-school activities. Enjoyment of reading was highest among those whose mothers had a university qualification. Girls enjoyed reading more than boys.

Many of the children read a range of material, including fiction and information. Fiction was somewhat less likely to be read by boys and children whose mothers had no qualification. Children who enjoy reading are more likely to read across the board. Enjoyment of reading was associated with higher average scores on all the competencies.

Reading has a double value: in itself, and as a topic for conversation with parents. Most children spoke to someone at home about what they were reading, more often their mother than father. Children who enjoyed reading were more likely to gain this additional value from their reading. Maternal qualification again played a role in child-parent talk about reading. Talking with parents about reading was associated with higher scores on the competency measures.

Three-quarters of the study children visited a public library, most with their family, though 15 percent went by themselves, and 13 percent with friends. Public library use was lowest among those whose mothers had no qualification, who did not enjoy reading, and boys. Frequent use of a public library was associated with higher scores on the competency measures.

Thus reading is a key aspect of children's performance at age 12, and not just for scores on reading measures.

The role of writing

The home writing which was done by half or more of the children is largely informative and as part of relationships with others, related to word knowledge, or copying existing material. Half the children enjoyed writing, with girls enjoying it more than boys. Enjoyment of writing had positive associations with children's social and attitudinal competencies and writing, but not with reading or mathematics.

The role of mathematics

At age 12, 45 percent of the study children enjoyed working with numbers. This enjoyment was positively associated with children's scores on the social and attitudinal competencies, mathematics, and Logical Problem-Solving. The main mathematics activities the children did at home were embedded in games, or using a ruler. Least common were activities involving calculators or computers.

Clubs, lessons, participation in formal music activity, and extracurricular activities

Seventy-nine percent of the study children belonged to some club or group when they were twelve – slightly down on the 85 percent at age 10. Sports club membership continued to dominate. Membership of children's service clubs had dropped to 13 percent from 21 percent at age 10. Membership of groups was more likely for boys, especially sports, and less likely for children whose mothers had no qualification, or who were from low-income homes.

Forty-seven percent of the study children attended lessons or coaching outside school. Participation in lessons outside school reflected family income levels. Performing arts lessons were most popular, followed by sports. Girls were more likely to attend performing arts lessons than sports lessons. The higher the level of maternal qualification, the more likely it was that children would attend performing arts lessons.

Forty-nine percent of the study children played a musical instrument or took part in a musical group, according to their parents. Forty-one percent played an instrument, and 11 percent sang in a choir. Nine percent played in an orchestra or cultural group. Choir and orchestra or cultural group membership occurred in similar levels at all family income levels. Playing an instrument was related to maternal qualification and family income levels.

Most children took part in some extracurricular activity at school, predominantly sports (64 percent), followed by performing arts (32 percent), and voluntary or service groups (20 percent). Girls were more likely to take part in performing arts activities, and service groups; boys in computer activities and games.

Money

Only 2 percent of the study children had no money of their own at the age of 12. The main sources were the family, through chores (47 percent), regular pocket money (40 percent), and irregular money (35 percent). A quarter had a job outside the home, with the main kind of work a source of employment that has since dried up in the Wellington region, delivering daily newspapers. Competency scores were unrelated to whether children worked outside the home.

Saving was the most frequent use of money earned or given, followed by buying food, games or toys, or clothes or make-up. Boys were more likely to spend their money on games or toys, and girls, on clothes or make-up.

Commonality and differences in children's use of leisure

Television watching, sports, and time with friends were common ways of spending time for the study children at age 12, no matter what their social background. The differences that are apparent and which are related to either gender or social background are mainly related to engagement in activities that use language or symbols, particularly through reading, performance, and communication. These are the activities that positively contribute to children's performance levels. Cheaper options, such as spending large amounts of time on television viewing, appear to make some negative contributions.

Children whose mothers have no qualification experience a 'double whammy' in relation to these differences: they do less of the activities which have positive associations, and watch more television. Because for all children, familiar activities are more likely to be valued, it becomes harder to take on new activities, or drop the old.

It is worth noting the overlaps of enjoyment of reading, writing, and number use, and that these continue to make positive contributions to children's competency scores after taking into account maternal

qualification and family income. If children from homes that are disadvantaged in terms of parental qualification and family income enjoyed literacy and mathematics related activities from an early age — a matter of both opportunity and methods of engagement of children's attention and interest — then they may be more likely to keep up with activities which use and extend early knowledge and skills as they grow older. One can only underline the importance of the greater awareness of providing such opportunities in early childhood education which has become evident in recent years, and of building parental confidence and skills to work with children at home.

Gender

The gender differences in activities show how traditional stereotypes continue in everyday life: boys focused on action, and girls on language and communication. The differences give some context to the differences found in competency scores. These favour girls, although the size of the differences is small in relation to literacy and mathematics for this sample. Gender differences are more marked in relation to social and attitudinal competencies.

Section Nine

Home experiences and support

Children’s views of their home experiences

We asked children to tell us about their experiences at home by rating them on a 4-point scale – *almost always/always, often, occasionally, or rarely/never*.⁴³ Most felt they belonged at home, got support, and were treated fairly. Most had interesting things to do – not always, but at least usually. However, around a third thought they got told off usually or always, 21 percent were usually or always bored, and around 15 percent thought their family showed little interest in their school life and homework.

Table 106 Children’s views of home – age 12

| Frequency→ | Almost always/ always | Usually | Occasionally | Never |
|---|-----------------------------|---------|--------------|-------|
| Activity← | % | % | % | % |
| I feel close to my family | 82 | 15 | 3 | 0 |
| I am comfortable | 80 | 17 | 3 | 0 |
| I get things explained to me if I don't know them | 73 | 23 | 4 | 0 |
| I get help if I need help | 73 | 23 | 4 | 1 |
| I get treated fairly | 61 | 31 | 7 | 1 |
| Expectations are fair | 61 | 33 | 6 | 0 |
| My family knows I've done my homework | 57 | 29 | 11 | 3 |
| I get listened to | 55 | 35 | 8 | 1 |
| My family asks me about school | 55 | 30 | 12 | 3 |
| I get a good night's sleep | 54 | 36 | 9 | 1 |
| I have lots of interesting things to do | 32 | 50 | 15 | 2 |
| My friends come round | 31 | 39 | 27 | 2 |
| Adults I like come to visit | 27 | 42 | 29 | 3 |
| I help out | 26 | 48 | 25 | 2 |
| I get told off | 10 | 23 | 59 | 8 |
| I can do what I like | 7 | 43 | 42 | 8 |
| I get bored | 5 | 16 | 63 | 16 |
| I feel lonely | 1 | 2 | 24 | 73 |

⁴³ At age 10, we used a slightly different scale: *always, often, sometimes, never*. The fieldwork team felt that some students found it difficult to distinguish between often and sometimes, and that the absolute phrasing of the always and never categories also made it difficult for some to decide on a category.

This picture is very similar to the study children's reports of their home experiences at age 10, but with more positive ratings given to these 3 items:⁴⁴

- I get help if I need help (73 percent at age 12 said almost always or always compared with 59 percent who said always at age 10);
- I get treated fairly (61 percent at age 12 said almost always or always compared with 49 percent who said always at age 10); and
- I get listened to (55 percent at age 12 said almost always or always compared with 40 percent at age 10 who said always).

Gender did not play a large role in children's views of their homes. Boys were more likely to report being bored usually or always (26 percent compared with 14 percent of girls) – but the same proportion of boys as girls thought they were rarely or never bored. Boys were more likely to be told off at home usually or always (40 percent compared with 26 percent of girls) – but just as likely to think their parental expectations were fair.

There were very few differences related to family resources. Children of university-qualified mothers were more likely to say they could usually do what they liked (67 percent compared with 38 percent of others). They were less likely to say that their family only occasionally or never knew when they had done their homework (7 percent compared with 24 percent of those whose mothers had no qualification). Māori children were more likely to say they were almost always or always bored at home (15 percent compared with 5 percent overall). Pasifika and Asian children in the study were more likely to say that they almost always or always helped out at home (52 and 43 percent respectively, compared with 26 percent overall). They were less likely to say that their friends came around almost always or always (4 and 14 percent compared with 32 percent overall).

Children's views of their home experiences and competency levels

We found that children's views of their home experiences were associated with their competency levels at age 10. The items that then showed associations with most competencies were being treated fairly, getting help if needed, and helping out. The items which showed least association were being listened to at home, and being asked about school.

At age 12, we found that the items which showed the most associations after taking family income and maternal qualification⁴⁵ into account were:

⁴⁴ Although the wording for the ratings changed, the fact that there was upward movement for only some of the items suggests that there was a change related to the children's experience rather than the rating wording.

⁴⁵ In general, the percentage points difference was more likely to decrease after taking maternal qualification into account than after taking into account family income, indicating a greater overlap between the items and maternal qualification (with a trend for children of mothers who had a university qualification to be reporting more of the level of experience which was associated with higher scores on the competencies).

- doing interesting things;
- being bored;
- helping out at home;
- getting help if needed;
- getting told off at home; and
- expectations are fair.

There were more items which showed only 2 or 3 associations after taking family income and maternal qualification into account. Some of the contrasts did not remain significant after we took these 2 key factors into account because of the small numbers of children who rarely or never experienced the positive interactions and support we asked about.

- Being treated fairly
- Feeling lonely
- Friends come round
- Closeness to family
- Getting things explained
- Adults I like visit
- Good night's sleep
- Can do what I like
- Family knows I've done my homework
- Family asks me about school.

However, though this second group of items did not have wide-ranging associations with the children's competencies, those associations which were found show some consistent patterns, and associations with particular competencies, including mathematics and some of the literacy measures.

We look now at the specific associations found for each of the items. Most of the contrasts were between the average scores of children who rated their experience as "almost always/always" or "usually", and those who rated their experience as "occasionally" or "rarely/never".

In the list that follows, the associations where the percentage points difference was 10 or more on average, or, for Reading Age, more than the equivalent of a year, have been starred.

Interesting things

Children who reported having interesting things to do always or usually tended to score higher than those who had them only occasionally or never.

Mathematics, PAT Reading Comprehension test*, Burt Word Reading test*, Writing*, Reading Age*, Perseverance, and Social Skills with Peers*.

Bored

Children who reported being bored occasionally or rarely/never tended to have higher scores than those who were often or always bored.

Mathematics*, PAT Reading Comprehension test, Burt Word Reading test, Writing, Reading Age*, Logical Problem-Solving, Perseverance*, Individual Responsibility, Social Skills with Peers, and Communication.

Helping out

Children who always or usually helped out had higher average scores for the social skills than those who helped out occasionally or rarely/never; children who always or rarely/never helped out had lower average scores for the cognitive competencies.

Mathematics*, PAT Reading Comprehension test*, Burt Word Reading test*, Writing*, Perseverance, Individual Responsibility, Social Skills with Peers, Social Skills with Adults, and Communication.

Get help if needed

Children who always or usually got help when they needed it had higher average scores than those who occasionally or never did.

Mathematics*, PAT Reading Comprehension test*, Burt Word Reading test*, Writing, Reading Age*, Logical Problem-Solving, Curiosity, Perseverance*, Individual Responsibility*, Social Skills with Peers, Social Skills with Adults*, and Communication*.

Fair expectations

Children who thought their family's expectations were always or usually fair had higher average scores.

Mathematics*, PAT Reading Comprehension test*, Burt Word Reading test*, Writing, Reading Age*, Logical Problem-Solving*, Perseverance*, Individual Responsibility, Social Skills with Peers, Social Skills with Adults, and Communication*.

Get told off

Children who were always told off had lower average scores.

Mathematics, PAT Reading Comprehension test, Burt Word Reading test*, Writing, Reading Age*, Perseverance*, Individual Responsibility*, Social Skills with Peers, and Social Skills with Adults.

Comfortable

Children who always or usually felt comfortable at home had higher average scores than those who felt they were only occasionally or never comfortable.

Mathematics*, PAT Reading Comprehension test*, Burt Word Reading test*, Writing*, Reading Age*, and Logical Problem-Solving*.

Listened to

Children who felt they were always or usually listened to had higher average scores than those who felt they were only occasionally or never listened to.

Mathematics*, PAT Reading Comprehension test, Burt Word Reading test, Reading Age, Communication, and Perseverance.

Treated fairly

Children who felt they were always treated fairly had higher average scores.

Writing, Perseverance, and Social Skills with Peers.

Friends come around

Children whose friends usually or often came around had higher average scores than those whose friends always came around.

Mathematics, PAT Reading Comprehension test, and Writing.

Closeness to family

Children who always or usually felt close to their family had higher average scores than those who occasionally felt close to their family.

Mathematics*, Reading Age*, and Logical Problem-Solving.

Can do what I like at home

Children who could usually do what they liked at home had higher average scores than those who could do this occasionally, always, or never.

Mathematics*, PAT Reading Comprehension test*, and Burt Word Reading test.

Lonely

Children who felt they were lonely at home occasionally or rarely had higher average scores than those who felt always or usually lonely.

PAT Reading Comprehension test*, Reading Age*.

Good night's sleep

Children who usually had a good night's sleep had higher average scores than those who occasionally-never had one.

Mathematics*, Burt Word Reading test, and Social Skills with Peers.

Adults child likes visit

Children who always had adults they liked visiting had lower average scores.

Mathematics, Writing, and Logical Problem-Solving.

Get things explained

Children who always or usually got things explained had higher average scores than those who had them explained occasionally-never.

Mathematics, and Communication*.

Family knows child has done homework

Children whose family always knew they did their homework had higher average scores.

Mathematics*, Burt Word Reading test*, and Writing.

Parental activities with the study children

The main activities that parents share with their 12-year-old children in this study reflect a mixture of shared interests and practical activities. Transporting the study children to their activities is second on the list!

Table 107 **Main activities parents do with their children at age 12**

| Parental involvement [†] | At age 12 (n=496) % |
|-----------------------------------|---------------------------|
| Spend time with family/friends | 63 |
| Transport student to activities | 58 |
| Physical activities | 47 |
| Watch sport | 43 |
| Shop | 41 |
| Eat together | 36 |
| Talk | 36 |
| Interest/hobby | 31 |
| TV/video watching | 28 |
| Homework | 27 |
| Housework | 19 |
| Play sport | 17 |
| Go to movies | 15 |
| Art/cultural/music/theatre | 13 |
| Church/spiritual | 11 |
| Computers | 8 |
| Reading | 7 |
| Other | 5 |
| Organisation | 3 |

There are some different patterns in the activities that parents share with their daughters and sons. Parents of sons were more likely to mention:

- watching sport (52 percent compared with 33 percent of girls); and
- transporting student to activities (62 percent compared with 53 percent of girls).

Parents of daughters were more likely to mention:

- shopping (52 percent compared with 31 percent of boys); and
- talking (41 percent compared with 32 percent of boys).

Parents of children whose mother had a university qualification were most likely to report that they spent time with them in relation to:

- art/music/theatre/cultural events (24 percent compared with 6 percent of those whose mothers had no qualification);
- going to movies (26 percent); and
- reading with them (16 percent compared with 2 percent of those whose mother had no qualification), but least likely to report spending time on shopping (27 percent).

Parents of children whose mother had no qualification were least likely to report that they spent time with them transporting them to activities, which is consistent with the much lower participation rate of these children in sports, clubs, or lessons (35 percent).

Family income was not related to most of these activities. However, low-income parents were less likely to transport their child to activities (44 percent), and the sharing of church or spiritual activities rose from 8 percent of very high-income parents to 17 percent of low-income parents. Family composition was also unrelated to these activities.

Parents of Pākehā/European children were most likely to spend time with their child on an interest or hobby (33 percent compared with 19 percent of others); and Pasifika parents in the study were most likely to share church activities with them (64 percent), but less likely to go to the movies with their child (none), or do physical activity with them (28 percent).

The average number of activities shared with a child was 5.08 (s.d. 2.4). The range was from 1 shared activity (4 percent) to 17 (1 parent). While the average number of activities did not differ by family characteristics, parents from families where the mother had no qualification were more likely to report doing 1–3 activities (40 percent, declining to 16 percent of mothers with a university qualification). A similar pattern was evident in relation to family income, with low-income families more likely to report doing 1–3 activities (36 percent, declining to 20 percent of the very high-income families).

We analysed the total number of activities that parents reported sharing with their children in relation to scores on the competency measures. The trend was for children whose parents reported doing only 1 or 2 things with them to score lower than others on the cognitive competency measures, with the highest average scores among those whose parents did between 5–7 activities with them. These differences remained significant for Mathematics, after taking into account family income and maternal qualification.

We also looked at 3 particular activities which seemed good indicators of the opportunity (or lack of it) for dialogue between parents and children: sharing an interest or hobby, watching television, and talking together. We found no significant associations.

Who children come home to at age 12

Most of the children came home to a parent (73 percent). Thirty-one percent also mentioned a sibling. Six percent came home to a relative, 3 percent to a babysitter or caregiver. Two or 3 percent each did not go straight home after school, but went to a relative or friend's house, after-school care, waited at their parent's work, or went to sports, a club, or lessons. Fifteen percent of the study children said they came home to an empty house. A third had some variation in who was waiting for them, or what they did after school.

Parental expectations

To find out more about the structure of children's home experiences, and indirectly, something about underlying parental approaches to parenting, we asked some questions about the kinds of rules or expectations parents had for their children. Most of the parents in the study had expectations or rules related to school work, housework, and language. They also had rules related to the use of media. Dress and use of the telephone were the 2 aspects of children's lives which were least likely to attract parental authority.

The study children tended to be less aware of parental rules or expectations. This may be because parents may be setting conditions or guiding behaviour in non-overt ways, or that parents do not always enforce these rules and expectations. Differences in parental and children's answers here may also reflect differences in perceptions of the role of parental rules. Parents may see having rules as indicative of "good parenting", and provide an optimistic view, whereas children see not having parental rules as indicative of their own independence, and thus understate their situation.

Parents and children were most likely to give the same answer in relation to rules or expectations about homework, television watching, and housework (87–94 percent agreement), and least likely to give the same answer about using the telephone (44 percent).

Table 108 Parental expectations or rules – parents’ and children’s views

| Frequency® | Parent view that rule exists | Student view that rule exists |
|--------------------------------------|---------------------------------|----------------------------------|
| Parental expectations [†] | % | % |
| Bed-time on school days | 94 | 66 |
| Homework | 93 | 84 |
| Language | 87 | - |
| Doing housework | 85 | 76 |
| Time to be home by | 82 | - |
| TV watching | 79 | 60 |
| Where child can meet his/her friends | 75 | 46 |
| Spending time with friends | 60 | 42 |
| Using the computer for games | 57 | 42 |
| Using the Internet | 57 | 48 |
| Playing video games/playstation | 47 | 44 |
| Dress | 47 | - |
| Using the telephone | 45 | 35 |
| Movies or videos child can watch | - | 70 |

- = not asked.

Parents also indicated that some activities did not apply in their household – 2 percent did not have televisions, 14 percent did not have computers, 26 percent did not have Internet access, 31 percent did not have video games or playstation, and 3 percent did not have a telephone.

Parental rules or expectations about television use were more likely for children who did *not* have a television in their room than those who did (82 percent compared with 69 percent); the reverse was true for telephones (60 percent of those who had one in their room had parental rules or expectations, compared with 44 percent of those who did not have one to themselves). Rules or expectations about computer use showed no association with whether children had one in their bedroom, but did if they had Internet access in their own room (88 percent compared with 56 percent).

There were only 2 aspects of the children’s home activities where parents were more likely to be conveying expectations or rules to children dependent on gender. Boys, who were more likely to be often playing electronic games, were more likely to report parental expectations or rules around this activity (52 percent compared with 36 percent of girls). Girls were more likely to talk on the phone often, and more likely to have expectations or rules around this (42 percent compared with 29 percent of boys).

Only one difference in parental expectations was related to family resources or composition: children whose mothers had no qualification were less likely to report expectations or rules about television watching (44 percent).

Māori children were less likely to report that there were expectations or rules in their home about television watching (40 percent compared with 60 percent overall), using the computer for games (19 percent compared with 42 percent overall), and playing electronic games (29 percent compared with 44 percent overall). This may be because 21 percent of them did not have a computer at home; 40 percent of the Pasifika students also had no computer at home. Asian children were more likely to report rules or expectations relating to spending time with their friends (86 percent compared with 42 percent overall).

For two-thirds of the children who spent time in 2 households, parental expectations or rules were the same in both houses; they were different for a third.

Bed-time

Sixty-six percent of the children said they had a set time to go to bed on school days – rather fewer than the 94 percent of parents who said their child had a set bed-time. Forty-one percent said their bed-time on school days was between 8 and 9pm, and 23 percent, between 9 and 10pm. There were no differences related to maternal qualification or family income. A quarter of the Pasifika children reported that they usually went to bed after 10pm on a school night, compared with 6 percent overall.

Children who had a set bed-time were more likely to usually be in bed by 9pm on a school day (54 percent compared with 33 percent of those who did not have a set bed-time). In most cases the set bed-time and actual bed-time were the same, though 18 percent of those whose set bed-time was before 9pm stayed up after that time, and 6 percent of those whose bed-time was between 9–10pm stayed up after 10pm. However, there was no relationship between the children's report of whether they got a good night's sleep, and their actual bed-time on school days.

Parental responses to children

To gain further insight into parental approaches to their role, we asked the parents of the study children what they would generally do if they saw their child was having difficulty with something s/he was doing, and how they handled disagreements with their child.

Most parents said they would either take a facilitative approach, providing support and advice (68 percent), or offer encouragement (27 percent). Fourteen percent would wait for the child to ask for help rather than step in. Twelve percent would show their child what to do. There were no differences in relation to family characteristics. We did not analyse the relationship between parental response to their child striking difficulty in a task and children's competency levels at age 12, since analysis in previous study phases showed little relationship.

Disagreements between parents and their 12-year-old children are almost universal. Only 6 parents (1 percent) in this study said they and their children never disagreed. Parents' reports of what they would do when there was a disagreement are given in the next table. Negotiation is the main response.

Table 109 Parental responses to disagreement between parent and child at age 12

| | At age 12 (n=496) % |
|---|---------------------------|
| Parent and child negotiate | 64 |
| Parent gets cross and gets her/his way | 38 |
| Parent stays calm and gets her/his way | 22 |
| Parental response varies | 21 |
| Child usually gets his/her way | 9 |
| Parent ignores the disagreement & waits for it to go away | 8 |

Forty percent of the parents reported more than 1 response in this situation. For example, half of those who said they remained calm and got their way also said they got cross and got their way – possibly indicating different tactics at different times, but with the same underlying principle of maintaining parental authority, though this was not always upheld (e.g., 14 percent of the parents who got cross and got their way also said their child usually got his/her way).

When parents and children disagreed, it was more likely that children whose mothers had no qualification got their own way, according to the parents (18 percent compared with 9 percent overall). But there were similar responses across all the levels of maternal qualification in terms of parental responses (calm or cross), and the use of negotiation. There were no family income or family composition-related differences in patterns of parental response.

There were no associations between parental reports of how they responded to their child when they disagreed, and the children’s perceptions of being comfortable at home, how well they were listened to at home, or treated fairly. Children who said they were rarely or never told off were more likely to have parents who said their response to disagreement was to negotiate (78 percent, declining to 55 percent of those who said they were almost always or always told off at home).

We grouped the responses after plotting the differences in mathematics scores for each response in order to analyse the relationship between different approaches to dealing with disagreements and children’s competency levels at age 12. This showed higher average scores for children whose parents negotiated with them, or whose parents felt no disagreements arose. Children whose parent let them win disagreements also had lower average scores for mathematics, the PAT Reading Comprehension test, the Burt Word Reading test, and Logical Problem-Solving than children whose parents adopted other approaches. The differences between groups of children indicated below were only slightly reduced after taking family income into account; there was more of an overlap between maternal qualification and parental handling of disagreements (78 percent of those in the “student wins” category had mothers with no or a school-level qualification, and negotiation was most likely to occur with parents who had a tertiary qualification), meaning that some of these differences became indicative or no longer notable.

Table 110 Parental handling of disagreements and children's competencies at age 12

| Parental handling of disagreements at age 12 [®] | Child "wins" | Parent "wins" | No problems arise or negotiation | Mixture of responses | All/any of these | Prob. of F-value from ANOVA | % var. acct. for |
|---|-------------------------|-------------------|----------------------------------|----------------------|-------------------|-----------------------------|------------------|
| Age-12 competency [¯] | Mean (n=19) | Mean (n=56) | Mean (n=145) | Mean (n=183) | Mean (n=93) | | |
| Perseverance | <i>61.2</i> | 64.5 | 74.9 | 70.5 | 61.7 [^] | < 0.0001 | 5.3 |
| Individual Responsibility | <i>67.1</i> | 71.8 | 80.1 | 75.5 | 70.5 [^] | 0.0007 | 3.8 |
| Social Skills with Adults | 72.8 | 72.2 | 79.5 | 78.0 | 72.6 [^] | 0.008 | 2.8 |
| Communication* | <i>61.8</i> | 67.5 | 72.8 | 69.9 | 64.1 [^] | 0.001 | 3.7 |
| Mathematics** | 34.2 | 45.7 | 55.2 | 51.1 | 50.4 | 0.002 | 3.5 |
| PAT Reading Comprehension | 35.2 [^] | 49.0 [^] | 60.5[^] | 53.6 [^] | 52.7 | < 0.0001 | 6.4 |
| Burt Word Reading* | <i>65.4</i> | 73.6 | 80.4 | 76.7 | 76.2 | 0.0005 | 4.0 |
| Writing | <i>47.4</i> | 49.7 | 54.2 | 51.8 | 49.2 | 0.0003 | 4.2 |
| Reading Age (yrs, mo) | 11.7 | 12.1 | 13.1[^] | 12.10 | 12.6 | 0.0001 | 4.7 |
| Logical Problem-Solving* | <i>58.6</i> | 69.3 | 72.0 | 70.8 | 69.9 | 0.0004 | 4.2 |
| Composite Competency* | <i>58.9[^]</i> | 62.8 [^] | 69.5[^] | 66.8 [^] | 63.1 [^] | < 0.0001 | 5.8 |
| Composite Cognitive Competency | <i>48.4[^]</i> | 57.0 [^] | 63.0[^] | 59.7 [^] | 58.5 | < 0.0001 | 5.3 |
| Composite Social & Attitudinal Competency* | <i>65.0</i> | 66.8 | 73.9 | 71.6 | 66.2 [^] | < 0.0001 | 4.8+ |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Summary

At age 12, most of the study children felt they belonged in their home, got support, had interesting things to do, and were fairly treated. They were somewhat more positive than they had been at age 10 that they got help if they needed it, got treated fairly, and were listened to. However, there were sizeable minorities who thought they were told off, got bored, or that their family showed little interest in their school life or homework.

Differences in gender and family resources and characteristics were reflected in just a few differences in these views, suggesting that they were not the decisive factors in children's experience, or their judgment of that experience, though we did find that children whose mothers had a university qualification were more likely to rate more highly the items that showed associations with the age-12 competency scores. The set of items which showed most associations with these scores was:

- doing interesting things;
- being bored;
- helping out at home;
- getting help if needed;
- getting told off at home; and
- expectations are fair.

Another 10 of the items showed associations with mathematics, and some of the literacy measures. Parent support came in the form of help, having things explained, and having parents knowledgeable about how the children spent their time – that they had completed their homework. It also came in the form of feeling close to parents, listened to by them, and trusted by them to do what the child wanted to do at home.

All the parents shared some activities with their children: socialising with other family or friends and transporting them to their activities headed the list. Parents of boys were more likely to watch sport with them, and transport them to activities. Parents of girls were more likely to mention shopping, and talking. These are consistent with some of the gender differences in children's activities at age 12 described in the previous section. There were some differences related to family resources, particularly maternal qualification, and children whose mothers had no qualification, or whose families had low-incomes, shared fewer activities with their parents. Children's mathematics scores at age 12 were related to the number of activities shared with parents, with lower average scores for children whose parents mentioned just 1 or 2 shared activities, and highest average scores for children whose parents mentioned 5–7 activities.

Most of the study children came home from school to a parent; 31 percent also mentioned a sibling. Fifteen percent came home to an empty house.

Most of the parents reported expectations or rules relating to school work, housework, language, and media use. Dress and telephone use were least likely to attract parental authority. Children were less aware of parental expectations or rules, perhaps because they were not always overt, or always enforced. Parents and children were most likely to agree on the existence of rules or expectations relating to homework, television watching, and housework, and least likely to agree about those relating to telephone use. Gender did not make much of a difference to the rules: boys reported more rules about electronic games, which they were more likely than girls to be playing, and girls, who talked more on the telephone than boys, to report rules about that. Two-thirds of the children who spent time in 2 households encountered similar rules or expectations in both.

Only 1 percent of the parents said they and their 12-year-old child never disagreed. Negotiation was the main response when they did, followed by the parent getting cross and getting their way. Almost half the parents use a range of responses at different times. Parental reports of their response to children were unrelated to the children's perceptions of feeling comfortable at home, listened to, or treated fairly, though children who said they were rarely or never told off were more likely to have parents who would negotiate in times of disagreement. Children whose parents negotiated with them had higher average scores than children whose parents let them win.

Overall, many of the study children lived in homes that were supportive and gave them structure, but without being overly restrictive. There were some telling differences related to family characteristics, particularly maternal qualification, but social class was not operating with strict borders and distinct differences. Nor was gender clearly differentiating interactions between the study children and their parents.

Section Ten

Puberty, parental concerns, and change

Puberty

Seventy-one percent of the children's parents reported some changes in their child which were related to puberty, and 9 percent said they thought some changes could be occurring. Girls were more likely to be experiencing puberty changes.

Table 111 Puberty changes (reported by parents)

| Puberty changes ⁻ | Girls | Boys | All |
|----------------------------------|--------------------|-------------------|-------------------|
| | age 12 (n= 235) | age 12 (n=261) | age 12 (n=496) |
| | % | % | % |
| Mood swings | 50 | 24 | 36 |
| Breasts | 58 | 0 | 27 |
| Height | 26 | 25 | 25 |
| Body hair | 35 | 15 | 24 |
| More sure of self/assertive | 22 | 21 | 21 |
| None | 9 | 30 | 20 |
| Greasy hair/spots | 16 | 17 | 17 |
| Weight | 16 | 15 | 15 |
| More thoughtful/mature attitude | 14 | 13 | 14 |
| Menstruation | 20 | 0 | 9 |
| Interest in opposite sex | 7 | 12 | 9 |
| Self-conscious/shy | 12 | 7 | 9 |
| Voice deeper | 0 | 7 | 4 |
| Other | 4 | 4 | 4 |
| Child concerned about appearance | 3 | 2 | 3 |

Seventy percent of the girls and 80 percent of the boys experiencing puberty changes at age 12 were thought by their parents to be comfortable with these changes. Twenty-three percent of the girls experiencing puberty changes were sometimes uncomfortable with them, and 7 percent were not comfortable with them, compared with 15 percent and 4 percent for the boys experiencing puberty changes. This is consistent with girls' greater experience of the kinds of puberty changes which children were not comfortable with: menstruation, mood swings, and becoming more self-conscious or shy.

Parental reports of their child's overall health and puberty changes were unrelated to maternal qualification, with 2 exceptions. Children of university-qualified mothers were less likely to be reported as becoming more assertive in a negative sense (9 percent compared with 24 percent of others), and those of mothers with no qualification less likely to be reported as becoming more thoughtful or mature (3 percent compared with 15 percent of others).

The occurrence of puberty changes among this sample at age 12 was unrelated to family income levels, other than fewer low-income parents reporting height changes (13 percent).

Comfort with puberty changes had some association with parents' perceptions of their child's general happiness, with only 58 percent of those seen as uncomfortable with the changes also seen as generally happy, compared with 86 percent overall. However, there was no link between comfort with puberty changes, and parental reports that their child was unsettled. Parents had concerns about their child's self-confidence for 46 percent of those who were experiencing discomfort with their puberty changes, compared with 16 percent overall, and about their child's home behaviour for 29 percent compared with 8 percent overall.

We found some trends relating competency levels to experience of puberty changes, and levels of comfort with these changes, but few significant relationships. There were some interesting interactions related to gender among the group who had yet to experience puberty, with girls in this group showing higher average scores than the boys in the group for mathematics and reading.

General happiness

Eighty-six percent of the study children were thought by their parents to be generally happy, 12 percent varied, and 2 percent were generally unhappy. These 2 latter groups were also more likely to be uncomfortable with puberty changes (19 percent compared with 4 percent of those regarded as generally happy). Children from very high-income homes were slightly more likely to be seen as generally happy (94 percent compared with 85 percent of others).

Parents and teachers had similar overall views about the general happiness of the study children. There were no differences related to school decile or ownership.

Unhappiness was also associated with unsettling events, with 63 percent of the children whose parents thought they were unhappy or sometimes unhappy experiencing things that were unsettling them, compared with 38 percent of those whose parents thought they were generally happy. Of those who were experiencing something unsettling, those who were regarded as generally happy were more likely to be coping with it: 46 percent compared with 18 percent of those who were generally or sometimes unhappy.

There were no gender differences related to parents' perceptions that their child was generally happy, or areas of concern.

General health

Sixty-nine percent of the study children were said to be in very good or excellent health at age 12, and 27 percent in good health. Four percent were said not to be in good health. Chronic illness (including asthma) was the main reason why children were not in very good health (13 percent). Seven percent were on medication. There were no differences in reported health status by gender or ethnicity. Parental reports that children's health was generally very good or excellent were related to family income, rising from 59 percent of children from low-income homes, to 80 percent of children from very high-income homes.

Teachers reported 14 percent of the study children to have ongoing health problems. There were no differences in teacher perceptions related to school decile or ownership.

Residential mobility

Sixty-nine percent of the study children had moved house at least once by the time they were 12. Twenty-three percent had moved once, 15 percent, twice, 17 percent, 3 or 4 times, and 14 percent, 5 or more times (to a total of 14 shifts for one child).

Children from low-income families had a higher average of the homes they had lived in (3.13 (s.d. 3.08), compared with 1.84 (s.d. 2.14) for children from very high-income families). A similar trend was evident in relation to maternal qualification. Children of 1-parent families had moved 2.47 (s.d. 2.7) times on average, compared with 1.66 (s.d. 1.20) times for children of original 2-parent families. However, children from new 2-parent families (with 1 step-parent) had the most moves on average, 4.56 (s.d. 3.29).

The number of times children shifted house was associated with their scores on some of the competency measures at age 12, as described in Section Four, though the associations generally became indicative or not notable once maternal qualification or family income were taken into account, suggesting that family resources may be a protective factor in relation to multiple shifts of residence. However, children who had moved 5 or more times had lower mathematics, Perseverance, and Social Skills with Peers scores.

Things unsettling children

Forty-one percent of the parents thought that their child was experiencing something that was unsettling for them, slightly higher than the 32–36 percent who identified something when the children were ages 6, 8, and 10. The age 12 level of being unsettled is closer to that at age 5. The things that were unsettling for children at this age varied. Parents were most aware of family-related triggers for being unsettled.

Twenty-seven percent mentioned aspects of family life and relationships. These included friction or stress at home (9 percent), but a much lower reason for being unsettled than at ages 10 (21 percent), or 8 (33 percent). Other family-related reasons were changes in the family (6 percent), relations between the child and their other parent (4 percent), death of a family member (4 percent), parental employment (2 percent), and moving house (2 percent).

Nine percent mentioned aspects of peer relationships, including friends (6 percent), being picked on or bullied (2 percent), or romantic relations (2 children).

Two percent mentioned either puberty changes or health problems.

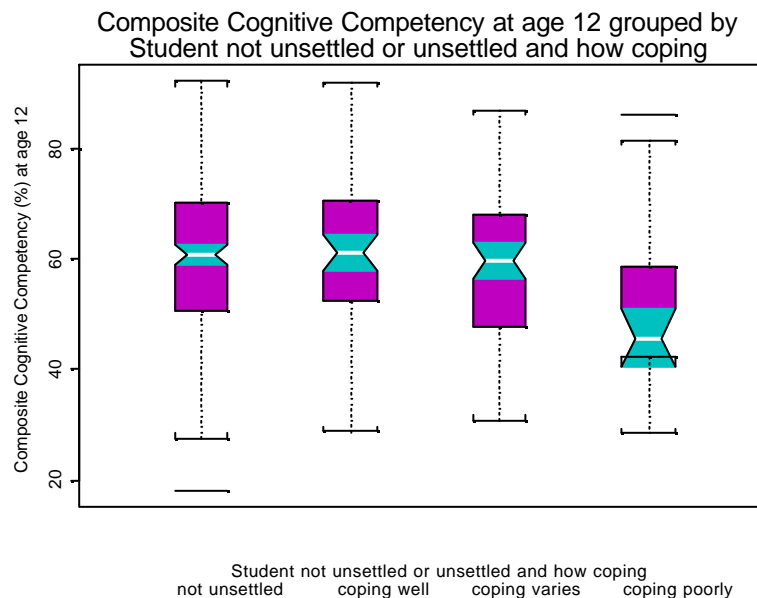
Most of those who were upset by something were coping with it: 40 percent well, and 48 percent, variably. Eleven percent were coping poorly.

Family resources were unrelated to whether children were upset, or how they were coping if they were. Children from original 2-parent families were less likely to have something unsettling them (36 percent compared with 51 percent of those in new 2-parent families, and 56 percent of those in 1-parent families). However, family composition was unrelated to how children were coping with their upsets.

At age 10, we found that children who were not coping had lower average scores for some of the social and attitudinal competencies than either those who were not upset at all, or those who were coping with being upset. After taking family income and maternal qualification into account, we found differences between the children who were not upset by anything currently, and those whose coping with what upset them varied, with higher scores for the former for Perseverance and Social Skills with Peers.

At age 12, we found a trend for those who were coping poorly to score below others, as shown in the figure for the Composite Cognitive Competency, but this did not remain significant after taking maternal qualification into account.

Figure 13 **Children's experience of being upset and age-12 Composite Cognitive Competency**



Parental concerns

We asked parents whether they had any concerns about their child in 6 areas. The areas where parents have most concern are related to help around the house, self-confidence, and behaviour at home.

Table 112 Parental concerns at their child's life at age 12

| Parental Concern ¹ | Concern | Qualified concern | No concern |
|-------------------------------|---------|-------------------|------------|
| | % | % | % |
| Help around the house | 21 | 16 | 64 |
| Self-esteem/self-confidence | 16 | 22 | 62 |
| Behaviour at home | 13 | 24 | 63 |
| Friendships | 11 | 14 | 75 |
| Interests | 9 | 10 | 81 |
| School | 8 | 9 | 83 |

Parental concerns about their children were generally unrelated to maternal qualification, with the exception that mothers who had no qualification were more concerned about their children in relation to:

- helping round the house (40 percent compared with 21 percent overall); and
- behaviour at home (25 percent compared with 13 percent overall).

The children of mothers with no qualification were around twice as likely as others to be seen as contesting parental authority, being mean, or shouting and being moody.

Low-income parents were more likely to have concerns about their child's help round the house (37 percent), home behaviour (24 percent), and friendships (19 percent).

Family composition was unrelated to parental concerns.

The main concern related to help around the house was that the child did not help at all, or had to be nagged (32 percent). Three percent said their child offered help, but not to the standard the parent needed.

Parents were concerned that their child's confidence was affected by their personality (19 percent), or their appearance (5 percent). Eight percent thought that their child's confidence was affected by fear of failing.

Twenty percent had concerns about their child contesting their authority as a parent. Eleven percent mentioned emotional outbursts or moodiness, and 9 percent, meanness or bullying of other family members.

Parents who were concerned about friendships were more likely to mention that their child had difficulty making or keeping friends (12 percent), than that they had unsuitable friends (8 percent). Two percent mentioned negative rivalry among friends.

The main concerns related to children's interests were that children did not have any interests, or did not sustain them (7 percent), or that the parent would like their child to have a different interest (6 percent). Three percent mentioned their child spent too much time on the computer or playstation, and one percent,

watching television. We looked at whether parental concerns about friendship were related to the child's club membership, lessons outside school, and playing a musical instrument: only club or organisational membership showed some association, with fewer children whose parents had some concern about their friendships belonging to a club or organisation (56 percent compared with 79 percent overall). Concerns about friendships were unrelated to parental rules or expectations, or with parents' frequency of seeing their own friends, and having friends they could call on easily if they needed help. Children whose parents expressed some concerns about their friendships were more likely to mention improvements to their friendships as something they would like to change in their life right now – but not all did (11 percent compared with 2 percent of those whose parents had no concerns about their friendships).

School concerns included lack of progress (5 percent), lack of motivation or interest (4 percent), the quality of the child's teacher (4 percent), and bullying (2 percent).

We analysed the relationship of parental concerns with the study children's competency levels first for each of the areas of concern, and then with the total number of concerns.

We found some relationships for most of the areas, but not in relation to children's interests. In general, children for whom parents held some concerns scored lower on average than those whose parents had no concerns, or qualified concern.

Household help

The associations below were diluted to some extent after taking family income and maternal qualification into account, largely because of an over-representation of children from low-income homes or with mothers who had no qualification in the group whose parents were concerned about their lack of help with housework. When we included gender into the ANOVA model we continued to find the same patterns, indicating that gender was not a major factor in parental concerns (though this does not mean that their concerns were related to different expectations for daughters and sons).

Table 113 **Parental concern about help around the house and children's competencies at age 12**

| Parental concerns about help around house® | Yes, concerned Mean (n=103) | Qualified yes for concern Mean (n=78) | Not concerned Mean (n=315) | Prob. of F-value from ANOVA | Percent variance acct. for |
|--|-----------------------------------|---|----------------------------------|-----------------------------|----------------------------|
| Age-12 competency ⁻ | | | | | |
| Perseverance | 62.7 | 69.0 | 71.3 | 0.003 | 2.4 |
| Individual Responsibility | 71.3 | 73.8 | 76.8 | 0.040 | 1.3 |
| Mathematics** | 46.0 | 51.9 | 52.3 | 0.047 | 1.2 |
| Writing | 48.9 | 52.0 | 52.4 | 0.011 | 1.8 |
| Logical Problem-Solving* | 67.3 | 72.2 | 70.8 | 0.007 | 2.0 |
| Composite Competency* | 62.9 | 66.2 | 67.2 | 0.004 | 2.2 |
| Composite Cognitive Competency | 56.2 | 60.7 | 60.7 | 0.008 | 2.0 |
| Composite Social & Attitudinal Competency* | 67.5 | 70.1 | 71.5 | 0.048 | 1.2 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Home behaviour

Intriguingly, social skills with adults (in the school) was the only competency where we found no relation with parental concern about their child's behaviour at home. The relationships we found were diluted when we took maternal qualification into account, and to a lesser extent, family income. This is because there was an under-representation of children whose mothers had a tertiary or university qualification, or who came from high-income families, in the group whose parents were concerned about their home behaviour.

Table 114 Parental concern about home behaviour and children's competencies at age 12

| Parental concerns about home behaviour® | Yes, concerned | Qualified yes for concern | Not concerned | Prob. of F-value from ANOVA | Percent variance accounted for |
|--|----------------|---------------------------|----------------------------|-----------------------------|--------------------------------|
| Age-12 competency ⁻ | Mean (n=63) | Mean (n=121) | Mean (n=312) | | |
| Curiosity | 56.9 | 60.3 | 63.7 [^] | 0.020 | 1.6 |
| Perseverance | 62.0 | 67.3 | 71.3 [^] | 0.005 | 2.1 |
| Individual Responsibility | 71.0 | 73.4 | 76.7 [^] | 0.058 | 1.1 |
| Social Skills with Peers* | 67.4 | 69.0 | 72.3 [^] | 0.018 | 1.6 |
| Communication* | 64.6 | 66.4 | 71.0 [^] | 0.002 | 2.5 |
| Mathematics** | 43.3 | 47.1 | 54.0 | 0.0004 | 3.1 |
| PAT Reading Comprehension | 48.8 | 49.7 ^{^^} | 57.1 ^{^^} | 0.0004 | 3.1 |
| Burt Word Reading* | 72.5 | 75.2 | 78.5 | 0.007 | 2.0 |
| Writing | 46.9 | 50.2 | 53.1 | < 0.0001 | 4.6 |
| Reading Age (yrs, mo) | 12.2 | 12.7 | 12.11 ^{^^} | 0.012 | 1.8 |
| Logical Problem-Solving* | 67.0 | 68.1 | 71.9 | 0.001 | 2.7 |
| Composite Competency* | 61.4 | 64.0 ^{^^} | 68.0 ^{^^^} | < 0.0001 | 4.3 |
| Composite Cognitive Competency | 54.5 | 57.2 ^{^^} | 61.8 ^{^^} | < 0.0001 | 4.6 |
| Composite Social & Attitudinal Competency* | 65.9 | 68.7 | 72.1 [^] | 0.002 | 2.4 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

^{^^^} Three fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Self-esteem/self-confidence

Here the associations are mainly with the attitudinal and social competencies. The associations found remained after taking family income, maternal qualification, and gender into account.

Table 115 Parental concern about self-confidence and children's competencies at age 12

| Parental concerns about self-confidence® | Yes, concerned | Qualified yes for concern | Not concerned | Prob. of F-value from ANOVA | Percent variance acct. for |
|--|-------------------|---------------------------|---------------|-----------------------------|----------------------------|
| Age-12 competency ⁻ | Mean (n=80) | Mean (n=108) | Mean (n=308) | | |
| Curiosity | 55.9 [^] | 59.2 | 64.6 | 0.0003 | 3.3 |
| Perseverance | 62.1 [^] | 68.6 | 71.1 | 0.005 | 2.1 |
| Individual Responsibility | 69.6 [^] | 75.0 | 76.7 | 0.018 | 1.6 |
| Social Skills with Peers* | 65.2 [^] | 70.2 | 72.5 | 0.0005 | 3.0 |
| Social Skills with Adults | 70.8 [^] | 75.3 | 78.5 | 0.002 | 2.5 |
| Communication* | 62.6 [^] | 67.6 | 71.3 | 0.0002 | 3.4 |
| Burt Word Reading* | 72.4 | 77.8 | 77.8 | 0.024 | 1.5 |
| Writing | 48.8 | 52.0 | 52.2 | 0.020 | 1.6 |
| Reading Age (yrs, mo) | 12.2 [^] | 12.9 | 12.10 | 0.019 | 1.6 |
| Composite Competency* | 61.0 [^] | 65.5 [^] | 67.7 | 0.0001 | 3.7 |
| Composite Cognitive Competency | 56.2 | 60.0 [^] | 60.5 | 0.029 | 1.4 |
| Composite Social & Attitudinal Competency* | 64.4 [^] | 69.3 | 72.4 | < 0.0001 | 4.0 |

* In these cases the squared model was a better fit.

[^] One fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Friendships

Dispositional and social skills were the main areas which were related to parental concerns about friendships, though there was also an association with Reading Age. These associations remained after taking into account family income, maternal qualification, and gender.

Table 116 Parental concern about friendships and children's competencies at age 12

| Parental concerns about friendships® | Yes, concerned | Qualified yes for concern | Not concerned | Prob. of F-value from ANOVA | Percent variance acct. for |
|--|----------------|---------------------------|---------------------------|-----------------------------|----------------------------|
| Age-12 competency ⁻ | Mean (n=57) | Mean (n=69) | Mean (n=370) | | |
| Perseverance | 59.2 | 68.1 [^] | 70.8 | 0.0009 | 2.8 |
| Individual Responsibility | 67.5 | 74.3 [^] | 76.5 | 0.005 | 2.1 |
| Social Skills with Peers* | 64.2 | 68.8 [^] | 72.3 | 0.0006 | 3.0 |
| Social Skills with Adults | 72.2 | 74.3 [^] | 77.7 | 0.052 | 1.2 |
| Communication* | 63.5 | 66.7 [^] | 70.4 | 0.026 | 1.5 |
| Reading Age | 12.0 | 12.8 [^] | 12.10[^] | 0.006 | 2.0 |
| Logical Problem-Solving* | 66.3 | 69.5 | 71.1 | 0.027 | 1.5 |
| Composite Competency* | 60.7 | 65.3 ^{^^} | 67.2^{^^^} | 0.003 | 2.4 |
| Composite Cognitive Competency | 55.7 | 59.9 [^] | 60.3^{^^^} | 0.042 | 1.3 |
| Composite Social & Attitudinal Competency* | 64.1 | 69.2 [^] | 71.7 | 0.003 | 2.4 |

* In these cases the squared model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

^{^^^} Three fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

School

There are some relationships between parental concerns about their child and school, and their social and attitudinal competency levels: those children whose parents have concerns have lower scores on these measures. Parents seem to have interpreted this question in terms of their child's response to school as an environment, rather than in terms of achievement in Mathematics and Literacy. These associations found between parental concerns and teacher ratings of children's social and attitudinal competencies remained after taking into account family income, maternal qualification, and gender.

Table 117 Parental concern about school and children's competencies at age 12

| Parental concerns about school® | Yes, concerned Mean (n=41) | Qualified yes for concern Mean (n=43) | Not concerned Mean (n=412) | Prob. of F-value from ANOVA | Percent variance accounted for |
|--|----------------------------------|---|----------------------------------|-----------------------------|--------------------------------|
| Age-12 competency ⁻ | | | | | |
| Curiosity | 55.0 | 60.6 | 62.9 [^] | 0.038 | 1.3 |
| Perseverance | 52.3 | 66.9 | 71.0 [^] | < 0.0001 | 5.6 |
| Individual Responsibility | 60.2 | 73.4 | 76.8 [^] | < 0.0001 | 5.4 |
| Social Skills with Peers* | 62.4 | 68.2 | 72.0 [^] | 0.0002 | 3.4 |
| Social Skills with Adults | 65.4 | 74.4 | 77.9 [^] | < 0.0001 | 3.8 |
| Communication* | 61.0 | 65.8 | 70.3 [^] | 0.003 | 2.3 |
| Composite Competency* | 58.0 | 64.8 [^] | 67.1 ^{^^^^} | < 0.0001 | 4.3 |
| Composite Social & Attitudinal Competency* | 59.4 | 68.2 | 71.8 [^] | < 0.0001 | 5.4 |

* In these cases the squared model was a better fit. ^ One fewer in this mean. ^^^ Four fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Number of parental concerns

Parents of 24 percent of the study children had no concerns about them in any of the 6 areas we asked about. Parents of 35 percent of the study children expressed a qualified concern in 1 or more of the 6 areas, and for 20 percent, concerns in only 1 of the areas. Parental concerns existed in 2 areas for 11 percent of the study children, in 3 areas for 5 percent, and in 4 to 6 of the areas for 5 percent of the study children.

Children whose parents had no concerns at all tended to have higher average scores, and those whose parents had concerns in 3 or more of the 6 areas, the lowest, for all the competencies other than the PAT Reading Comprehension test. Thus parental concerns are reflective of children's performance. These differences remained after taking family income and maternal qualification into account.

Table 118 Number of parental concerns and children's competencies at age 12

| Number of parental concerns [®] | No concerns at all Mean (n=119) | Some qualified concerns Mean (n=172) | Only one of these concerns Mean (n=101) | Two of these concerns Mean (n=56) | Three of these concerns Mean (n=23) | 4, 5, or 6 of these concerns Mean (n=25) | Prob. of F-value from ANOVA | % var. acct. for |
|--|---------------------------------------|--|---|---|---|--|-----------------------------|------------------|
| Age-12 competency [~] | | | | | | | | |
| Curiosity | 66.2 | 62.2 | 62.8 | 55.2 [^] | 62.5 | <i>52.2</i> | 0.001 | 3.9 |
| Perseverance | 76.2 | 70.7 | 67.9 | 59.8 [^] | 62.5 | <i>56.2</i> | < 0.0001 | 6.9 |
| Individual Responsibility | 81.2 | 75.6 | 74.1 | 69.8 [^] | 70.2 | <i>63.8</i> | < 0.0001 | 5.2 |
| Social Skills with Peers* | 75.2 | 71.0 | 71.1 | 66.7 [^] | 66.6 | <i>61.7</i> | < 0.0001 | 5.1 |
| Social Skills with Adults* | 79.9 | 76.9 | 77.1 | 72.9 [^] | 72.8 | <i>68.0</i> | 0.011 | 3.0 |
| Communication* | 73.8 | 69.2 | 68.9 | 64.5 [^] | 65.0 | <i>60.6</i> | 0.001 | 4.0 |
| Mathematics** | 51.7 | 53.5 | 51.3 | 47.4 | 48.5 | <i>38.2</i> | 0.035 | 2.4 |
| Burt Word Reading* | 79.5 | 77.8 | 75.7 | 75.0 | 76.3 | <i>68.5</i> | 0.031 | 2.5 |
| Writing | 53.9 | 52.1 | 50.7 | 51.2 | 49.1 | <i>44.5</i> | 0.0006 | 4.3 |
| Reading Age (yrs, mo) | 12.11 | 12.10 | 12.8 | 12.2 [^] | 12.5 | <i>11.11</i> | 0.011 | 3.0 |
| Logical Problem-Solving* | 72.1 | 71.2 | 70.2 | 67.0 | 69.4 | <i>64.7</i> | 0.025 | 2.6 |
| Composite Competency* | 70.0[^] | 67.0 ^{^^} | 65.7 [^] | 61.7 [^] | 63.0 | <i>56.9</i> | < 0.0001 | 7.3 |
| Composite Cognitive Competency | 61.6[^] | 61.2 ^{^^} | 59.0 [^] | 57.2 | 57.5 | <i>51.5</i> | 0.003 | 3.6 |
| Composite Social & Attitudinal Competency* | 75.4 | 70.9 | 70.3 | 64.8 [^] | 66.6 | <i>60.4</i> | < 0.0001 | 7.0 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.^{^^} Two fewer in this mean.The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Summary

Puberty

At age 12, many of the children were experiencing puberty, in a range of ways: mood swings, development of breasts, increasing height or body hair, and being more assertive. Girls were more likely to be experiencing noticeable changes, and 70 percent were comfortable with these changes. Only 6 percent were not at all comfortable with their puberty-related changes, particularly if they were related to mood swings or breasts. Puberty changes and reactions to them were generally unrelated to children's competency levels, though an interesting association was found indicating that girls who had yet to experience puberty had higher average scores for mathematics and reading than boys who had yet to experience puberty. There was some relationship between experience of puberty changes and experience of unsettling events, with children's general happiness, which teachers and parents saw similarly.

Most of the children were said to be in very good or excellent health, with parental reports of their overall children's health related to family income levels.

Coping with upsets

There was a slightly higher proportion of children whose parents thought something was upsetting them at age 12 than there had been at earlier school ages. Parents were most aware of family-related reasons. As at earlier ages, most children who were upset could cope with it; 11 percent of those who were upset could not. Experiences of upsets and how children coped with them was largely unrelated to family characteristics or gender. We found that those whose coping with being upset varied had lower scores for Perseverance and Social Skills with Peers. There was a tendency for children who were coping poorly to score lower on the cognitive competencies, though this did not remain after accounting for maternal qualification.

Parental concerns

Two-thirds or more of the parents of the study children had no concerns about their age-12 child in relation to help around the house, their self-esteem, behaviour at home, friendships, interests, or school. Help around the house, self-esteem, and behaviour at home are the main areas of parental concern.

There are some interesting trends relating to maternal qualification: parents with university qualifications seem more tolerant of their age-12 children becoming assertive, and may be less likely to see that assertiveness as contesting parental authority. Children's home behaviour and help with housework are more likely to be concerns where mothers have no qualification, or family incomes are low.

In general, children for whom parents held some concerns had lower average scores; the associations were often diluted after taking maternal qualification and family income into account because of differences in parental concerns linked to these 2 family resources. Associations between the study children's competency scores and parental concerns about friendship, self-esteem, and school were not eroded by family resource levels or gender. Concern about school was not related to the cognitive competencies, but to the social and attitudinal competencies.

Residential mobility

Sixty-nine percent of the study children had now moved house at least once since they were born, and 14 percent had moved at least 5 times. Mobility between houses was more common for children in 2-parent families with 1 step-parent, for children from low-income families, children of 1-parent families, and those whose mothers had no maternal qualification. There were associations showing lower average mathematics and Social Skills with Peers scores for children who had moved house 5 or more times. Maternal qualification and family income appeared to be protective factors for the other competencies with regard to a high number of house shifts.

Section Eleven

Relations with peers, and values

In this section we look at the study children's friendships, and the role that their peers played in their lives, both positive and negative. We then describe the values which the children chose from a set as those which were most important to them, both now and looking ahead to their adult life. We address 2 of the main research questions for the study at the end of this section.

Being with friends

Being with friends was among children's top 3 preferred activities. We asked them later on in the interview what were the main things they did with their friends. Around half of them mentioned informal activity, both verbal and physical. There were clear differences among boys and girls for most of the activities.

Table 119 **Activities with friends at age 12**

| Activity | Age 12 | Girls | Boys |
|------------------------------------|--------------|--------------|--------------|
| | (n=496) % | (n=235) % | (n=261) % |
| Hang out at friend's house | 53 | 63 | 44 |
| Physical activity (informal) | 52 | 33 | 69 |
| Talk (incl. phone) | 47 | 62 | 33 |
| Go out – entertainment | 37 | 43 | 31 |
| Play games (e.g. card or computer) | 30 | 22 | 38 |
| Go out – no fixed agenda | 22 | 23 | 20 |
| Organised sport | 20 | 16 | 24 |
| Shopping | 17 | 29 | 7 |
| Parties/holidays | 10 | 14 | 7 |
| Other | 4 | 3 | 5 |

Also mentioned were church/spiritual events (1 percent).

Fourteen percent mentioned 1 activity only, and 13 percent mentioned 5 or more activities.

There were no income-related differences in the activities with friends mentioned by the study children. Children whose mothers had a university, trades, or tertiary qualification were more likely to mention going out to entertainment (42 percent compared with 31 percent of those whose mothers had a school or

no qualification), or to mention parties or holidays (13 percent compared with 8 percent). There were no ethnic-related differences among the study children.

All the children could identify at least one good thing about their friendships. Again, gender was the main characteristic where differences emerged. Sharing interests was more important for boys; support and someone to talk to, more important for girls.

Table 120 **Good things about friendships at age 12**

| | Age 12 (n=496) % | Girls (n=235) % | Boys (n=261) % |
|--------------------|------------------------|-----------------------|----------------------|
| Fun | 52 | 56 | 48 |
| Support | 49 | 56 | 42 |
| Share interests | 43 | 37 | 49 |
| Someone to talk to | 41 | 47 | 36 |

Also mentioned were church/spiritual events (1 percent).

Children from low-income homes were less likely to mention fun (33 percent). Children whose mothers had no qualification were less likely to mention having someone to talk to (32 percent compared with 51 percent of those whose mothers had a university qualification). Pasifika children were more likely to mention support from their friends (80 percent).

Just over half could also identify something which was not so good about their friendship. Arguments were the main difficulty (27 percent). Fourteen percent also found friends could be unreliable or fickle, and 7 percent, that they could be judgmental. Competition was cited by 6 percent. Four percent said their friends could sometimes be boring. For others, the hard thing about friendships was losing them (5 percent), or growing out of them (3 percent). Two percent mentioned relations between boys and girls as a tension in their friendship.

Boys were more likely to say that there was nothing that was not good about their friendships (53 percent compared with 43 percent of girls), and girls, that friendships could be unreliable (18 percent compared with 11 percent of boys).

There were no income or ethnicity-related differences here. Children whose mothers had a university qualification were less likely to say there was nothing that was not so good about their friendships (37 percent compared with 47 percent of others).

Just over half the children said they had 5 or more close friends (55 percent). Thirty-one percent had 3–4 close friends, and 13 percent, 1 or 2. Two children felt they had no close friends. Gender and family characteristics were not related to the number of close friends. We found only one indicative association between the number of friends children had, and their competency levels. Children who had 3–4 close friends scored 6 percentage points more on average than those who had 5 or more close friends on the PAT Reading Comprehension test.

About a third of the children each said their close friends were either all girls, all boys, or both genders. All but 2 children who said their close friends were all girls were also girls; and all but 1 of those whose

close friends were all boys were boys. Forty-two percent of the boys said their close friends included both boys and girls, compared with 27 percent of the girls.

Parents and friends

Ninety-one percent of the study children felt that their parents liked their friends, or most of them. Eight percent thought their parents liked only some of their friends, and 1 percent thought their parents did not like their friends. These views were unrelated to child gender or family characteristics.

Parental judgment was still respected, and was more weighty than friendships. When we asked the study children what they would do if their parents told them not to do something and their friends really wanted them to do it, 66 percent of the study children would not do the activity, and another 6 percent would try to persuade their friends not to do it. Fourteen percent would try to persuade their parents to let them. Eleven percent thought it would depend what the activity was. Only 6 percent would go ahead and do the activity their friends proposed, but their parents opposed. Girls were more likely to try to persuade their parents to let them do the activity (17 percent compared with 10 percent of boys), and boys more likely to do it anyway (8 percent compared with 3 percent of girls).

There were no income or ethnicity-related differences here. Children whose mother had no qualification were more likely not to do something their parents had told them not to do (78 percent, declining to 60 percent of children with whose mother had a university qualification).

The role of friendship in children's lives at age 12

We undertook a factor analysis using the material from children's answers which had a bearing on the role friendships played in their lives, and parents' answers as to whether they had a concern about their child's friendship (detailed in Section Ten). These were all open-ended questions.

The factors drawn from children's descriptions of their relations with their friends, and the time they spent with friends, yielded 6 factors. We used the average of children's scores for the items within each factor to give us categories to use in cross-tabulation to answer one of the research questions, and this also gives us another dimension to the picture of the study children's patterns of friendship.

- *Friendship is a key value.* This comprised children's responses to how often they spoke to friends on the phone, hang out with friends, and whether these were among the activities they liked most. Twenty-six percent of the study children scored highly on this factor, indicating that friendship was a key value to them. It was of some importance to 61 percent, and of low importance to 14 percent.
- *Friendships focus on fun.* This comprised the items that fun was what they enjoyed in their friendship, and what they did in their friendship was hang out at a friend's house, or share parties or holidays, and a reverse score on physical activity. Twenty-two percent of the study children scored highly on this factor, indicating that fun was what they valued most in their friendships. Fun in friendships was of some importance for 63 percent of the study children, and played a limited role for 16 percent.

- *Friendships focus on communication.* This comprised the items talk as one of the main aspects of the friendships, someone to talk to was an enjoyable part of friendship, and being bored was one of the less enjoyable parts.
Communication in friendships was highly regarded by 25 percent of the study children. It was of some importance to 40 percent, and of limited importance to 36 percent.
- *Matter of fact friendships.* This comprised the items that there was nothing bad about the friendships, that what was not enjoyed about friendships was that they were unreliable/fickle, or that there were arguments.
Forty-eight percent of the study children enjoyed good friendships in relation to these aspects, and 48 percent, quite good friendships. Three percent did not have good friendships.
- *Formal friendships.* This comprised the items that friendship included organised sports and going to church, and what was not enjoyed was competition and relations with the opposite sex.
Eight percent of the children scored highly on this factor, indicating a formal structure to friendships.
- *Aimless friendships.* This comprised the (reverse scored) items that friendship was to share interests and support, that it included hanging out with friends, and parental concern about the friendships. In other words, a high score for this factor indicated a lack of content in the friendships.
Twelve percent of the children had high scores on this factor, indicating mainly aimless friendships. Sixty-nine percent had some experience of aimless behaviour in their friendships, and 19 percent, very little experience.

Cronbach's alpha values for the factors were relatively low, with the highest being 0.61. The alpha values for the factors *Friendship is a key value*, *Matter of fact friendships*, and *Aimless friendships* were about 0.6, and those for the other factors were much lower. We decided to use all the factors in further analysis, as the groupings of items in them appeared to have a logical basis.

We cross-tabulated the children's scores on these factors with 4 key aspects of children's lives which are linked to their performance at age 12: enjoyment of reading, hours spent watching television, maternal qualification, and school socio-economic decile. Different patterns of friendship showed only a few associations with these key aspects. Children who enjoyed reading were somewhat more likely to score highly on the *Friendships focus on communication* factor (29 percent compared with 18 percent of those who did not enjoy reading, or had mixed views about it). Children who scored highly on the *Aimless friendships* factor were somewhat more likely to be watching television for more than 2 hours a day (54 percent compared with 43 percent overall).

Bullying and getting a hard time at school

Twenty-four percent of the study children said they had been picked on or bullied by someone in the last couple of months. This is much the same as the rate of bullying at age 10. Most of this occurred at school (20 percent), with 4 percent having been bullied at home, and 2 percent in a public place. Most of the bullying was verbal, and included teasing and being called names (17 percent). Eight percent of the

students reported physical bullying, and 2 percent, the use of weapons. Two percent each also reported being left out or rejected, or ganged up on.

The main response to the bullying was to ignore it (10 percent). Five percent of the children had been assertive, and 4 percent each had told their teacher or parent. Three percent fought back, and another 3 percent hid or ran away.

Fifteen percent of the study children said they had bullied or picked on someone else in the same period. Again, most of this was verbal (11 percent). Four percent had physically bullied another child. One percent mentioned ganging up on or leaving out another child. There were no gender or ethnic differences apparent in experiences of bullying.

Two-thirds of the study children had neither bullied nor been bullied in the past few months.

Children who had bullied in the last few months were around twice as likely to also have been bullied (45 percent compared with 21 percent of those who had not bullied). Thirty-four percent had had verbal abuse compared with 15 percent of those who did not bully, 16 percent had been physically bullied, compared with 7 percent of those who did not bully, and 9 percent had been left out or ganged up on compared with 3 percent of those who did not bully.

We looked to see if bullying was associated with the children's gender, family characteristics, and school characteristics. Reports of being bullied or of bullying, types of bullying, and responses to bullying did not vary by gender. Experiences of being bullied were related to maternal qualification, rising from 8 percent of the study children whose mother had a university qualification saying that school was a place where they were occasionally bullied, to 27 percent of those whose mother had no qualification.

There was no association with school type or ownership. Almost twice as many of the study students in decile 5–10 schools said they had been bullied than their decile 1–4 peers (27 percent compared with 15 percent).

At age 10, we found that children who had recently taken part in bullying – whether as victim or bully – tended to have lower scores on our competency measures than those who had not. This remains the case at age 12.

Table 121 **Bullying and children's competencies at age 12**

| Bullying® | Victim & bully Mean (n=33) | Victim only Mean (n=87) | Bully only Mean (n=41) | Neither Mean (n=335) | Prob. of F-value from ANOVA | Percent variance acct. for |
|--|---|--|---------------------------------------|-------------------------------------|--|---|
| Age-12 competency⁻ | % | % | % | % | | |
| Perseverance | 63.6 | <i>61.3</i> | 63.4 [^] | 72.4 | < 0.0001 | 4.7 |
| Individual Responsibility | 70.3 | 70.7 | 72.5 [^] | 77.1 | 0.015 | 2.1 |
| Social Skills with Peers* | 67.1 | <i>65.7</i> | 67.0 [^] | 73.0 | < 0.0001 | 4.7 |
| Social Skills with Adults | 72.5 | 72.5 | 74.0 [^] | 78.4 | 0.015 | 2.1 |
| Communication* | 65.4 | <i>64.9</i> | 64.9 [^] | 71.1 | 0.004 | 2.6 |
| Mathematics** | <i>40.6</i> | 47.8 | 44.5 | 53.6 | 0.001 | 3.2 |
| PAT Reading Comprehension | 50.0 | <i>48.6</i> | <i>46.0</i> | 57.2^{^^^^} | 0.0001 | 4.2 |
| Burt Word Reading* | 72.6 | 74.6 | 70.2 | 78.8 | 0.0007 | 3.4 |
| Writing | 48.7 | 50.3 | 49.5 | 52.5 | 0.040 | 1.7 |
| Reading Age (yrs, mo) | <i>12.0</i> | 12.3 | 12.3 [^] | 12.11[^] | 0.0001 | 4.1 |
| Logical Problem-Solving* | 68.1 | 70.1 | <i>65.8</i> | 71.2 | 0.028 | 1.8 |
| Composite Competency* | 62.1 | 62.4 | <i>61.6[^]</i> | 68.1^{^^^^} | < 0.0001 | 5.5 |
| Composite Cognitive Competency | 54.7 | 57.4 | <i>54.5</i> | 61.5^{^^^^} | 0.0001 | 4.1 |
| Composite Social & Attitudinal Competency* | 67.0 | <i>65.8</i> | 66.6 [^] | 72.5 | 0.0002 | 4.0 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^^^} Four fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in italics.

There was no relationship between parental concern about friendships or behaviour at home and the children's reports of either bullying or being bullied.

We did not ask parents whether their child had been bullied or had bullied others. Three percent of the parents said their child was unsettled because of being bullied. We found no relationship between parental concern about friendships or behaviour at home and the children's reports of either bullying or being bullied. This suggests that some age-12 children may not show parents distress about being bullied, or that experiences of bullying co-occur with other experiences and reactions.

In Section Two, we gave the study children's responses to our social problem-solving task, asking them what they would say or do if someone gave them a hard time in the school grounds. At age 12, they were somewhat less assertive than they had been at age 10, and aggressive responses doubled, but were still low (10 percent).

Boys' and girls' initial responses to getting a hard time in the school playground were similar, though more girls than boys would seek help from another student (6 percent compared with 1 percent). More boys would provide an aggressive response if they continued to get a hard time in the playground (14 percent compared with 5 percent of girls), and more girls would tell their parents (24 percent compared with 11 percent of boys).

Children whose mother had no qualification were less likely to be assertive in their first response (18 percent compared with 30 percent overall), and may be more likely to be aggressive in their second

response (16 percent, $p = 0.07$, compared with 6 percent of those whose mothers had a university qualification). Children from the lowest-income homes were more likely to respond aggressively if their first response had no effect (17 percent compared with 4 percent of others).

Values

To get some idea of the animating values held by the study children, we asked them to choose the 3 things that were of most importance to them from a list of 13. Enjoyment of life, and doing well at school or sport headed the list. The next biggest group was being with family and friends, and being helpful or kind.

Table 122 **Children’s most important 3 things at age 12**

| Most important things ⁻ | Age 12 (n=496) % |
|--|------------------------|
| Enjoying the things I do | 42 |
| Doing well at school | 42 |
| Doing well at sport | 37 |
| Being with family/whānau/fono | 33 |
| Having lots of friends | 32 |
| Being helpful or kind | 28 |
| Money to spend | 23 |
| Good sense of humour | 20 |
| Wearing the right clothes/looking cool | 16 |
| Doing well at an interest outside school | 8 |
| Going to church | 8 |
| Good looking | 5 |
| Having the latest things | 5 |

We used multidimensional scaling to look at the relationship between these values, and see if they fell into groups. We found 3 groups of values:

- The “*anchored and achieving*” group of values (being with family/whānau/fono, doing well at school, being helpful or kind, enjoying the things one does).

On a scale of 1–5, with 5 indicating that children had given all 4 items, 11 percent of the study children scored 4, 39 percent scored 3, 34 percent scored 2, and 16 percent gave none of these 4 items. Thus this set of values mattered to 50 percent of the study children.

- The “*action and friendship*” group of values (having money to spend, lots of friends, doing well at sport, looking cool).

On a scale of 1–5, with 5 indicating that children had given all 4 items, 5 percent of the study children scored 4, 26 percent scored 3, 41 percent scored 2, and 28 percent gave none of these 4 items. This group of values mattered (score 3 or more) to 31 percent of the study children.

- The “*appearances matter*” group of values (being good looking, having the latest things).

On a scale of 1–3, with 3 indicating both items were given by a child, 9 percent scored a 2, and 91 percent gave neither of these items. This group of values mattered (score 2 or more) to only 9 percent of the study children.

Having a good sense of humour, doing well at an interest outside school, and going to church stood on their own.

We used the 3 groupings of values in our analysis of the relations between competency levels and motivation and peer relations. We found some relationships:

- those with a higher level of social skills at age 10 were more likely to have a high or very high score for the “action and friendship” group of values at age 12, whereas those with high ratings for Perseverance and Individual Responsibility at age 10 tended not to have high scores for the “action and friendship” group of values;
- those with high scores for the “action and friendship” group of values were more likely to try to persuade their parents to let them join their friends in an activity their parents did not want them to undertake;
- those with high scores for the “appearances matter” group of values at age 12 tended to have lower scores for Individual Responsibility and Communication at age 10; and
- those with high scores for the “anchored and achieving” group of values tended to have higher Communication scores at age 10.

We also cross-tabulated the children’s scores on these 3 groups of values with 4 key aspects of children’s lives which are linked to their performance at age 12: enjoyment of reading, hours spent watching television, maternal qualification, and school socio-economic decile.

Children who had high scores for the “anchored and achieving” group of values were more likely to enjoy reading (49 percent of those who scored 2 for this factor, compared with 65 percent of those who scored 1), and were somewhat less likely to watch more than 2 hours television a day (40 percent compared with 53 percent of those scoring 1). There were no associations with maternal qualification or school decile. Thus these values may act in concert with the kinds of activities or ways of spending time which support children’s achievement.

Children who had high scores for the “action and friendship” group of values were less likely to enjoy reading (47 percent of those who scored 3 or 4 for this factor, compared with 78 percent of those who scored 1). There were no associations with amount of television watched, maternal qualification, or school decile.

Children who had high scores for the “appearances matter” set of values were also less likely to enjoy reading (49 percent of those who scored 2 for this factor, compared with 65 percent of those who scored

1). There were no associations with amounts of television watching or maternal qualification. There was a higher proportion of students who had high scores for the “appearances matter” set of values among those in the study attending decile 1–2 schools (20 percent compared with 9 percent of students in decile 3–10 schools).

Values in adulthood

We also asked the children to identify from a list of 12 aspects, the 3 that would be of most importance to them when they were adults. A happy family life is most important for two-thirds of the study children, followed by good health. Having an interesting job was mentioned by twice as many of the children at age 12 as having lots of money. This is consistent with the overall picture from the things that were most important to the children currently, where enjoyment, doing well, and family and friends were given more weight than money.

Table 123 Values of most importance in adulthood

| Value ⁻ | Age 12 (n=496) % |
|--|------------------------|
| Happy family life | 66 |
| Good health | 49 |
| Good education | 41 |
| Interesting job | 38 |
| Lots of friends | 30 |
| Lots of money | 19 |
| Doing well at sports | 16 |
| Important job | 13 |
| Being creative/making something new | 8 |
| Taking part in church/spiritual activities | 6 |
| Good looks | 5 |
| Influencing other people | 4 |

When we asked the study children what was the best thing that had happened for them in the last 12 months, the replies were wide ranging, with some reflection of the main values identified above. Twenty-one percent mentioned a specific enjoyable experience, 8 percent travel, and 7 percent getting a present they had wanted. Their own achievements were mentioned: 17 percent a sports achievement, 7 percent a school achievement, and 4 percent an arts achievement. Ten percent mentioned friendship, and 8 percent, the happiness or restoration of their family. Seven percent did not feel they could name one best thing that had happened.

There were similar patterns when we asked the children to look ahead and think of the best thing that could happen to them in the next year, with somewhat less emphasis on specific enjoyable events (perhaps these cannot be predicted). Thirteen percent mentioned achievement in sport, 10 percent at school, and 4 percent in the arts. Sixteen percent were concerned with friends: to either keep their existing friends (6 percent), or make new ones (10 percent). Nine percent were looking ahead to secondary

school: 6 percent wanted to get into the school they most wanted to be in, and 3 percent wanted to like their new school. Eight percent had their eyes on a new possession, and 7 percent mentioned money. The best thing for 3 percent would be having their family happy or together, and for 2 percent, to have an improvement in their appearance.

Forty percent of the study children would like to change something in their lives at their age of 12. Seven percent would like more money. Three or 4 percent mentioned one of a wide range of aspects of their life they would like to change: improving a skill, their health, or confidence, changing their family, appearance, or friendship, to have their parents back together again, or to gain a treasured possession.

Relations with children's peers, and their earlier competency levels

One of our specific research questions was:

How are children's earlier competency levels in social skills, parental and teacher reports of their attitude to school and relevant school behaviour related to their experience at age 12 of their peers (including bullying), and the pattern of their peer relations outside school?

To analyse this, we looked at factors drawn from age-10 data on the Social Skills with Peers measure and teachers' perspectives on their school behaviour, bullying experience, and attitude to school, and their relationship with the age-12 friendship factors (described earlier in this section), and children's bullying experiences at age 12.

The factor analysis of the age-10 Social Skills with Peers and teachers' perspectives on their school behaviour at age 10 showed 6 factors:

- *Poor social skills* (using competency items showing response to peer pressure, poor work habits, loss of temper, not working well with others, and teacher descriptions that children were immature or bullied).
Five percent of the study children had poor social skills, 25 percent had some poor social skills, 48 percent had mostly good social skills, and 21 percent had good social skills.
- *Social isolation* (using competency items showing child left out by others, not good at making and keeping friendships, and teacher descriptions that child had low self-esteem, was not popular, or had no strengths in terms of behaviour).
Five percent of the children were socially isolated, 14 percent were somewhat isolated, 63 percent were rarely isolated, and 19 percent, never isolated.
- *Egotistical* (using teacher descriptions that a child was impatient, bossy, self-centred, or a leader).
Two percent of the children were very egotistical, 16 percent were somewhat egotistical, and 82 percent were not egotistical (in these senses).

- *Co-operative* (using teacher descriptions that a child was willing, well-behaved, kind, and made an effort).

Seven percent of the children were very co-operative, 23 percent were mostly co-operative, 39 percent were mixed in their co-operative behaviour, 29 percent were somewhat unco-operative, and 2 percent were unco-operative.

- *Dutiful* (using teacher descriptions that a child was organised, tried hard, was passive, and had some poor behaviour – an interesting mix of positive and negative behaviours (the latter were reverse scored.)

Three percent of the children were very dutiful, 9 percent were mostly dutiful, 33 percent were mixed in their dutiful behaviour, 41 percent were not dutiful (in these senses), and 15 percent were not at all dutiful.

- *In own world/creative* (using teacher descriptions that a child was creative, unreliable, or lived in his/her own world, another mix of positive and negative behaviours (the latter were reverse scored).

Ten percent of the children lived in their own world sometimes, 90 percent did not.

The Cronbach's alpha values for the first 2 factors, poor social skills and isolation, were reasonable (0.75 and 0.8 respectively). The Cronbach's alpha values for the other factors were considerably lower (under 0.5). The scales were still used as constituent items in them seemed to be related to some extent.

Two age-10 variables that seemed to “act in isolation” were kept separate. These were the teacher descriptions of children's behaviour as aggressive or showing signs of being spoilt. One difficulty for analysis with these variables is that there were relatively few children at the extreme ends of the scale. The bullying factor combined both children's and teachers' responses to create a 4-level factor: definitely not bullied, bullied in the past, may be bullied, and definitely bullied.

We also included parental answers about the child's attitude to school at age 10 in our analysis. We created 2 factors for age 12:

- *Isolation at school* (from children's ratings to 2 items about their school experience: I get lonely at school, and I have good friends (reverse scored).

One percent of the study children usually felt isolated at school, 22 percent did sometimes, and 77 percent, never.

- *Bullied at school* (from children's rating on the item about their school experience: I get bullied at school, and their response to whether they had been bullied in the last few months).

Twelve percent of the study children were usually bullied, 18 percent sometimes, and 70 percent, never.

We then undertook a series of cross-tabulations with chi-squared tests of the relationship between the age-10 factors and the age-12 factors, followed by a canonical correlation analysis. An attempt to use classification trees was not particularly successful. There was probably too much noise to be able to build an adequate model with so many variables, given a sample size of 495. Similarly, fitting log-linear

models was made more difficult by the small numbers in the cells once 3 or more of the variables were included together.

The cross-tabulations showed that:

- children who at age 10 had relatively poor social skills, who were fairly isolated in their relations with peers, who had been bullied, were more likely to be bullied at age 12;
- children who were not enthusiastic about school at age 10 were more likely to be bullies at age 12;
- children who were socially isolated at age 10 were less likely to see friendship as a key value (4 percent compared with 29 percent of those who were not at all socially isolated at age 10); and
- children who had poor social skills were less likely to rate highly on the factor *friendships focus on fun* (19 percent compared with 32 percent of those with high levels of social skills).

A further investigation of the interrelationships between the 2 sets of variables (age 10, and age 12) was done using canonical correlation. In canonical correlation, factors are found for the 2 sets of variables, such that the correlation between pairs of factors is as high as possible. We excluded variables with low loadings on the standardised canonical coefficients in the final model. This model produced these 2 sets of variables, as shaded in the figure below.⁴⁶

Figure 14 Relations between age-10 and age-12 peer experiences and behaviour

| Age-10 variables | | | Age-12 variables | | |
|------------------|-------------------------------------|---------|------------------|-------------------------------------|---------|
| | Standardised canonical coefficients | | | Standardised canonical coefficients | |
| | V1 | V2 | | W1 | W2 |
| Bullied10 | -0.5153 | 0.5526 | Friends key12 | 0.2387 | 0.4700 |
| Poorsoc10 | 0.0274 | 0.6738 | Matter of fact12 | -0.1351 | -0.1285 |
| Isolation10 | -0.7097 | -0.7240 | Fun12 | 0.0260 | -0.4884 |
| Cooperative10 | -0.0351 | 0.3539 | Communic12 | -0.0563 | -0.2922 |
| | | | Bullying | 0.6915 | -0.6371 |
| | | | Isolation | 0.4661 | 0.5749 |

The age-10 variables explain 55.2 percent of their own variance, and 7.8 percent of the variance in the age-12 variables; the age-12 variables account for 35.5 percent of their own variance, and 5 percent of the variance in the age-10 variables.

The first pair of variables (V1 and W1, with adjusted canonical correlation of 0.41) shows that not being bullied at age 10 and not experiencing social isolation is strongly related to not being bullied and not feeling isolated at school at age 12.

⁴⁶ These were statistically significant (p -values < 0.0001 and 0.0005, respectively). Some of the variables used in the canonical correlations are scaled so that 1=positive, and some so that 1=negative; thus a negative loading may be for a “positive” amount of a variable in the figure.

The second pair of variables (V2 and W2, with adjusted canonical correlation of 0.23) shows that children who were not isolated at age 10 (indicated by the negative sign before the variable), but who had poor social skills and were bullied then, were more likely to experience social isolation and bullying at age 12, to not find much fun in friendships, yet to also place a key value on friendship. But they place less value on communication within friendship (perhaps because they have had little experience of this), and do not have a matter of fact approach to friendship. Friendship has mattered a great deal at both ages, but is not a source of confidence.

Current patterns of peer relations, attitudes to school, and competency levels

The second research question related to the role of peers in the study children's lives focused on their current attitudes and performance levels. It was:

How are children's attitudes to school, including motivation and engagement, their problem-solving approaches and competency levels at age 12 related to the pattern of their peer relations in and outside school?

We used the friendship factors and variables used in the previous analysis to give us factors related to patterns of peer relations for this analysis. To analyse these in relation to children's attitudes to school and problem-solving approaches, we used relevant answers from the children to specific questions (most of these were dichotomous — the children answered yes or no — which meant they could not be used in a factor analysis), the “values” factors described earlier in this section, and “attitudes to school performance” factors, which are described fully in Section Thirteen. To see which of these variables showed significant associations (at the 5 percent level) with the outcome measures, we used 2 different kinds of analysis:

Cross-tabulation between the categorical and dichotomous variables relating to attitudes to school, problem-solving approaches, and competency levels at age 12, and the variables relating to the pattern of the study children's peer relations, including bullying, and ANOVA and canonical correlation analysis were used to analyse the relationship between the variables that took an approximately continuous form (e.g. the competency measures), and the peer relations variables.

We found a number of patterns. Compared to the study children who had not recently been bullied, those who *bullied* other children at age 12 were:

- more likely to have friendships focused on fun;
- less likely to score highly on the “anchored and achieving” group of values, and more likely to score highly on the “appearances matter” group of values;
- more likely to try to persuade their friends not to do something their parents opposed;
- less likely to have a positive attitude to school; and
- less likely to see their school progress in terms of diligence.

Those who bullied other children did not lack social skills – indeed, they put a high value on friendships, and on how they appeared to others – but not at the cost of their relations with their parents. They would try to persuade their friends not to do something their own parents opposed. School work may seem more opposed to this emphasis on friendships of a certain kind, because it does involve effort, rather than the appearance of ease which is valued in the friendships.

When we look at the variables that are related to *being* bullied at age 12, we found that compared with the study children who had not been recently bullied, those who were regularly bullied were:

- less likely to try to persuade their parents to let them do something their friends wanted them to do;
- more likely to feel isolated at school;
- less likely to be engaged in learning, and more likely to feel distressed at school; and
- more likely to see their school progress in terms of diligence.

Unlike their peers who bullied, schoolwork is meaningful for those who were bullied, in terms of effort. But school was not an enjoyable place for them to be. Two interpretations seem possible for the lower proportions found in this group who would try to persuade their parents to let them do something with their friends. First, that this is not a likely situation for them. However, there were no differences between those who were bullied and others in terms of their social skills, or the things they did value about friendships. Another possible interpretation is that they lack confidence about their ability to persuade others, including their parents.

Compared with those who did not feel isolated in school, children who experienced *isolation* at school at age 12 were:

- less likely to be engaged in learning, and more likely to feel distress at school (only 4 percent of those who were usually felt distress at school were never isolated, compared with 98 percent of those who never felt distressed at school);
- slightly more likely to see school progress in terms of whether they found the work easy;
- less likely to try to persuade their parents to let them do something with their friends; and
- more likely to respond aggressively if given a hard time in school (18 percent compared with 8 percent of those who were never isolated).

Aspects which were different for the study children who scored highly on the factor “friendships focus on communication”, compared with those who did not, focused on problem-solving. They show them readily reaching out for help. They were:

- more likely to ask peers for help if they have a hard project or can't find a book;
- more likely also to ask their teacher for help if they have a hard project;
- less likely to persist if they could not find a book;
- more likely to tell their parents if they were given a hard time in the playground;
- less likely to score highly for the “action and friendship” group of values; and
- tended to have higher scores for Communication.

The study children whose parents held some concerns about their friendships did not have different approaches to friendship, or different patterns of scores for the three sets of values. Perhaps this is because there was a range of reasons for parental concerns about friendships: some due to a concern about a lack of friends, as evident below, but some for other reasons. They were:

- more likely to try to persuade their friends not to do something their parents would disapprove of;
- more likely to tell their parents if they got a hard time in the playground;
- more likely to feel isolated at school; and
- more likely to have lower scores for Communication, Perseverance, Social Skills with Adults, and the PAT Reading Comprehension test.

We did find some relationships between the other forms of friendship found for the study children at age 12, but with fewer variables, making a consistent pattern harder to discern. Perhaps what they underline is the value of collecting evidence about students' particular forms of friendship if there is a concern about their performance at school.

Those who scored highly on the “matter of fact” friendship factor were:

- more likely to seek help from the teacher if they were given a hard time in the playground, and less likely to take a passive approach;
- less likely to feel isolated at school; and
- tended to have better Writing and PAT Reading Comprehension test scores.

Those who scored highly on the “aimless” friendship factor were:

- more likely to seek help from another student if they were given a hard time in the playground; and
- more likely to have lower scores for mathematics and the PAT Reading Comprehension test.

Those who scored highly on the “friendship is a key value” factor were:

- less likely to persist if they struck a hard project; and
- more likely to have lower scores for the PAT Reading Comprehension test.

Those who scored highly for the “friendships focused on fun” factor were more likely to try to persuade their parents to let them undertake the activity with friends that their parents opposed. Conversely, those who scored highly for the factor “formal friendships” would try to persuade their friends not to do the activity.

We undertook a canonical correlation to look at the relationship between children's attitudes to school and attitudes to learning, and their patterns of peer relations and values at age 12. We dropped those variables that had low loadings on both canonical variables in an initial model. We ended with the sets given in the figure below. The shaded variables are those that loaded relatively heavily on the standardised canonical variables. The school engagement group of variables account for 74.2 percent of their own variance, and 22.9 percent of the variance of the patterns of peer relations group of items; the patterns of peer relations group accounts for 37.6 percent of their own variance and 10.5 percent of the

engagement group's variance. The 2 canonical coefficients were statistically significant (p -values both < 0.0001).

Figure 15 **Relations between school engagement and patterns of peer relations and values**

| | School engagement | | | Patterns of relations | |
|------------------------------------|-------------------|--------|-------------------|-----------------------|---------|
| | V1 | V2 | | W1 | W2 |
| School engagement12t ⁴⁷ | -0.1176 | 0.9041 | CuriosityT | 0.0929 | -0.2471 |
| DistressAtSchl12t | 0.9706 | 0.2661 | Gcomp | -0.0759 | -0.4967 |
| Diligent12 | -0.0528 | 0.2234 | shiny12 | -0.0578 | 0.2453 |
| | | | anchored12-0.0171 | -0.2317 | |
| | | | freeflow12 | -0.0142 | 0.2010 |
| | | | bullying | 0.1802 | -0.3707 |
| | | | isolation | 0.8885 | 0.2307 |
| | | | Matteroffact12 | 0.1644 | -0.0443 |

The first pair of variables (V1 and W1, adjusted canonical correlation of 0.71) shows that children who were not distressed at school were seldom isolated at school, and to a lesser extent, were unlikely to be bullied, and were likely to take their friendships as matter of fact.

The second pair of variables (V2 and W2, adjusted canonical correlation of 0.31) shows that children who had a low rate of engagement in school were more likely to have a lower score on the social and attitudinal competencies (gcomp), and be bullied; and to a lesser extent, to have higher scores on the “action and friendship” and “appearances matter” groups of values than on the “anchored and achieving” group of values, be unlikely to be socially isolated, and have low scores for Curiosity.

We do not know which came first – a turning away from or failure to engage in schoolwork, or more enjoyment of things that do not always sit well with the work required of school; but by age 12, they are found in association.

Summary

Friendships

Peers are important to the study children at age 12. Being with friends was among their most preferred ways to spend their time. Much of this activity is informal. There were marked gender differences, with boys much more likely to spend their time with friends in informal physical activity or playing games, and girls much more likely to spend time talking and shopping. Boys valued sharing interests more, and girls, having someone to talk to.

⁴⁷ Variables ending with a T or t have been normalised (transformed).

Just over half the study children could identify something that was not so good about their friendship – mainly arguments, or unreliability. Boys were somewhat more positive (or less critical) about their friendships than girls.

Differences in family resources and ethnicity were not reflected in such marked differences as are evident with gender in the way the study children spent time with their friends or what they valued about their friendships.

Just over half the children said they had 5 or more close friends; 13 percent had 1 or 2. The number of close friends was unrelated to gender or family characteristics, and was largely unrelated to children's competency scores. Close friends tended to be of the same sex, but 42 percent of the boys and 27 percent of the girls said their close friends included both boys and girls.

Ninety-one percent of the study children felt that their parents liked their friends, or most of them. Parental judgment was still respected, and was more weighty than friendships. When we asked the study children what they would do if their parents told them not to do something and their friends really wanted them to do it, 66 percent of the study children would not do the activity, and another 6 percent would try to persuade their friends not to do it. Fourteen percent would try to persuade their parents to let them. Eleven percent thought it would depend what the activity was. Only 6 percent would go ahead and do the activity their friends proposed, but their parents opposed. Girls were more likely to try to persuade their parents to let them do the activity, and boys more likely to do it anyway.

Through factor analysis, we found that that fun in friendships was more likely to be valued than communication, that most children had good friendships, but around 12 percent had mainly aimless friendships, and 3 percent did not have good friendships.

Bullying

Around a quarter of the study children said they had been picked on or bullied by someone in the last couple of months. Bullying frequency at age 12 was much the same as it was at age 10. Most of this occurred at school (20 percent), with 4 percent having been bullied at home, and 2 percent in a public place. Most of the bullying was verbal. The main response to the bullying was to ignore it, or seek help from a teacher or parent. Fifteen percent of the children said they had bullied another child in the last few months. Gender was unrelated to experiences of being bullied or bullying, but children whose mothers had no qualification were more likely to be bullied. There were more reports of bullying from children attending decile 5–10 schools than those attending decile 1–4 schools.

Children who had experienced bullying — as victim or bully, or both — tended to score lower on most of the competency measures than those who had not been involved in bullying.

Values

Enjoyment of life, and doing well at school or sport were most important to the study children at age 12. The next biggest group of things that were of most importance to them was being with family and having

lots of friends, and being helpful or kind. We found that these values fell into three groups: “anchored and achieving” (50 percent), “action and friendship” (31 percent) and “appearances matter” (9 percent). Those who had high scores for the “anchored and achieving” group of values were more likely to enjoy reading and have higher scores for Communication at age 10; those who had high scores on the “action and friendship” group of values to have had high scores for social skills at age 10; and those who had high scores on the “appearances matter” group of values, more likely to have had lower scores at age 10 for Individual Responsibility.

What would be of most importance to the study children in their adulthood was a happy family life, followed by good health. Having an interesting job was mentioned by twice as many of the children at age 12 as having lots of money.

Patterns of peer relations and children’s earlier social skills and school behaviour

Cross-tabulation of factors relating to children’s earlier social skills and their current patterns of relations with peers showed no notable associations between “ordinary” levels of social skills and comfort at school at age 10, and “ordinary” relations with peers at age 12. However, relatively poor social skills, social isolation, and being bullied at age 10 were more likely to precede being bullied at age 12, and children who were socially isolated 2 years earlier were less likely to see friendship a key value, and those who had had poor social skills, less likely to think of friendships as fun. Canonical correlation analysis confirmed this picture, and gave it some additional dimensions. Earlier poor social skills and experiences of bullying were more likely to precede social isolation and bullying at age 12, and an emphasis on friendship which was less likely to focus on communication, fun, or as part of the everyday. Friendship has mattered a great deal at both ages, but is not a source of satisfaction. Looked at another way, it would appear that some children with poor social skills at age 10 need additional support from adults in their life if they are to have positive experiences of friendship 2 years later.

Patterns of peer relations, attitudes to school, and competency levels

We found that those who bullied other children were more likely to have friendships focused on fun, and more likely to score highly on the “appearances matter” group of values. They were less likely to be engaged in learning, and were less likely to view diligence as a sign that they were doing well at school.

Those who were regularly bullied did not show differences in friendship patterns or values, but were more likely to feel distressed at school, as well as being less engaged in learning than those who were not bullied. But they were more likely to see diligence as a sign that they were doing well at school. So for both the bully and the bullied, school is not enjoyable – but for rather different reasons.

Distress at school was also more likely to be experienced by those who experienced isolation at school; they saw school progress in terms of ease, and were more likely to respond aggressively if given a hard time in school. So those who feel isolated do not respond passively, but like the bully and bullied, they are also more likely to be disengaged from learning.

Children who emphasised communication in their friendships were more likely to reach out for help if they needed it, and to problem-solve. There were also other trends for other patterns of friendship that we found which suggest that these are related to how children tackle work at school, with lower scores for the PAT Reading Comprehension test for children who had aimless friendships – or for whom friendship was an especially key value.

Thus there are indications that while friendship is an everyday part of most children's lives at age 12, its value can over-topple if it becomes too important, if relationships are vexed or focused on power, or if the friendship has little shared content. Too large a focus on friendship can become counter to engaging in schoolwork – or else be a sign that children are not engaging in the work required to make the most of school.

Section Twelve

School and class characteristics

In this section we look at some of the characteristics of the schools attended by the study children, and the characteristics of the children's classrooms.

We have not analysed every factor which we report here. The analysis is limited to factors which previous analysis in the study has shown to have links with children's competencies, or which are of perennial interest. We do not undertake any analysis of the resource aspects of schools and teachers, since measurement of these is problematic, as is the assumption of direct links with children's current competency levels (Burtless, 1996; Norton, Sanderson, Booth, and Stroombergen, 2000).

Characteristics of schools attended by the competent children sample at age 10

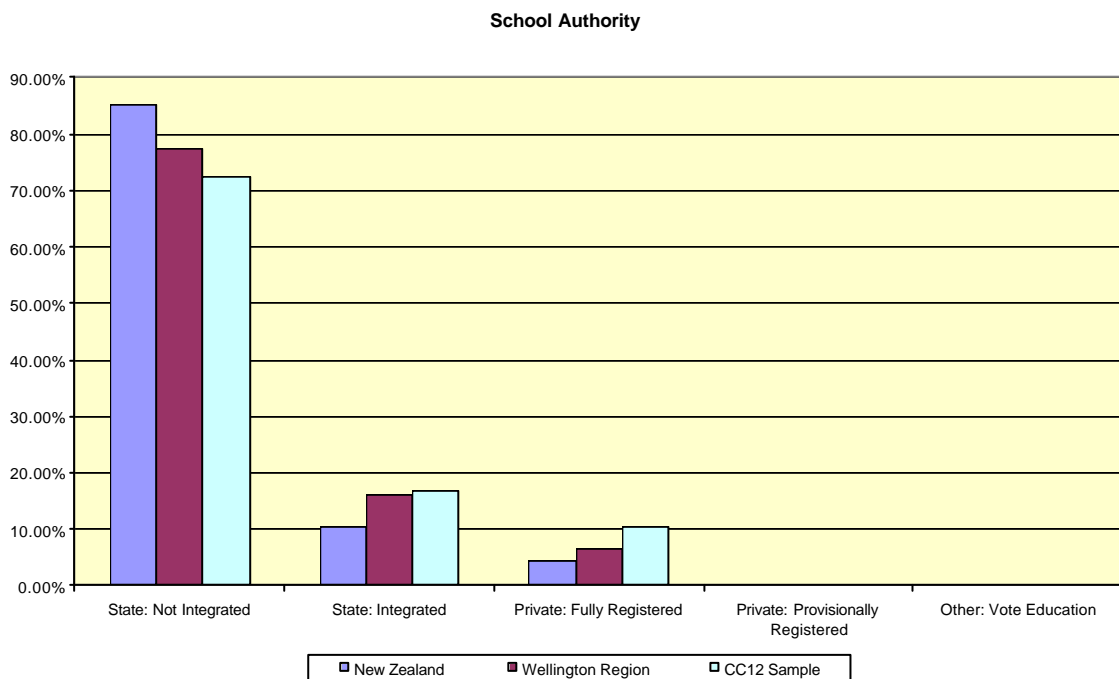
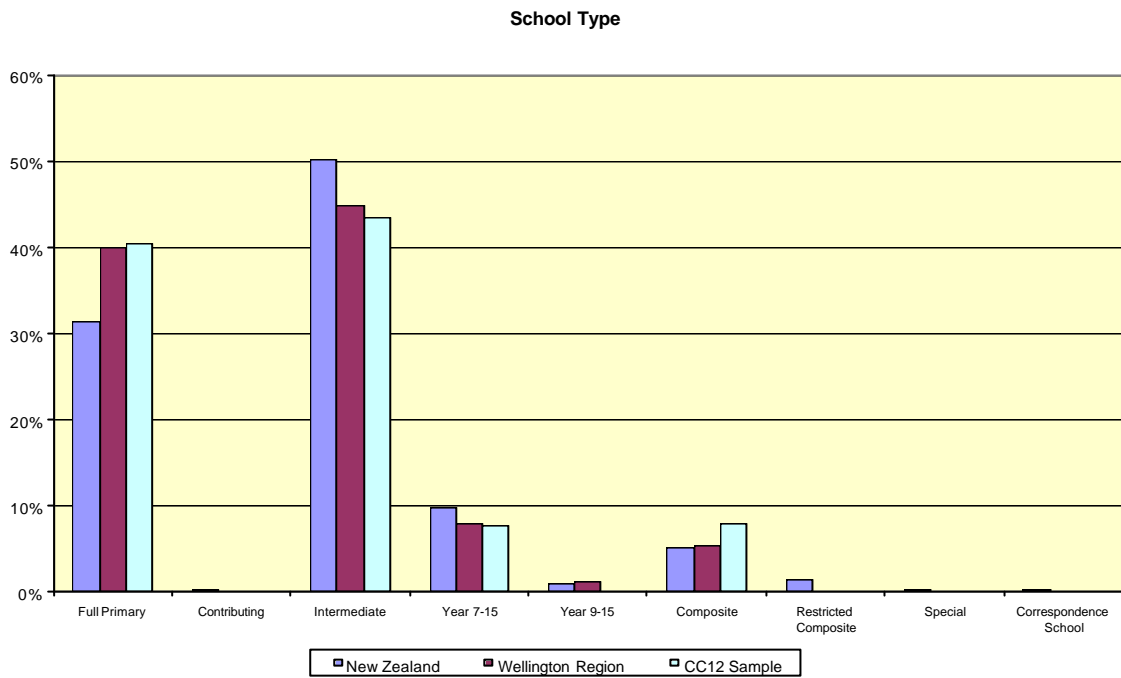
The table below shows the main characteristics of the schools attended by the study children at age 10. One child in the study was being home-schooled.

The study children's patterns of attendance at different school types is similar to those of age-12 children in the Wellington region, but with higher private school attendance. Their patterns of attendance in terms of school socio-economic decile are similar for decile 2, 5, and 9 schools, but vary for the others.⁴⁸

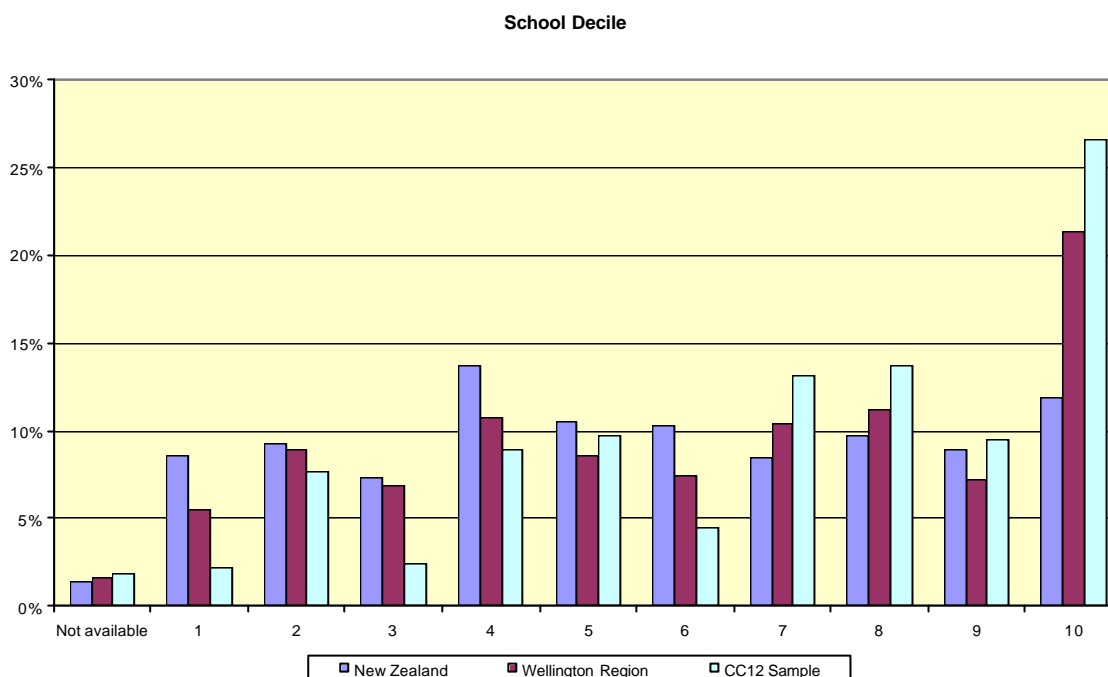
⁴⁸ We are grateful to the Data Management section of the Ministry of Education for providing roll-related data for this age group for Wellington and nationally.

School and class characteristics

Figure 16 School characteristics



School and class characteristics



* The schools attended in the "not available" category are all private schools.

** Ninety-three percent of the Competent Children study children attending composite schools attended private schools, and the rest, state integrated schools.

Most of the children in the study were attending Wellington region schools, which tend to be clustered at the high-decile end. Partly because of this, there were few family-related differences in the characteristics of the schools attended. Māori and Pasifika children were more likely to attend decile 1–2 schools (27 percent compared with 6 percent of Pākehā/European and Asian children in the study). Māori were least likely to attend decile 9–10 schools (17 percent compared with 36 percent of others). Māori children were also less likely than others to attend private or state integrated schools (12 percent compared with 28 percent of others).

Children whose mothers had no qualification were more likely to attend intermediates (52 percent), with none of this group attending composite schools. Twenty-one percent attended decile 1–2 schools, compared with 8 percent of children whose mothers had a qualification, and at the other end of the decile spectrum, 20 percent attended decile 9–10 schools, compared with 39 percent of children whose mothers had some qualification. Children of mothers with a university qualification were most likely to attend decile 9–10 schools (56 percent). Attendance at private schools was linked to maternal qualification: rising from 1 percent of those whose mothers had no qualification to 19 percent of those whose mothers had a university qualification.

There were similar trends in relation to family income, as shown in the next table.

Table 124 Family income and school characteristics

| Family income → | Over \$80K (n=162) | \$60–80K (n=96) | \$30–60K (n=152) | < \$30K (n=70) | Sample (n=496) |
|--------------------------|-----------------------|--------------------|---------------------|-------------------|-------------------|
| School characteristics ↓ | % | % | % | % | % |
| State | 63 | 72 | 77 | 84 | 72 |
| State integrated | 17 | 22 | 16 | 11 | 17 |
| Private | 20 | 6 | 6 | 4 | 10 |
| Decile 9–10 | 52 | 31 | 30 | 19 | 36 |
| Decile 7–8 | 22 | 29 | 31 | 26 | 27 |
| Decile 5–6 | 13 | 18 | 13 | 19 | 14 |
| Decile 3–4 | 7 | 13 | 13 | 16 | 11 |
| Decile 1–2 | 2 | 9 | 1 | 19 | 10 |
| Intermediate | 36 | 47 | 47 | 47 | 44 |
| Full (incl F1–2) | 40 | 41 | 41 | 44 | 41 |
| Secondary (yr 7–15) | 6 | 9 | 8 | 6 | 8 |
| Composite | 18 | 8 | 3 | 3 | 8 |

The school characteristics we analysed in relation to children's competency levels were socio-economic decile, school ownership, and school type.

School socio-economic decile

The quantitative research literature on the impact of the socio-economic mix of schools provides mixed findings. This probably reflects different measures and methods of analysis, and available data. While it is evident that schools with different socio-economic mix do have different patterns of student achievement, some research finds this difference to be due to differences in family income (i.e., school socio-economic mix makes no separate and additional contribution of its own), or differences in prior student achievement (Wilkinson et al., 2000). To some researchers, this distinction is a moot point: it is these very differences in student resources and experience which characterise differences in socio-economic mix. Other research, particularly in economics and political science, does show a distinct role for school socio-economic mix, after other confounding factors such as individual family income have been taken into account (literature reviewed in Wylie, 1998). The qualitative research literature certainly shows quite different interactions between teachers and students occurring in schools serving low-income communities and schools serving middle-income communities, with clear effects for the curriculum covered (Thrupp, 1999).

In this study, we have found that the socio-economic mix of the early childhood education centre attended by study children continues to have a link with their competency levels at age 12, 7 years after they left it. This link is independent of family income and maternal qualification.

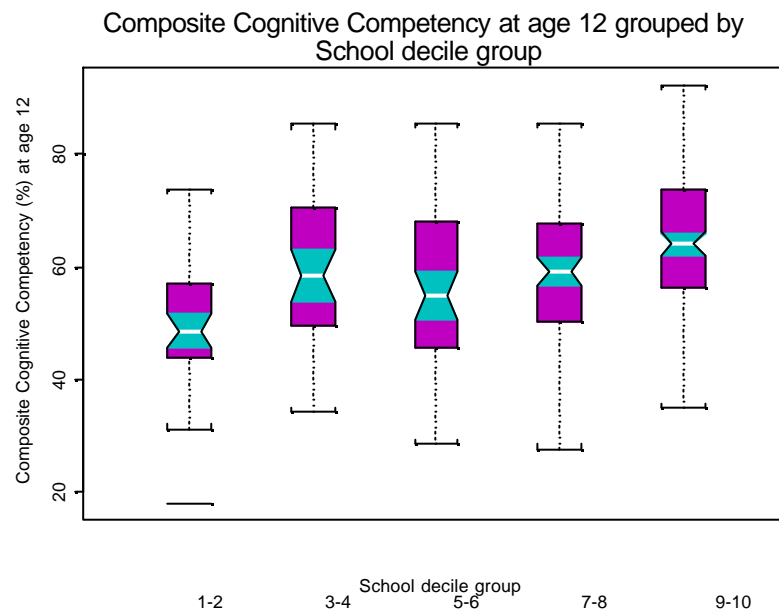
Our analysis at age 8 showed that school decile continued to have an additional impact on children's Literacy, Mathematics, and Logical Problem-Solving scores after taking family income into account. When we used the children's age-5 literacy score and their school decile in a 2-factor analysis of variance model, we found that school decile had a stronger influence on children's PAT Reading Comprehension

scores than did their age-5 literacy scores. Adding family income at age 5 into the model showed that family income was stronger, but that school decile did play a small additional part in explaining the variance or spread of student scores, particularly differentiating children at decile 1–2 and decile 5–6 schools from others.

At age 10, the 1-factor analysis showed some marked differences related to school decile, particularly separating out children attending decile 1–2 schools. Indeed, the study children attending decile 3–4 schools had scores which were much the same as children attending decile 9–10 schools.

At age 12, we find the same trend. This is illustrated for the composite cognitive competency, and remains after taking family income and maternal qualification into account.

Figure 17 **School decile and Composite Cognitive Competency**



School and class characteristics

Table 125 School socio-economic decile and children's competencies at age 12

| School Decile ⁴⁹ ® | Deciles 1–2 Mean (n=48) | Deciles 3–4 Mean (n=56) | Deciles 5–6 Mean (n=70) | Deciles 7–8 mean (n=133) | Deciles 9–10 Mean (n=180) | Prob. of F-value from ANOVA | Percent variance accounted for |
|--------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------------------------------|-----------------------------------|---|
| Social Skills with Adults | 73.8 | 81.0 | 74.4 | 74.5 | 78.6 [^] | 0.042 | 2.0 |
| Communication* | 64.6 | 75.4 | 69.4 | 66.1 | 70.5 [^] | 0.001 | 3.8 |
| Mathematics** | 34.9 | 49.3 | 47.3 | 48.9 | 58.5 | < 0.0001 | 9.2 |
| PAT Reading Comprehension | 40.8 [^] | 55.1 [^] | 50.9 [^] | 52.3 [^] | 59.6[^] | < 0.0001 | 6.9 |
| Burt Word Reading* | 70.9 | 78.8 | 74.9 | 76.7 | 78.6 | 0.031 | 2.2 |
| Writing | 46.2 | 50.8 | 49.5 | 51.1 | 54.3 | < 0.0001 | 5.9 |
| Reading Age (yrs, mo) | 11.7 | 13.2[^] | 12.6 | 12.8 | 12.11 [^] | < 0.0001 | 5.4 |
| Logical Problem-Solving* | 62.4 | 69.5 | 67.0 | 70.4 | 74.0 | < 0.0001 | 8.9 |
| Composite Competency* | 60.8 [^] | 67.8 [^] | 64.6 [^] | 64.7 [^] | 68.7^{^^} | 0.0002 | 4.5 |
| Composite Cognitive Competency | 50.2 [^] | 59.1 [^] | 56.6 [^] | 58.7 [^] | 64.1[^] | < 0.0001 | 10.3 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

However, not all the differences between school deciles remain significant after taking into account family income and maternal qualification. With Communication, the differences between students at decile 3–4 schools and others remained significant, but not the differences for students at decile 9–10 schools. For mathematics, differences between students at decile 1–2 schools remain, but not between students at decile 9–10 schools and others. Students at decile 1–2 schools continued to show differences from their decile 9–10 counterparts for the PAT Reading Comprehension test, but not on the Burt Word Reading test. So for mathematics and reading comprehension, there are marked associations which distinguish students in decile 1–2 schools from others.

Why should decile 1–2 schools stand out? We know that the decile ranking is a pointer to the collective family and home resources available to students and to the schools. Collectively, the families of children at these schools have low levels of educational achievement, and low family incomes, with higher unemployment levels than in other communities. Teachers in this study gave decile 1–2 classrooms the lowest rating for general parental support for student learning.

We found no socio-economic decile differences in parental reports of their own or their child's experiences with their school, including parental satisfaction with their child's progress, other than that voluntary work in the classroom was highest among the parents of children attending decile 9–10 schools (13 percent).

Children attending decile 1–2 schools do bring with them some differences in how they spend their time out of school that seem likely to affect their learning. Only 23 percent of the decile 1–2 school students in this study said they often read a book in their spare time (compared with 48 percent overall, and rising to 60 percent of those in decile 9–10 schools). Twenty-two percent of decile 1–2 students watched 6 hours

⁴⁹ This analysis is for state and state-integrated schools only.

or more television a day, compared with 7 percent of students in decile 3–10 schools. The proportion of students watching television before school decreased inversely to school decile: from 57 percent of decile 1–2 students to 25 percent of decile 9–10 students. Forty-one percent of decile 1–2 students never read a magazine (compared with 24 percent overall), 27 percent never used a computer (falling to 5 percent of students in decile 9–10 schools), and 73 percent said they never went to art/music/dance classes (falling to 50 percent of decile 9–10 school students).

However, decile 1–2 students were just as likely to often do their homework, use a computer, or read a newspaper. While the frequency with which they did their homework was much the same as others, some spent less time on it: 35 percent spent less than an hour a week (compared with 15 percent overall) – though there were just as many decile 1–2 students who spent more than 4 hours a week on their homework as others. Thirty-five percent said they found it hard to get their homework done (compared with 23 percent overall); however, there were no differences in the reasons they found it difficult.

Less than half enjoyed reading (49 percent compared with 65 percent of students in other decile schools); however, their enjoyment of writing was similar to others. They were *more* likely to say that they enjoyed working with numbers (67 percent compared with 45 percent overall), and there were few differences in their home mathematics activities: they were less likely to use scales to weigh things accurately (29 percent), or to mention activities involving simple statistics (14 percent).

“Reading age” is a broad gauge of children’s reading ability, and one which is less encouraged now than formerly, since it does not correspond to clear age-based measures, and is dependent on a mix of teacher experience of students at different ages, and their expectations of students. It was used in the Competent Children project because teachers would be familiar with this way of giving a quick assessment. We asked teachers to estimate it for each of the children in the study, and also to give us the lowest reading age in their class, and the highest reading age in their class.

The average lowest reading age estimated by teachers for the classes included in the study was 8.1 years, and the highest, 15 years. In the table below, decile 1–2 classes have the lowest reading age, and, with decile 5–6 classes, the widest span of reading performance to work with. Note that there are age-12 children in classes at every decile whose reading was seen to be at a much higher level than their chronological age, with no difference in the average highest reading age related to school decile.

Table 126 School decile and reading ages

| Decile | Lowest reading age (years) | | Highest reading age (years) | |
|-------------|----------------------------|------|-----------------------------|------|
| | Average | s.d. | Average | s.d. |
| Decile 1–2 | 6.8 | 1.4 | 14.5 | 1.2 |
| Decile 3–4 | 7.8 | 1.5 | 15.1 | 0.7 |
| Decile 5–6 | 7.5 | 1.4 | 15.1 | 1.6 |
| Decile 7–8 | 8.2 | 1.4 | 14.8 | 0.9 |
| Decile 9–10 | 8.8 | 1.6 | 15.2 | 1.1 |

The classes in the decile 1–2 schools attended by study children were also more likely to have a higher number of children whose first language was not English. The average number of children whose first

language was not English was 2 per class. In decile 1–2 schools in the study, the average was 6.4, compared with 1.1 in decile 9–10 schools.

None of the decile 1–2 schools attended by children in the study had classes of less than 20 students at age 12. Seventy percent of the classes with few than 20 students were in decile 9–10 schools, and 26 percent in decile 7–8 schools. Students attending decile 1–2 schools were the most likely to have classes of 26 to 30 (63 percent compared with 33 percent overall). However, they were less likely to have classes of 30 or more (27 percent compared with 44 percent overall).

There was a higher proportion of classes in the decile 1–2 schools where the average attendance rate of students was less than 90 percent (17 percent of the students in decile 1–2 schools, compared with 8 percent overall).

School ownership

Seventy-two percent of the study children were attending state schools, 17 percent state integrated schools, and 11 percent, private schools. Those attending private schools had higher average scores for mathematics, the PAT Reading Comprehension test, writing, and Logical Problem-Solving.

Table 127 School ownership and children's competencies at age 12

| School ownership® | State Mean (n=358) | State Integrated Mean (n=85) | Private Mean (n=52) | Prob. of F-value from ANOVA | Percent variance accounted for |
|--------------------------------|--------------------------|---------------------------------------|---------------------------|--------------------------------------|---|
| Age-12 competency ⁻ | | | | | |
| Mathematics** | 49.1 | 52.9 | 60.9 | 0.004 | 2.2 |
| PAT Reading Comprehension | 52.6 ^{^^^} | 55.0 [^] | 64.6 | 0.0005 | 3.0 |
| Writing | 50.9 | 51.2 | 57.4 | 0.0001 | 3.6 |
| Logical Problem-Solving* | 69.7 | 70.2 | 75.5 | 0.004 | 2.2 |
| Composite Competency* | 65.1 ^{^^^^} | 68.1 [^] | 70.5 | 0.003 | 2.4 |
| Composite Cognitive Competency | 58.6 ^{^^^} | 60.3 [^] | 66.6 | 0.0002 | 3.5 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^^} Three fewer in this mean.

^{^^^^} Four fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

However, these differences did not remain significant after taking family income and maternal qualification into account, other than for writing. Some interesting indicative interactions emerged for mathematics and the PAT Reading Comprehension test. The ownership of the school appeared to be more important than family income for students attending state integrated schools, but not for those attending state or private schools. It appeared to be more important than maternal qualification for students attending state integrated or private schools.

There is little in the material we have from parents and students which might shed light on these patterns. As with the previous phase, we found little difference in parents' reports of their and their children's experience which reflected the different ownership of the schools they attended. The one difference we

found was that children attending private schools were less likely to dislike their current teacher (6 percent) than those attending state (19 percent), or state integrated schools (12 percent).

There are a few differences in the children's reports of how they are spending their time out of school. Private school students in the sample were less likely to report that they often spent time hanging out with their friends (33 percent compared with 52 percent overall); they were more likely to often be taking part in art/music/dance classes (27 percent compared with 14 percent overall).

Attitudes to reading and writing do not vary in relation to school ownership; the only difference in mathematics activities is that private school students were more likely to mention activities involving simple measurement (71 percent); however, they were also less likely to say they enjoyed working with numbers (33 percent compared with 44 percent for those in state schools, and 54 percent of those in state integrated schools). Students in state schools were less likely to spend more than 4 hours a week on homework: 16 percent compared with 35 percent of those in state integrated schools, and 53 percent of those in private schools. Private school students were less likely to find their homework hard to do (29 percent compared with 42 percent overall).

School type

At the age of 12, most of the study students attended intermediates (44 percent), or full primary schools (40 percent). Nine percent attended composite schools (Year 1-13), and 8 percent, Year 7-15 secondary schools. In the comparisons which follow, we have not included the composite schools, because of their large overlap with private schools. Lower decile schools were more likely to include intermediates and secondary schools, and high-decile schools, full primary schools.

Table 128 **School decile and school type**

| Decile | Intermediate | Full primary | Secondary | Composite |
|---------------------|--------------|--------------|-----------|-----------|
| Decile 1-2 percent | 47 | 23 | 31 | 0 |
| Decile 3-4 percent | 54 | 32 | 14 | 0 |
| Decile 5-6 percent | 73 | 26 | 1 | 0 |
| Decile 7-8 percent | 65 | 32 | 2 | 0 |
| Decile 9-10 percent | 14 | 61 | 6 | 18 |
| No decile percent | 0 | 11 | 0 | 78 |

We found some differences in the study children's competency levels in literacy and Logical Problem-Solving related to the kind of school they were attending. However, these were all related to composite schools, with their large overlap with private schools, and were no longer significant when family income and maternal qualification were taken into account.

Table 129 School type and children's competencies at age 12

| School type [®] | Full primary (Mean) (n=201) | Intermediate Mean (n=216) | Composite Mean (n=40) | Secondary Year 7–15 Mean (n=38) | Prob. of F-value from ANOVA | Percent variance accounted for |
|--------------------------------|-----------------------------------|---------------------------------|-----------------------------|--|--------------------------------------|---|
| Age-12 competency [–] | | | | | | |
| PAT Reading Comprehension | 55.1 ^{^^} | 52.3 ^{^^} | 64.0 | 50.8 | 0.008 | 2.4 |
| Writing | 52.2 | 50.5 | 56.9 | 49.8 | 0.002 | 3.0 |
| Reading Age (yrs, mo) | 12.11 ^{^^} | 12.7 | 12.11 | 12.3 | 0.055 | 1.5 |
| Logical Problem-Solving* | 71.6 | <i>68.6</i> | 74.2 | 69.7 | 0.011 | 2.2 |
| Composite Cognitive Competency | 60.6 ^{^^} | <i>58.1^{^^}</i> | 65.5 | 58.4 | 0.006 | 2.6 |

* In these cases the squared model was a better fit.

^{^^} Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

There were some differences in the nature of classes which were related to school type. Full primary and intermediate students were most likely to be in composite classes (85 and 70 percent respectively), compared with 24 percent of secondary students in the sample, and 5 percent of those in composite schools.

Twenty-two percent of the students in full primary schools had one teacher for all their subjects, compared with 3 percent of those in other school types.

Secondary students were most likely to be doing no extracurricular activities at school (34 percent).

There was a lower proportion of intermediate students whose teachers said they saw their mothers regularly (17 percent), though the proportion of these students whose teachers said they never saw their mother was much the same for all school types. Proportions were also similar in terms of seeing the students' fathers, but lower for seeing other members of the family for intermediate and secondary students (9 and 3 percent compared with 15 percent of full primary students, and 17 percent of composite school students). Views of the quality of the relationship were similar across all school types.

Classroom characteristics

Class size

The average class size experienced by the study children was 28, the same as at ages 10 and 8. The smallest class size was 15, and the largest, 60 (shared by 2 teachers). As at age 10, private schools had the lowest average class size (22 children, compared with 26 for state integrated schools, and 29 for state schools). Thirty-three percent of the private school students were in classes of 20 or less, compared with 4 percent of those in state integrated and 1 percent of those in state schools.

Average class size was not related to school decile, apart from being slightly lower for decile 9–10 schools, which may reflect the fact that most of the private schools were in this group. Indeed, there were differences in class size for the decile 9–10 schools depending on their ownership: an average of 28.41

for study students attending state schools, 25.44 for those attending state integrated schools, and 22.52 for those attending private schools.

Students at intermediate schools were in slightly larger classes: an average of 30.3, compared with 27 for those at full primary schools.

Year level

Fifty-three percent of the study children were in Year 7 at age 12, and 47 percent in Year 8. One child was in Year 6. Students in Year 8 had slightly higher scores on average for the Burt Word Reading test, writing, and Reading Age only. These differences remained after taking into account family income and maternal qualification.

Table 130 Year level and children's competencies at age 12

| Year Level® | Level 7 | Level 8 | Prob. of F-value from ANOVA | Percent variance accounted for |
|--------------------------------|-------------------|---------------------------|-----------------------------|--------------------------------|
| Age-12 competency ⁻ | Mean (n=234) | Mean (n=259) | | |
| Burt Word Reading* | 74.7 | 79.1 | 0.001 | 2.1 |
| Writing | 50.3 | 52.9 | 0.006 | 1.5 |
| Reading Age (yrs, mo) | 12.5 [^] | 12.11 | 0.0009 | 2.2 |
| Composite Cognitive Competency | 58.3 | 61.0^{^^^} | 0.024 | 1.0 |

* In these cases the squared model was a better fit. [^] One fewer in this mean. ^{^^^} Three fewer in this mean. The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*. (The sole level 6 student was left out of this comparison.)

Composite and single-level classrooms

Composite classes remained the dominant form of class (67 percent of students), much as at age 10. However, there was a shift away from the wider groupings seen at age 10, where around a quarter were taught in classes that included younger children, to a narrower range at age 12. Sixty percent were in composite Years 7 and 8 classes, 3 percent in Years 6 and 7 classes, and 2 percent in Years 6, 7, and 8 classes. One percent were in wide range classes.

Single-level classes were most likely to be experienced by students in private schools (90 percent compared with 54 percent of students in state integrated schools, and 19 percent of those in state schools). However, they did not follow the school decile rankings: the schools that were more likely to have single-level classes were decile 1–2, and decile 9–10 schools (38 and 48 percent respectively); and decile 3–4 schools, least likely (5 percent).

Numbers of teachers and variation in physical classrooms

At the age of 12, only 11 percent of the children had a single teacher for all their subjects. This contrasts with 36 percent at age 10. They also experienced a greater number of teachers. Thirty-three percent had 1 or 2 subjects taught by other teachers, 31 percent had 3 or 4 subjects taught by other teachers, and 25

percent had between 5 and 9 subjects taught by other teachers. Specialist or practical subjects were most likely to be taught by a teacher other than the child's classroom teacher, though mathematics and science also feature. Literacy remains the prerogative of the classroom teacher.

Table 131 **Subjects with other teachers**

| Item | Age 12 |
|-----------------------------------|--------------|
| | (n=496) % |
| Technology | 72 |
| Music/Art | 53 |
| Information technology/computers | 37 |
| Maths | 33 |
| Sport | 28 |
| Science | 26 |
| Māori | 20 |
| Language other than English/Māori | 16 |
| Other | 14 |
| Language | 13 |
| None | 11 |

As when the children were age 12, students in private schools and in Year 7–15 secondary schools had a higher number of subjects taught by another teacher (an average of 6, compared with 3 for state and state integrated school students, 2 for full primary school students, and 3 in intermediates).

Some of the information from this list reflects different curriculum emphases in different schools: for example, Māori was more likely to be taught by another teacher in decile 1–2 schools (42 percent). Decile 9–10 schools were possibly using information technology more in the day-to-day life of schools, with fewer students at these schools having other teachers for it (20 percent). Decile 1–2 school students were least likely to have other teachers for sport (4 percent).

Teachers who did not take a child for all subjects were just as likely to see the child's mother and father as those who did, indicating that "home" teachers did take responsibility for this liaison. Both groups of home teachers had similar views of their relationship with the student's parents.

Only 5 percent of the students were taught in open-plan spaces, somewhat less than the 10 percent at age 8.

Teachers of the children in the study had an average of 10.9 years' teaching experience, with a range from less than 1 year, to 40 years. Their average number of years in their current school was 4, with a range from less than 1 year, to 33 years. Teachers in decile 9–10 and 3–4 schools had the longest teaching experience on average (12.8 and 13 years respectively), and teachers in decile 3–4 schools the longest experience at their current school (5.7 years on average). Teachers in private schools had longer teaching experience on average (14.9 years, compared with 12.3 years in state integrated schools, and 10 years in state schools), but less experience at their current school (3.4 years on average, compared with 5.1 years for teachers in state integrated schools, and 3.9 years for teachers in state schools).

The proportion of children in the study children's classes that was present most days was at least 75 percent, with an average of 97.07 percent. The lowest figure was in a decile 7–8 school, but different decile classes and those with different ownership had similar patterns of class attendance. Students in intermediate and secondary schools were somewhat more likely to have classes where less than 90 percent of the students were present most days (12 percent compared with 4 percent of those in full primary and composite schools).

Parental support for children's schoolwork

We asked the teachers of the study children to rate the general classroom parental support for their children's schoolwork, on a scale of 1–5 (1= none, 5= fantastic). One student was in a class which was rated as receiving no parental support at all. Two percent were in classrooms rated at the next lowest level, 2, and 24 percent at 3. Sixty-three percent were in classrooms rated 4, and 11 percent in classes given the top rating of 5. The average level of parental support at the classroom level was high, 3.82.

Perceptions of general parental classroom support had some relationship with individual children's mathematics and literacy, but not with their dispositional and social skills. Children who were in classes where the support was rated 3 or less tended to have lower scores than those in classrooms where the support was rated 4 or 5. These associations remained after taking family income into account. They remained for the competencies other than the PAT Reading Comprehension test after taking into account maternal qualification.

Table 132 **Parental support for most children in the class and children's competencies at age 12**

| Class parental support® | Support none or infrequent | Support sometimes | Support very good | Support fantastic | Prob. of F-value from ANOVA | Percent variance accounted for |
|--------------------------------|----------------------------|-------------------|---------------------------|-------------------|-----------------------------|--------------------------------|
| Age-12 competency ⁻ | Mean (n=12) | Mean (n=117) | Mean (n=312) | Mean (n=53) | | |
| Mathematics** | 29.6 | 43.5 | 54.3 | 53.0 | < 0.0001 | 5.7 |
| PAT Reading Comprehension | 43.4 | 48.9 [^] | 55.9 ^{^^^} | 58.4 | 0.002 | 3.0 |
| Writing | 49.9 | 48.8 | 52.3 | 54.0 | 0.003 | 2.8 |
| Reading Age (yrs, mo) | 11.2 | 12.5 [^] | 12.10 | 12.11 | 0.004 | 2.7 |
| Logical Problem-Solving* | 58.9 | 67.6 | 71.6 | 71.4 | 0.0001 | 4.1 |
| Composite Competency* | 59.8 | 63.1 [^] | 67.4^{^^^} | 67.3 | 0.003 | 2.8 |
| Composite Cognitive Competency | 48.4 | 55.7 [^] | 61.3 ^{^^^} | 61.6 | < 0.0001 | 5.3 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^^} Three fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Parental support at the classroom level, as gauged by teachers, was associated with the socio-economic mix of the students in the school.

Table 133 Teacher rating for parental support for most children in their class

| For children in classrooms at | Average on scale of 1–5 | % rated 1–3 |
|-------------------------------|-------------------------|-------------|
| Decile 1–2 schools | 3.3 | 67 |
| Decile 3–4 schools | 3.6 | 39 |
| Decile 5–6 schools | 3.6 | 41 |
| Decile 7–8 schools | 3.8 | 21 |
| Decile 9–10 schools | 4.1 | 10 |

Private school classes had a higher rating for parental support (4.2, compared with 3.9 for state integrated school classes, and 3.7 for state school classes).

Peer support

We asked the teachers of the study children to rate the peer support given by the students in the class to each other, on a scale of 1–5. The average level of peer support was 3.83. Only 9 percent of the children's classrooms were rated 1–2 by the teachers, and 9 percent were rated as fantastic (5) in terms of peer support.

Children whose classes were rated 3 or less for the support children gave each other tended to show lower scores on the dispositional and social competency measures and writing, but not for mathematics and reading. These associations remained after taking into account family income and maternal qualification.

Table 134 Level of peer support for most children in the class and children's competencies at age 12

| Class peer support® | Support none or infrequent | Support sometimes | Support very good | Support fantastic | Prob. of F-value from ANOVA | Percent variance accounted for |
|--|----------------------------|-------------------|---------------------------|-------------------|-----------------------------|--------------------------------|
| Age-12 competency [†] | Mean (n=9) | Mean (n=109) | Mean (n=331) | Mean (n=45) | | |
| Curiosity | <i>51.4</i> | 58.8 | 63.2 | 63.5 | 0.058 | 1.5 |
| Perseverance | 63.2 | <i>62.0</i> | 71.2 | 72.4 | 0.001 | 3.2 |
| Individual Responsibility | <i>61.1</i> | 68.3 | 77.6 | 76.7 | < 0.0001 | 4.7 |
| Social Skills with Peers* | <i>56.2</i> | 67.0 | 72.2 | 73.0 | < 0.0001 | 4.4 |
| Social Skills with Adults* | 74.1 | <i>70.0</i> | 79.0 | 75.7 | < 0.0001 | 4.3 |
| Communication* | <i>62.2</i> | 64.9 | 70.3 | 71.8 | 0.008 | 2.4 |
| Writing | <i>49.2</i> | 49.4 | 52.6 | 50.1 | 0.022 | 1.9 |
| Composite Competency* | <i>60.0</i> | 62.2 | 67.5^{^^^} | 67.3 [^] | 0.0003 | 3.8 |
| Composite Social & Attitudinal Competency* | <i>61.4</i> | 65.2 | 72.2 | 72.2 | < 0.0001 | 4.8 |

* In these cases the squared model was a better fit. ^ One fewer in this mean. ^^^ Three fewer in this mean.
The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Ratings of peer and parental support were unrelated to whether most children in the class came to school every day. The average rate of peer support within the class was not related to school decile, ownership, or type.

Summary

Around 40 percent of the study children were each attending intermediates or full primary schools, with under 10 percent each attending Year 7–15 secondary schools, or composite schools, mostly private. A higher proportion of the children were attending private schools than their peers in the Wellington region. The kind of school attended by children was related to family characteristics. Children whose mothers had no qualification were more likely to be attending intermediates or decile 1 schools; very few of this group attended private schools. There was a similar trend in relation to family income. Māori and Pasifika children were more likely to attend decile 1–2 schools, and Māori children, state schools.

School socio-economic decile

In Section Four, we reported that children who had attended a decile 1–2 school over their schooling years tended to have lower average scores, over and above family income and maternal qualification. We also found lower average scores for children currently attending decile 1–2 schools for mathematics and reading comprehension, over and above family characteristics. Some of this may be due to differences in how the study children in these schools spent their time, with less emphasis on reading, and more on television than others. The teachers of these classes gave estimates of the range of reading age in their class which included both a lower reading age at the bottom end of the range than teachers of classes in higher decile schools gave, and a wider range than most others. Decile 1–2 school classes in the study also had somewhat lower average attendance, a lower average level of parental support, a higher proportion of children whose first language was not English, and had fewer small classes (under 20). However, decile 1–2 parent satisfaction levels were much the same as others.

School ownership

Private school students had higher average scores for writing, after taking family income and maternal qualification into account. There are no clear differences in children's accounts of their time-use, or attitudes to writing, or parental accounts of their relationship with the school which could shed light on why this might be so; however, private school students were more likely to spend 4 hours or more a week on homework.

School type

There were some apparent differences for children's literacy and Logical Problem-Solving levels related to the type of school they were attending. However, there are uneven patterns of distribution of school

types in terms of socio-economic characteristics, with most composite schools falling into the decile 9–10 or no-decile brackets, few intermediates were decile 9–10 schools, and few full primary schools were decile 1–2. Once we took maternal qualification and family income separately into account, these differences were no longer evident.

Classroom characteristics

The average class size of 28 experienced by the Competent Children study children has remained constant from age 8. Classes were lowest in private schools, and highest in intermediate schools. Sixty-seven percent of the children were taught in composite classes, most covering both Year 7 and Year 8.

Only 11 percent of the children now had a single teacher for all their subjects. Almost all the classroom teachers taught their children literacy; mathematics was likely to be taught by another teacher for a third of the children, and science, a quarter. The specialist subjects of technology and music or art were most likely to be taught by another teacher. However, at age 12, children's home class teachers saw the children's parents just as often if they did not teach the child all their subjects, and if they did.

The general level of parental support for the schoolwork of the children in the class was given a high average rating (3.82/5). There were some associations with the general level of parental support in a classroom and mathematics and the literacy measures other than the PAT Reading Comprehension test. Levels of parental support were related to the school socio-economic decile, and ownership.

The general level of peer support in the study children's classrooms was also high (3.83/5). Children who were in classrooms with low ratings for peer support had lower average scores for the social and attitudinal competencies and writing after taking family income and maternal qualification into account. Levels of peer support were unrelated to school characteristics.

Year level

At age 12, 53 percent of the study children were in Year 7, and 47 percent in Year 8. Students in Year 8 had slightly higher scores on average for the Burt Word Reading test, writing, and reading age only.

School experiences – children’s and parents’ perspectives

Children’s attitudes to school at age 12

Most children enjoyed school, according to their parents’ report: 75 percent, slightly up on ages 10 and 8, and higher than at age 6 (62 percent). Eleven percent were described as being matter of fact and simply accepting school attendance as part of their daily routine, and 6 percent had mixed feelings, sometimes enthusiastic, sometimes not. Four percent of the children were unhappy with school, and another 3 percent had taken a while to settle but were now enjoying themselves. One percent were bored. Children from very high-income homes were least likely to be unhappy about school, or have mixed feelings about it (5 percent, rising to 17 percent of children in low-income homes). A slightly higher proportion of girls were thought to enjoy or be enthusiastic about school (80 percent compared with 71 percent of boys).

Parental reports of children’s current attitudes to school were linked to their achievement levels. On the whole, children who were bored or unhappy had lower average scores. Children who enjoyed school, or had taken a while to settle, tended to have higher scores on average. Scores were most variable for the group which had taken a while to settle to school.

These patterns remained after taking family income and maternal qualification into account for most, but not all the competencies. The contrasts were no longer significant for mathematics in taking maternal qualification into account, largely because differences in children’s responses to school were related to their mother’s final educational level. For example, 17 percent of those whose mothers had no qualification were either bored, unhappy, or had mixed feelings about school, compared with 4 percent of those whose mothers had a university qualification.

Table 135 Student's current response to school and competencies at age 12

| Student's current response to school® | Enjoys | Routine | While to settle | Bored or unhappy | Mixed | Prob. of F-value from ANOVA | Percent variance accounted for |
|--|-----------------------------|-------------|-----------------|------------------|-------------|-----------------------------|--------------------------------|
| Age-12 competency ^ˉ | Mean (n=372) | Mean (n=54) | Mean (n=15) | Mean (n=25) | Mean (n=30) | | |
| Curiosity | 63.3 [^] | 63.5 | <i>51.7</i> | 52.8 | 56.5 | 0.005 | 3.0 |
| Perseverance | 71.2[^] | 66.9 | 70.8 | <i>48.8</i> | 63.8 | < 0.0001 | 5.5 |
| Individual Responsibility | 76.7 [^] | 72.5 | 78.3 | <i>64.6</i> | 67.7 | 0.004 | 3.1 |
| Social Skills with Peers* | 72.3[^] | 68.4 | 70.7 | <i>61.1</i> | 65.3 | 0.0003 | 4.2 |
| Social Skills with Adults | 78.5[^] | 72.7 | <i>67.2</i> | 71.0 | 69.7 | 0.001 | 3.6 |
| Communication* | 71.0[^] | 67.4 | 62.2 | 60.2 | <i>59.1</i> | 0.0002 | 4.4 |
| Mathematics** | 52.1 | 47.8 | 61.7 | <i>39.4</i> | 46.5 | 0.025 | 2.2 |
| PAT Reading Comprehension | 55.7 ^{ˆˆˆˆˆ} | 50.9 | 59.6 | <i>42.3</i> | 50.6 | 0.011 | 2.6 |
| Burt Word Reading* | 77.8 | 76.6 | 79.2 | <i>65.7</i> | 74.9 | 0.004 | 3.1 |
| Writing | 52.6 | 50.5 | 50.1 | <i>45.7</i> | 47.9 | 0.003 | 3.2 |
| Reading Age (yrs, mo) | 12.10^{ˆˆ} | 12.7 | 12.9 | <i>11.11</i> | 12.2 | 0.049 | 1.9 |
| Composite Competency* | 67.6^{ˆˆˆˆˆ} | 64.3 | 65.4 | <i>56.2</i> | 60.8 | < 0.0001 | 5.5 |
| Composite Cognitive Competency | 60.7^{ˆˆˆˆˆ} | 57.9 | 63.4 | <i>51.0</i> | 56.5 | 0.002 | 3.5 |
| Composite Social & Attitudinal Competency* | 72.2[^] | 68.6 | 66.8 | 59.7 | 63.7 | < 0.0001 | 5.0 |

* In these cases the squared model was a better fit.

* In this case the square-root model was a better fit.

[^] One fewer in this mean. ^{ˆˆ} Two fewer in this mean. ^{ˆˆˆˆ} Four fewer in this mean. ^{ˆˆˆˆˆ} Five fewer in this mean. The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

At age 10 we found marked associations between children's initial response to starting their school career, at age 5, and their competency levels: children who showed initial enthusiasm or who were unhappy tended to have the highest average scores. Our interpretation was that it was likely that overt unhappiness was often able to be responded to by teachers and parents. Two years later, we found only a significant association with Communication, and an indicative one with Reading Age, with children who had taken a while to settle when they first started school showing lower average scores. This is consistent with the earlier conclusion that it was these children, and those who had shown a matter of fact (neutral) attitude who also warranted adult attention in the early days of school.

Does liking the teacher matter?

Most of the study children were reported by their parents to like their teacher (77 percent). Sixteen percent of the children had mixed views about their current teacher, and 7 percent did not like their teacher. Boys were more likely to have mixed feelings about their current teacher/s (21 percent compared with 11 percent of girls), and were more likely to have had teachers previously that they did not like (49 percent compared with 37 percent of girls). There were no differences linked to family characteristics of income, maternal qualification, or ethnicity.

It was reasonably common for children to strike at least one teacher that they did not like in their school career: 43 percent of the children had done so, and a further 14 percent had had some teachers they had

mixed views about. Forty-three percent of the children had liked all their teachers, according to their parents. Again, there were no differences related to family characteristics.

Children who did not like their current teacher were somewhat more likely to have had teachers previously whom they did not like (68 percent compared with 41 percent of those who liked their current teacher).

The good news for those concerned about personal differences that emerge between individual students and individual teachers is that children's views about their current teacher do not seem to affect their mathematics, literacy, Logical Problem-Solving, or curiosity. But children are picking up something in that relationship that is reflected in teacher ratings of their dispositions and social skills.

The patterns below remained after taking family income and maternal qualification into account. The 3 groups were all distinct: average scores were highest for the children who liked their teacher, followed by those who had qualified views, and then by those who disliked their teacher.

Table 136 Student's attitude to current teacher and children's competency scores

| Student's attitude to current teacher® | Does not like teacher | Likes teacher | Qualified "yes" to liking the teacher | Prob. of F-value from ANOVA | Percent variance accounted for |
|--|-----------------------|-----------------------------|---------------------------------------|-----------------------------|--------------------------------|
| | Mean (n=34) | Mean (n=382) | Mean (n=80) | | |
| Age-12 competency ⁻ | | | | | |
| Perseverance | 56.6 | 71.8 [^] | 61.5 | < 0.0001 | 5.4 |
| Individual Responsibility | 61.9 | 78.0 [^] | 67.4 | < 0.0001 | 7.2 |
| Social Skills with Peers* | 63.7 | 72.8 [^] | 64.7 | < 0.0001 | 6.0 |
| Social Skills with Adults* | 64.5 | 78.7 [^] | 71.7 | < 0.0001 | 5.5 |
| Communication* | 59.9 | 70.5 [^] | 66.2 | 0.0004 | 3.1 |
| Composite Competency* | 58.8 | 67.6 ^{^^^^} | 62.4 | < 0.0001 | 5.5 |
| Composite Social & Attitudinal Competency* | 60.9 | 72.5 [^] | 65.1 | < 0.0001 | 6.6 |

* In these cases the squared model was a better fit. ^ One fewer in this mean. ^^^^^ Five fewer in this mean.
The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

It is hard to know with the data we have whether children are responding to how they perceive the teacher to perceive them, or whether it is existing levels of these dispositions and social skills which teachers are responding to, and may be seeking to change.

We analysed parents' reports of whether the child had had any teachers s/he did not like. We found some similar trends, with differences for Perseverance, Individual Responsibility, and Social Skills with Peers, and an indicative difference for Social Skills with Adults. There were also some interactions. While children from low-income homes had lower reading scores if they also had mixed views about their previous teachers, the same was not true for their peers from middle or high-income homes. Interestingly, there was no interaction with maternal qualification levels. There was a similar trend with regard to Reading Age. However, there do not seem to be large negative effects for children's mathematics and literacy scores related to their liking of their teachers (though our question may have been too general).

Children's views of their school experience at age 12

Overall, the children were positive about their experiences of school: most usually enjoyed themselves, they felt teachers helped them, and they had good friends. But just over half said they usually did interesting things at school, liked their teachers, and that they learnt most things pretty quickly.

Table 137 Children's views of their experience at school⁵⁰

| Frequency ® | Usually | Occasionally | Rarely/ Never |
|--|---------|--------------|------------------|
| School is a place where: | % | % | % |
| I have good friends | 93 | 6 | 1 |
| Teachers help me do my best* | 82 | 17 | 1 |
| I learn what I need for my future* | 77 | 21 | 3 |
| I enjoy myself | 76 | 22 | 2 |
| Teachers treat me fairly in class* | 73 | 25 | 2 |
| My teacher tells me when I do good work* | 73 | 25 | 1 |
| Rules are fair (n) | 70 | 28 | 2 |
| Teachers listen to what I say* | 69 | 28 | 2 |
| I get all the help I need* | 68 | 31 | 1 |
| I keep out of trouble | 61 | 36 | 3 |
| I like my teachers (n) | 58 | 37 | 5 |
| I learn most things pretty quickly* | 58 | 39 | 3 |
| My marks reflect my ability (n) | 56 | 38 | 5 |
| I do interesting things* | 55 | 42 | 3 |
| I could do better work if I tried | 31 | 55 | 14 |
| Rules are respected by everyone (n) | 29 | 62 | 9 |
| I get bored | 12 | 55 | 33 |
| I get tired of trying | 9 | 51 | 40 |
| I feel restless | 8 | 51 | 41 |
| I get a hard time | 3 | 27 | 70 |
| I get bullied | 2 | 15 | 83 |
| I feel lonely | 2 | 18 | 80 |
| I feel sad | 1 | 18 | 80 |
| I get upset | 1 | 26 | 73 |

(n) = new item.

* = notable difference from responses at age10.

The responses from the children at age 12 show some differences from their responses at age 10. We changed the scale between age 10 and age 12, so the comparisons cannot be exact. A comparison of the "sometimes" and "never" answers at age 10 with the "occasionally" and "rarely/never" answers at age 12 must therefore be given with some caution, and only large differences (around one and a half or double the proportion at age 10) are noted here, in the items starred. There does seem to have been an increase in

⁵⁰ These items are based on the *Quality of school life* inventory, which covers relations with teachers, enjoyment of and engagement with school work, and relations with peers. This inventory was developed by the Australian Council for Educational Research, and used in their Longitudinal Studies of Australian Youth (e.g. Marks, 1998), with selected items used in International Education Association (IEA) studies, including New Zealand, and by Nash and Harker (1994) in their *Progress at School* study. We chose items appropriate for the age group, which appeared to have more weight than others in the available analyses.

the proportions of those who are less positive about their school experience between the 2 years, largely in terms of their interaction with teachers and doing interesting things, rather than in terms of emotional responses to the classroom, and relations with peers.

The widest differences were seen in relation to students' academic performance. For many items, there was a gradient from those seen by their teachers to be performing at a very low or below average level, to those performing at a very good/excellent level. The students whom teachers judged to be performing below average overall tended to be less positive about their classroom experiences, particularly for feeling they did interesting things, that teachers helped them do their best, being treated fairly in class, getting a hard time, and being told by their teacher that they had done good work, being listened to by teachers, getting all the help they need, getting tired of trying, and feeling restless. They were more likely to say they were bullied. However, they were just as likely to like their teacher.

Children's responses to many of these questions were related to whether they liked their current teacher. But liking the teacher was not linked to reports of friendship, bullying, loneliness, sadness, or being upset, or to views that they could do better work if they tried or learnt most things pretty quickly, and that the class rules were respected.

Disliking any previous teacher did not appear to influence children's current responses to their classroom: there were no associations found. However, we did not ask how many of the children's previous teachers were disliked, and possibly some analysis using the proportion of teachers who were disliked might have shown some associations.

Boys were somewhat less positive than girls about their experiences at school. They were less likely to say they usually:

- did interesting things (50 percent compared with 61 percent of girls);
- were treated fairly in class (69 percent compared with 78 percent of girls); and
- kept out of trouble (53 percent compared with 70 percent of girls).

Boys were more likely to think they could usually do better work if they tried (36 percent compared with 27 percent of girls), and 34 percent said they were rarely or never tired of trying, compared with 46 percent of the girls. Eleven percent said they usually felt restless at school, compared with 4 percent of the girls.

There were only a few individual items where school characteristics were associated with differences in student responses: in other words, differences in school characteristics do not mean that there are distinct types of schools in which students will have quite different experiences. Because there are only a few, it is likely that some differences found are more to do with this particular sample, and may not be found in similar studies; others are consistent with other findings in this study.

Study children who were in composite schools were more likely to say they were only rarely or never given a hard time (88 percent).

Belief that a student could usually do better work if he or she tried was related to school decile, rising from 22 percent of the students in decile 9–10 schools, to 47 percent of those in decile 1–2 schools.

There were no family income associations, and only a few associations with ethnicity: Māori students were more likely to think they could do better work if they tried (50 percent compared with 27 percent of Pākehā/European) and Pākehā/European students were more likely to report that they usually kept out of trouble (64 percent compared with Māori, 46 percent)

There were some associations with maternal qualification. The feeling that teachers usually treated a student fairly in class rose with levels of maternal qualification from 64 percent of those whose mother had no qualification to 80 percent of those whose mother had a university qualification. There was a similar trend with reporting that the student usually kept out of trouble, rising from 43 percent of those whose mother had no qualification, to 75 percent of those whose mother had a university qualification, and with feeling that the student's marks usually reflected his or her ability, rising from 43 percent of those whose mother had no qualification, to 65 percent of those whose mother had a university qualification. There was a reverse trend for feeling that the student could usually do better work if they tried, rising from 20 percent of the students whose mother had a university qualification, to 42 percent of those whose mother had no qualification. Those whose mother had a university qualification were most confident that they usually learnt most things pretty quickly: 81 percent (compared with 58 percent overall).

We undertook a factor analysis of the children's responses to these items to reduce them for analysis purposes in relation to the research question which is answered at the end of this section. This produced 2 factors with alpha values of 0.81 and 0.74 respectively (the other factors had much lower alpha values, or the variables loaded singly onto a factor).

The first draws together experiences of enjoyment, support, fairness, and belief in the value of the work of school.

Engagement in school – children's answers to the items about school being a place where:

- I get all the help I need
- Teachers are fair
- Teachers listen to what I say
- I enjoy myself
- Teachers help me do my best
- The rules are fair
- I like the teachers
- I do interesting things
- Teachers tell me when I do good work
- I learn what I need for the future
- I get bored [reversed].

The second factor signals *distress*:

- I am upset
- I am lonely
- I am sad.

We cross-tabulated the children's scores on these factors with 4 key aspects of children's lives which are linked to their performance at age 12: enjoyment of reading, hours spent watching television, maternal qualification, and school socio-economic decile. We found that the higher a child's score was on the *Engagement in school* factor, the more likely they were to enjoy reading (72 percent of those who usually engaged in school, decreasing to 43 percent of those who rarely engaged in school), and to watch less than 2 hours television a day (64 percent, decreasing to 48 percent of those who rarely engaged in school). Though the proportion of those who were usually engaged in school was related to levels of maternal qualification (ranging from 43 percent of the children whose mothers had a university qualification to 22 percent of those whose mothers had no qualification), the proportions of those who only rarely or occasionally engaged with school were unrelated to maternal qualification levels. Student engagement in school-levels were much the same across all the school deciles. Distress at school does not show similar associations. Taken together, this would suggest that children's own confidence in the kinds of skills practised at school – particularly the key role of literacy both in itself and as a key to knowledge and understanding – plays an important role in their engagement in school.

Children's views of their classroom experiences and competency levels

We found that children's views of their classroom experiences were often associated with their competency levels at age 10. The items that then showed associations with most competencies after taking into account family income and maternal qualification were to do with fair treatment, having interesting work, and keeping out of trouble. The items which showed least association were to do with peer relations (or lack of them).

At age 12, we found that after taking into account family income and maternal qualification, the items fell into 4 groups: those that showed an association with 11 or 12 of the 12 competency measures, those that showed an association with between 8–10, those that showed associations with 4–7, and those that showed no or few associations. This is a different pattern from the set of items asked about home experiences, which fell into 2 groups.

The items which showed widespread associations with the competency measures (11 or 12 of the 12) were:

- I keep out of trouble
- I could do better work if I tried
- I get tired of trying
- I get bored
- The rules are fair, and
- I learn most things pretty quickly.

These items are mostly about the actual work of school, and either alienation from it – it holds no attraction or experience of success – or ability to identify with its structure (fair rules) and what it offers.

The next group shows associations with around two-thirds of the 12 competency measures. These items were:

- I do interesting things
- The teacher helps me do my best
- Teachers treat me fairly in class
- My teacher tells me when I do good work
- I get a hard time in school
- I feel restless
- I get bullied
- My marks reflect my ability.

This group has more items focused on the student's interaction with their teacher, with some items relating to peer relations, and some on the student's engagement with the work of learning and achieving.

The third group shows associations with a third to a half of the competency measures:

- I feel lonely at school
- I learn what I need for my future
- I like my teachers
- Teachers listen to what I say
- I have good friends at school
- I enjoy myself
- I get all the help I need.

This set of items is also mixed, with somewhat more of a focus on the tone of relationships with teachers and peers.

The final group of 2 shows few or no associations with the 12 competency measures:

- I feel sad at school – no associations
- The rules are respected by everyone.

We report next the specific associations found for each of these items. Most of the contrasts were between the average scores of children who rated their experience as “usually”, and those who rated their experience as “occasionally” or “rarely-never”. In the lists that follow, the starred associations are those where the percentage points difference was 10 or more on average, or, for Reading Age, more than the equivalent of a year.

Items with universal associations

I could do better work if I tried

Children who reported they rarely/never, or occasionally could do better work if they tried had higher average scores than those who said they could usually do better work if they tried.

*Mathematics**, *PAT Reading Comprehension test**, *Burt Word Reading test*, *Writing*, *Reading Age*, *Logical Problem-Solving*, *Curiosity*, *Perseverance**, *Individual Responsibility*, *Social Skills with Peers*, *Social Skills with Adults*, and *Communication*.

I keep out of trouble

Children who said they usually kept out of trouble had higher average scores than those who said they did so occasionally, or rarely/never.

Mathematics, PAT Reading Comprehension test*, Burt Word Reading test*, Writing, Reading Age*, Logical Problem-Solving, Curiosity, Perseverance*, Individual Responsibility*, Social Skills with Peers, Social Skills with Adults, and Communication.*

The rules are fair

Children who thought that the school rules were usually fair had higher average scores than those who thought they were only occasionally, or rarely/never fair.

Mathematics, PAT Reading Comprehension test, Burt Word Reading test, Writing, Reading Age, Logical Problem-Solving, Curiosity, Perseverance*, Individual Responsibility*, Social Skills with Peers*, Social Skills with Adults*, and Communication*.*

I learn most things pretty quickly

Children who thought they usually learnt most things pretty quickly had higher average marks than those who thought they did so only occasionally, or rarely/never.

Mathematics, PAT Reading Comprehension test*, Burt Word Reading test*, Writing, Reading Age, Logical Problem-Solving, Curiosity*, Perseverance, Individual Responsibility, Social Skills with Peers, Social Skills with Adults, and Communication*.*

I get tired of trying

Children who reported that they rarely or never got tired of trying had higher average marks than those who reported usually or occasionally getting tired of trying; for the cognitive competencies, those who reported occasionally getting tired of trying had higher average marks than those who reported getting often tired of trying.

Mathematics, PAT Reading Comprehension test, Burt Word Reading test, Reading Age, Logical Problem-Solving, Curiosity, Perseverance*, Individual Responsibility, Social Skills with Peers, Social Skills with Adults, and Communication.*

I get bored

Children who said they usually got bored had lower average marks than those who said they occasionally or rarely/never got bored.

Mathematics, PAT Reading Comprehension test, Burt Word Reading test, Writing, Reading Age*, Curiosity, Perseverance*, Individual Responsibility*, Social Skills with Peers*, Social Skills with Adults*, and Communication*.*

Items with many associations

I do interesting things

Children who said they usually did interesting things at school had higher average scores than those who said they did them occasionally or rarely/never for the social and attitudinal competencies, and for three of the 4 literacy measures.

PAT Reading Comprehension test, Writing, Reading Age, Curiosity, Perseverance, Individual Responsibility*, Social Skills with Peers*, Social Skills with Adults*, and Communication*.*

I feel restless

Children who reported that they usually felt restless at school had lower average marks than those who felt restless occasionally or rarely/never for the social and attitudinal competencies, mathematics, and 3 of the 4 literacy measures.

Mathematics, PAT Reading Comprehension test*, Writing, Reading Age, Curiosity, Perseverance*, Individual Responsibility*, Social Skills with Peers, Social Skills with Adults, and Communication*.*

My marks reflect my ability

Children who thought the marks they received for their work usually reflected their ability had higher scores than those who thought their marks only occasionally did so, for social and attitudinal competency measures, mathematics, and the 4 literacy measures.

Mathematics, PAT Reading Comprehension test, Burt Word Reading test, Writing, Reading Age, Perseverance, Individual Responsibility, Social Skills with Adults, and Communication.

Teachers help me to do my best

Children who thought their teachers usually helped them do their best had higher average scores than others for the social and attitudinal competencies, and all 4 literacy measures.

PAT Reading Comprehension test, Burt Word Reading test, Writing, Reading Age, Perseverance, Individual Responsibility*, Social Skills with Peers, Social Skills with Adults*, and Communication*.*

Teachers treat me fairly in the classroom

Children who felt they were usually treated fairly by their teachers had higher average scores for the social and attitudinal competency measures, mathematics, and 2 of the literacy measures.

Mathematics, Writing, Reading Age, Perseverance, Individual Responsibility*, Social Skills with Peers, Social Skills with Adults*, and Communication.*

I enjoy myself

Children who usually enjoyed themselves had higher average marks than those who said they occasionally or rarely/never did so for the social and attitudinal competency measures, and 1 literacy measure.

Burt Word Reading test, Curiosity, Perseverance, Individual Responsibility, Social Skills with Peers, Social Skills with Adults*, and Communication.*

I get all the help I need

Children who thought they usually got all the help they needed had higher average marks than those who thought they got it occasionally or rarely/never for the social and attitudinal competencies, and 2 of the literacy measures.

Writing, Reading Age, Curiosity, Perseverance, Individual Responsibility*, Social Skills with Peers*, Social Skills with Adults*, and Communication*.*

Teachers tell me when I do good work

Children whose teacher usually told them when they were doing good work had higher average scores than those who heard this from their teacher only occasionally, or rarely/never for the social and attitudinal competencies, and 1 of the literacy measures.

Reading Age, Curiosity, Perseverance, Individual Responsibility, Social Skills with Peers, Social Skills with Adults, and Communication*.*

I get bullied

Children who said they were rarely/never bullied at school had higher average scores than those who said they were occasionally or usually bullied for the social and attitudinal competencies, and the four literacy measures.

PAT Reading Comprehension test, Burt Word Reading test, Writing, Reading Age, Perseverance*, Individual Responsibility, Social Skills with Peers*, and Social Skills with Adults*.*

I get a hard time in school

Children who felt they rarely/never got a hard time in school had higher average scores than those who thought they occasionally did for the social and attitudinal competency measures, and 3 of the literacy measures.

PAT Reading Comprehension test, Burt Word Reading test, Reading Age, Curiosity, Perseverance, Individual Responsibility, Social Skills with Peers, Social Skills with Adults, and Communication.*

Items with some associations

I have good friends at school

Children who thought they usually had good friends had higher average marks than those who thought they had them occasionally or rarely/never for social and attitudinal competencies.

Perseverance, Individual Responsibility*, Social Skills with Peers*, Social Skills with Adults*, and Communication*.*

I like my teachers

Children who usually liked their teachers had higher average marks than those who liked them only occasionally, or rarely/never, for 5 of the social and attitudinal competency measures.

*Perseverance**, *Individual Responsibility**, *Social Skills with Peers**, *Social Skills with Adults**, and *Communication**.

Teachers listen to what I say

Children who thought their teachers usually listened to what they had to say had higher average scores than those who thought they listened only occasionally, or rarely/never, for 4 social and attitudinal competency measures, and 1 literacy measure.

Reading Age, *Perseverance*, *Individual Responsibility*, *Social Skills with Peers*, and *Social Skills with Adults**.

I learn what I need for my future

Children who thought they were usually learning what they needed for their future had higher average marks than those who thought they did so occasionally or rarely/never for some of the social and attitudinal competency measures.

Perseverance, *Individual Responsibility**, *Social Skills with Peers**, and *Social Skills with Adults**.

I feel lonely

Children who usually felt lonely at school had lower average marks than those who felt lonely only occasionally, or rarely/never, for 2 of the social and attitudinal competencies, and 2 of the 4 literacy measures.

Perseverance, *Social Skills with Peers**, *PAT Reading Comprehension test**, and *Writing*.

Items with few associations

The rules are respected by everyone

Children who thought their school rules were rarely/never respected by everyone had lower average marks than those who thought they usually or occasionally were for 2 competency measures.

*Social Skills with Peers**, and *Writing*.

Children's perceptions of their classrooms

As at ages 8 and 10, we also asked the study children to use the *My Class Inventory (MCI)* to give us their perceptions of the difficulty of the work they were given, their general enjoyment (satisfaction), the degree of competitiveness between students, friction between children, and friendliness between children (cohesion).

The next table gives the age-12 responses, and compares them with the study children's responses at ages 8 and 10. On the whole, enjoyment (satisfaction) levels are lower in the study children's classrooms at age 12 (as they perceive them), but so also are levels of the difficulty of the work they are given, and competition. Levels of both cohesion and friction were highest when the children were aged 8. There has been some further differentiation among classroom peers in terms of friendship since age 10.

Table 138 Children’s perceptions of their classroom at age 8, 10, and 12

| | Age 8 (n=522) % | Age 10 (n=507) % | Age 12 (n=496) % |
|---|-----------------------|------------------------|------------------------|
| <i>Satisfaction – subscale average</i> | 11.89 | 11.49 | 9.26 |
| Students enjoy their work in my class | 85 | 64 | 39 |
| Some students are not happy in my class® | 71 | 62 | 56 |
| Students seem to like my class | 90 | 82 | 62 |
| Some students don’t like my class® | 52 | 52 | 52 |
| My class is fun | 94 | 85 | 63 |
| <i>Friction – subscale average</i> | 11.31 | 9.30 | 10.86 |
| Students are always fighting with each other | 34 | 16 | 13 |
| Some of the students in class are mean | 69 | 61 | 47 |
| Many children in our class like to fight | 32 | 26 | 21 |
| Certain students always want to have their own way | 74 | 78 | 72 |
| Students in my class fight a lot | 35 | 19 | 15 |
| <i>Competitiveness – subscale average</i> | 11.31 | 11.87 | 9.07 |
| Students often race to see who can finish first | 51 | 55 | 42 |
| Most students want their work to be better than their friend’s work | 48 | 51 | 34 |
| Some students feel bad when they do not do as well as the others | 72 | 71 | 55 |
| Some students always try to do their work better than the others | 69 | 74 | 62 |
| A few students in my class want to be first all of the time | 75 | 78 | 59 |
| <i>Difficulty of work – subscale average</i> | 7.92 | 7.25 | 13.03 |
| In my class the work is hard to do | 50 | 57 | 14 |
| Most students can do their work without help® | 84 | 75 | 71 |
| Only the smart students can do their work | 29 | 9 | 5 |
| Schoolwork is hard to do | 43 | 28 | 14 |
| Most of the students in my class know how to do their work® | 92 | 89 | 85 |
| <i>Cohesiveness – subscale average</i> | 10.10 | 9.07 | 11.31 |
| In my class everybody is my friend | 38 | 31 | 26 |
| Some people in my class are not my friends® | 78 | 78 | 73 |
| All students in my class are close friends | 67 | 40 | 21 |
| All the students in my class like one another | 49 | 32 | 23 |
| Students in my class like each other as friends | 80 | 66 | 50 |

® = reverse scored for subscale means.

At ages 8 and 10 we found few differences in school or family characteristics with the items, and few or inconsistent associations with the subscales of satisfaction, friction, or competitiveness. There were some associations with the difficulty and cohesiveness subscales, but we have similar items in the children’s ratings of their own experiences at school, with which this section began. For these reasons, we decided not to undertake further analysis of the Inventory responses at age 12.

Children's responses to difficulty in their work

We asked the study children what they would do if they were trying to do a project at school, and found it hard. Their main response was to seek help from their teacher.

Table 139 Children's responses to finding a project hard at age 12

| Activity | At age 12 (n=496) % |
|---------------------------|---------------------------|
| Request help from teacher | 75 |
| Request help from peer | 32 |
| Persist | 10 |
| Ask parent | 10 |

Also mentioned were look up results in textbook (2 percent), choose another project to do, give up/go off task/wait for teacher/don't know, and don't find anything hard (1 percent each).

As a further indication of their problem-solving skills at school, and the degree to which they felt able to find information independently, we asked them what they would do if they were trying to find a book in the school library and it was hard to find. Again, the teacher or librarian is the first port of call for many students, though a substantial minority also felt confident to find a book by using the library catalogue.

Table 140 Responses to difficulty in finding a book in the school library

| Activity | At age 12 (n=496) % |
|---|---------------------------|
| Request help from teacher/librarian | 64 |
| Use catalogue/library retrieval system | 37 |
| Request help from peer | 11 |
| Pick another book from shelves not seen | 3 |

Also mentioned were persist (2 percent), and try and find a different book, give up/wait for teacher, have no trouble finding books, and other (1 percent each).

Few students did nothing or gave up when faced with the 2 situations we posed them.

Maternal qualification levels made little difference to children's reactions, other than that children whose parents had a tertiary or university qualification were somewhat more likely to ask their parents if they were stuck with a project (13 percent compared with 7 percent of those whose mother had a school or no qualification), and children whose mothers had a university qualification were more likely to seek help from the teacher or librarian if they could not find a book (77 percent compared with 62 percent of others). There were no income-related differences.

If they found a project hard to do, girls were more likely to request help from their teacher (80 percent compared with 69 percent of boys), or from a peer (37 percent compared with 28 percent of boys). Boys

were marginally more likely to persist (12 percent compared with 7 percent, $p = 0.06$). Girls were also more likely to request help from a teacher or librarian if they couldn't find a book in the library (70 percent compared with 59 percent of boys), or from a peer (15 percent compared with 8 percent of boys).

Homework

Children's views

Most of the study children did homework at least 2 days a week: 57 percent said they did homework on 4 or 5 days, and 32 percent, on 2 or 3 days each week. Nine percent said they did homework on one day a week, and 1 percent said they never did homework. There was an association with level of maternal qualification: 49 percent of the children whose mothers had no qualification said they did homework on 4–5 days a week, rising to 64 percent of those whose mothers had a university qualification.

The study children's estimates of the number of hours they spent on homework each week at age 12 ranged from half an hour (3 percent) to 20 hours (1 child), with an average of 3.31 hours (s.d. 2.28). Girls' average time spent on homework was 3.51 hours, slightly more than the average for the boys in the study, 3.11 hours. Pasifika and Pākehā/European children reported the highest average time spent on homework each week: 3.48 and 3.32 hours respectively, compared with 2.88 for Asian children, and 2.71 for Māori children in the study.

Children whose mothers had no qualification reported a lower average amount of time spent on homework, 2.49 hours a week. Children from the highest-income homes had a slightly higher average time spent on homework, 3.67 hours a week.

We found that time spent on homework was associated with all of the competency measures. However, the contrast was between those who did homework for less than an hour a week, and those who did homework for an hour or more, with no significant differences between children spending different amounts of time above that. Allowing for family income and maternal qualification did reduce some of these associations to an indicative level, but the associations with the cognitive competencies remained significant. The difference between those who did homework for less than an hour a week and others for the Composite Cognitive Competency after allowing for maternal qualification was between 6–8 percentage points.

The average number of hours spent on homework reflected how often children did it. The average time spent on homework by those who only did it once a week was 1.83 hours (s.d. 1.61), for those who did it 2–3 days a week, 2.65 hours (s.d. 2.53), and for those who did it 4–5 days a week, 3.9 hours (s.d. 2.53).

Views of how important homework is were also reflected in the time children gave it: an average of 3.59 hours (s.d. 2.1) for those who thought it was very important, 3.11 (s.d. 2.08) for those who thought it mattered, 2.83 (s.d. 1.8) for those who thought it wasn't important, and 2.45 (s.d. 2.13) for those who thought its importance depended on what it was. Not surprisingly, those who didn't like homework did

less of it on average (2.74, s.d. 1.59), than those who liked some of it, or all of it, with little difference between these groups (an average of 3.61, s.d. 2.62 for the former, and 3.51, s.d. 2.29 for the latter).

However, average hours spent on homework were not related to whether children reported difficulty getting it done.⁵¹

Just under half the study children thought it was very important to do homework (49 percent). Thirty-one percent thought homework mattered (but was not very important). Eleven percent thought homework was not important, 5 percent said the importance of homework depended on what it was, and 3 percent were unsure. These views were unrelated to maternal qualification.

Pākehā/European students were less likely to say that doing homework was very important: 45 percent compared with 69 percent of the Māori, Pasifika, and Asian students in the study. However, they were just as likely to say they liked doing homework. Pasifika students were more likely to say they found it hard to get their homework done (48 percent compared with 23 percent overall), with 40 percent saying the reason why was because they found their homework difficult.

Not surprisingly, children who liked doing all of their homework were more likely to see it as very important (71 percent).

Boys were just as likely as girls to think it was very important to do homework, and to say they did not find it hard to get their homework done. However, 41 percent of them did not enjoy doing it, compared with 23 percent of girls. They were more likely to identify the difficulty of homework and not wanting to do it as things that got in the way of their getting their homework done (34 percent compared with 20 percent of girls). Six percent said they forgot to take their work home, compared with 3 percent of the girls. Girls were more likely to identify obstacles to homework as practice of music or performing arts (10 percent compared with 3 percent of boys).

Children's views on the importance of homework showed associations with only the competencies of mathematics and Logical Problem-Solving. However, the contrasts which remained after taking family income and maternal qualification into account were between the small number who said they did not know if homework mattered, who generally scored lower than others. So there were no significant differences between the average scores of children holding different views of the value of homework.

Around two-thirds of the study children liked doing at least some of their homework, including 24 percent who liked doing most or all of what they were given. Thirty-two percent did not like doing homework. These views were also unrelated to maternal qualification. However, not liking homework, or liking only some of it, were related to enjoyment of reading, with 53 percent of those who did not enjoy reading disliking homework, 36 percent of those who had mixed views of reading, and 26 percent of those who enjoyed reading. Enjoyment of working with numbers was also associated with views of homework, with 51 percent of those who did not enjoy working with numbers also disliking homework,

⁵¹ We did not analyse this in terms of their reasons for difficulty.

compared with 29 percent of those who had mixed views about working with numbers, and 26 percent of those who enjoyed working with numbers.

Fifty-eight percent of the study children found some difficulty getting their homework done, 23 percent most of the time. Experience of difficulty was unrelated to how important they thought homework was. The main obstacles to their homework completion were mainly related to their own out-of-school interests, or the difficulty of the work, followed by family obligations.

The reasons they gave were sports (18 percent), the difficulty of the homework (15 percent), not wanting to do it (12 percent), television or friends (10 percent each), siblings (9 percent), music or performing arts, or family social activities or outings (6 percent each), noise (5 percent), a paid job (4 percent), forgetting to take the work home (4 percent), or the computer (3 percent).

Teacher views

According to their teachers, 72 percent of the study children always did their homework, 20 percent did it sometimes, and 7 percent did not do their homework. Girls were more likely to always complete their homework: 83 percent compared with 63 percent of the boys. Sixty-three percent of children from low-income homes always did their homework, compared with 79 percent of children from the highest-income homes. Similarly, 62 percent of the children whose mothers lacked a qualification always did their homework, compared with 83 percent of those whose mothers had a university qualification. There were no ethnic differences.

A higher proportion of children attending decile 1–2 schools did not do their homework (19 percent). This was the only school-related difference.

Homework completion and children's competency scores at age 12

As in previous phases of the Competent Children study, children who always did their homework (on the teacher's report) had higher average scores, and those whose homework varied tended to have higher average scores than those who never completed their homework. This remained the case after we took into account family income and maternal qualification for all but one of the competencies. The association with the PAT Reading Comprehension test was no longer evident when we included family income and maternal qualification, largely because children from low-income homes, or whose mothers had no qualification, were less likely to always complete their homework than others.

Table 141 Homework completion and children’s competencies at age 12

| Homework – teacher view® | Always completed | Completion varies | Never completed | Prob. of F-value from ANOVA | Percent variance accounted for |
|--|---------------------------|-------------------|-----------------|-----------------------------|--------------------------------|
| Age-12 competency ⁻ | Mean (n=358) | Mean (n=98) | Mean (n=37) | | |
| Curiosity | 65.2 | 55.7 | <i>49.0</i> | < 0.0001 | 7.6 |
| Perseverance | 76.4 | 55.2 | <i>35.8</i> | < 0.0001 | 33.4 |
| Individual Responsibility* | 81.5 | 63.0 | <i>46.5</i> | < 0.0001 | 28.3 |
| Social Skills with Peers* | 73.8 | 64.9 | <i>57.4</i> | < 0.0001 | 12.2 |
| Social Skills with Adults* | 80.0 | 70.5 | <i>59.5</i> | < 0.0001 | 11.2 |
| Communication* | 73.3 | 59.6 | <i>53.4</i> | < 0.0001 | 15.1 |
| Mathematics** | 53.6 | 45.3 | <i>40.3</i> | 0.0001 | 3.6 |
| PAT Reading Comprehension | 56.3^{^^^} | 49.4 | <i>47.0</i> | 0.002 | 2.6 |
| Burt Word Reading* | 78.5 | 73.6 | <i>70.2</i> | 0.0005 | 3.0 |
| Writing | 52.9 | 48.7 | <i>46.9</i> | < 0.0001 | 4.3 |
| Reading Age (yrs, mo) | 12.11[^] | 12.1 | <i>11.10</i> | < 0.0001 | 5.4 |
| Logical Problem-Solving* | 71.5 | 68.1 | <i>65.0</i> | 0.0009 | 2.8 |
| Composite Competency* | 69.6^{^^^} | 59.2 | <i>51.5</i> | < 0.0001 | 20.9 |
| Composite Cognitive Competency | 61.4^{^^^} | 55.9 | <i>53.2</i> | < 0.0001 | 4.9 |
| Composite Social & Attitudinal Competency* | 75.0 | 61.5 | <i>50.3</i> | < 0.0001 | 25.6 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^^} Three fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

We cannot tell from our data whether not doing homework reflects existing difficulties with school and subject work, or whether it contributes to those difficulties; the truth is likely to lie somewhere in between, in a dialectical process.

Parents’ views

All but 6 percent of the children got some help with their homework from their parents or someone in the household, as reported by their parents. The main kind of help was general: “as needed” (67 percent). Thirty percent of the parents of the study children said they provided resources, and 29 percent supervised. Thirteen percent mentioned mathematics, 8 percent projects, 3 percent reading, and 1 percent, science. There was no relationship between teacher perceptions of children’s overall progress and whether parents helped them with homework.

While parents were equally likely to help their children with homework, girls were more likely to get help with mathematics homework (17 percent compared with 9 percent of boys).

There were no maternal qualification differences in relation to the kind of help with homework that parents gave their children. Projects or research homework were valued somewhat more where the mother had a tertiary/trades or university qualification (46 percent compared with 33 percent of those where the mother had no qualification or a school qualification).

However, low-income parents were less likely to mention that they supervised their child's homework (16 percent), and more likely to mention help with reading (10 percent compared with 2 percent of very high-income parents). By contrast, 17 percent of the very high-income group mentioned helping their child with maths, declining to 7 percent of the low-income group.

Projects or research were thought to be the kind of homework students got the most value from (41 percent), followed by mathematics (21 percent), with 8 percent also mentioning times-tables. Ten percent mentioned writing, 9 percent reading, and 7 percent spelling. Seven percent mentioned social studies, and 2 percent each science or the arts. Three percent mentioned learning about how to study and meeting deadlines. Four percent thought that none of their children's homework was of any value. Family characteristics did not show any differences in parent views here.

Talking about school at home

We asked the study children who they talked to most about what happened to them at school. Mothers were the most frequently named (77 percent). Twenty-eight percent mentioned their fathers. Siblings were mentioned by 11 percent, and friends by 10 percent. Two percent each mentioned another relative or adult. Four percent said they spoke to no-one about what happened to them at school. Seventy-two percent spoke to just 1 person mostly, but 28 percent spoke to 2 or more. School work was the main thing they spoke about, followed by their social activity at school, and interesting or unusual events.

Girls were more likely to talk to their parents about social activities or friends (53 percent compared with 36 percent of boys), or make negative comments about teachers (9 percent compared with 3 percent of boys). Boys were more likely to talk about sports at school (19 percent compared with 7 percent of girls).

Children from very high-income homes were more likely to talk of social activity or friends (55 percent compared with 38 percent of others), and of unusual or interesting things (45 percent, declining to 24 percent of children from low-income homes). There were no ethnicity-related differences.

Children whose mothers had no qualification were less likely to talk about their school work and achievement (25 percent compared with 40 percent of those whose mothers had a tertiary/trade or university qualification). Children whose mothers had a university qualification were more likely to talk to their parent about interesting or unusual events at school (59 percent).

Table 142 Topics of school children discuss with their family

| Topics ⁻ | Age 12 (n=496) % |
|-----------------------------------|------------------------|
| Work (including achievement) | 60 |
| Social activity | 36 |
| Interesting/unusual events | 34 |
| Sport | 21 |
| Fighting/bullying/social problems | 18 |
| Everything | 14 |
| Only good things | 4 |
| Only if they ask | 4 |

Also mentioned were nothing really/can't think/don't know (2 percent).

Children's views on doing well at school

The study children's views of how they knew how well they were doing at school are much the same for ages 12 and 10, though there has been some increase in the proportion of study children who use a comparison with others in the class to gauge their own performance level, and a slight decrease in those who judge their performance level by the ease of the work they are given.

Table 143 Children's views on progress at school at age 10 and 12⁵²

| I feel I am doing well at school when: | Agree % | |
|---|----------------------|----------------------|
| | At age 10 (n=507) | At age 12 (n=496) |
| I do my very best | 90 | 91 |
| I solve a problem by working hard | 90 | 89 |
| I work really hard | 85 | 88 |
| What I learn makes sense | 84 | 84 |
| My friends and I help each other | 88 | 83 |
| I get a new idea about how things work | 84 | 82 |
| I learn something interesting | 86 | 81 |
| Something I learn makes me think about things | 76 | 76 |
| I have the highest test marks | 64 | 66 |
| I am the only one who can answer questions | 44 | 49 |
| I do not have anything hard to do | 49 | 41 |
| I know more than other people | 37 | 38 |
| I do not have to try hard | 38 | 33 |
| Others get things wrong and I do not | 23 | 32 |

⁵² These items were developed for the age-10 phase after a scan on the research literature on motivation and children's attributions, particularly whether they saw progress in terms of intrinsic motivation and effort, or in terms of extrinsic signs.

Children who were judged by their teachers to be performing at a very good/excellent level for their age group were less likely to judge their own performance by whether they had to try hard: otherwise, there were no differences. This is important: it is not that children whose achievement is lower than others do not get excited by understanding, thinking about things, or getting a new idea about how things work. Boredom and lack of challenge were cited as reasons for dissatisfaction by parents whose child was achieving below the average level, not just those whose child was achieving at the top level.

As with the study children's views of their school experience, there were few associations with school characteristics, other than decile 1–2 students being more likely to associate doing well at school with not having anything hard to do (66 percent).

Pākehā/European and Asian children were less likely to feel they were doing well at school when they had nothing hard to do (39 and 43 percent respectively, compared with 52 percent of Māori children and 68 percent of Pasifika children).

Children whose mothers had no qualification were more likely to feel that they were doing well at school when they had nothing hard to do (54 percent, declining to 34 percent of those whose mothers had a trade/tertiary, or university qualification).

Boys used comparison with others in the class more than girls do to gauge how well they were doing well at school when they were the only one who could answer questions (54 percent compared with 43 percent of the girls), and when they knew more than other people (42 percent compared with 32 percent of the girls).

Relation of children's views of progress and competency levels

As at age 10, we found fewer associations between competency levels and children's views on how they knew if they were doing well at the work of school, than children's reports of their classroom experiences and interactions.

The items which showed most associations at age 10 were: *I feel I am doing well when: I solve a problem; I don't have anything hard to do; I work really hard; something I learn makes me think about things; I have the highest test mark.* These items were consistent with the generally accepted understanding from the motivation and attribution literature that children who see achievement in relation to changes in their own understanding or mastery ("intrinsic" motivation) are more likely to show higher achievement than those who judge their own achievement by comparison with others and "extrinsic" benchmarks such as marks, and achievement in terms of effort rather than ability. Those who agreed that they were doing well when they did not have anything hard to do had lower scores than those who disagreed or were unsure.

At age 12, we found fewer associations between the individual items we asked about to ascertain children's views of their school progress, and their competency levels, once we took family income and maternal qualification into account. The individual items fell into 4 groups: one with only 1 item, showing associations with children's scores on 9 of the 12 competency measures; a second group

showing associations with between a third and a half of the measures, a third group showing associations with less than a quarter of the measures, and a fourth showing only 1 or no associations.

The item which showed most association (with 9 of the competency measures), was *I feel I am doing well when I know more than other people*, when children who said they were unsure about this, or it depended, had higher average scores than those who either agreed or disagreed. This item had associations with:

Mathematics, PAT Reading Comprehension test, Burt Word Reading test, Reading Age, Perseverance*, Individual Responsibility, Social Skills with Peers, Social Skills with Adults, and Communication.

Items showing associations with some competencies

Something I learn makes me think about things

Children who disagreed with this had lower average scores than those who agreed or who said it depended/they were unsure.

*Curiosity**, *Perseverance**, *Individual Responsibility**, *Social Skills with Peers**, and *Social Skills with Adults**.

I get a new idea about how things work

Children who disagreed with this had lower average scores than those who agreed.

*Perseverance**, *Individual Responsibility*, *Social Skills with Peers*, *Social Skills with Adults**, and *Communication**.

Nothing is hard to do

Children who agreed with this had lower average scores than those who disagreed or who said it depended/they were unsure.

Mathematics, *PAT Reading Comprehension test*, *Burt Word Reading test*, *Writing*, *Reading Age*, and *Logical Problem-Solving*.

I solve a problem by working hard

Children who agreed with this had higher average scores than those who disagreed.

Individual Responsibility, *Social Skills with Peers**, *Social Skills with Adults**, and *Communication*.

Items showing associations with few competencies

I work really hard

Children who agreed with this had higher average scores than those who disagreed.

*Perseverance**, *Mathematics**, and *Logical Problem-Solving*.

I don't have to try hard

Children who were not sure or said it depended had higher average marks than those who agreed.

Mathematics, PAT Reading Comprehension test, and writing.

I am the only one who can answer questions

Children who were not sure or said it depended had higher average scores than others.

Burt Word Reading test and writing.

Others get things wrong

Children who were unsure or said it depended had higher average scores than others.

PAT Reading Comprehension test and Burt Word Reading test.

What I learn really makes sense

Children who agreed had higher average scores than those who disagreed.

Communication and Logical Problem-Solving.*

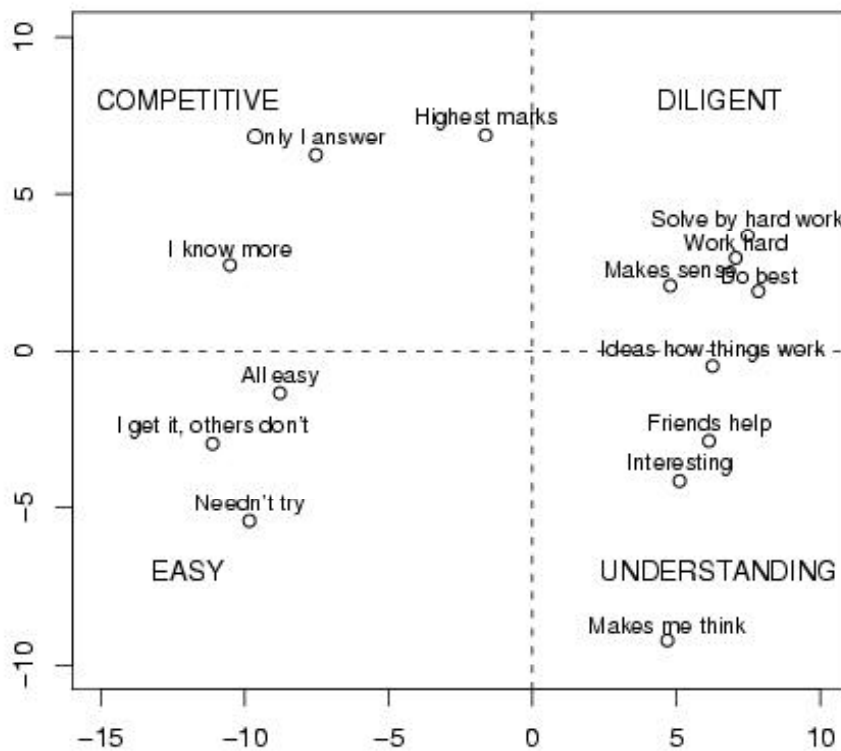
One or no associations

I have the highest test marks, I do my very best, friends help each other, and I learn something interesting.

Results from a multidimensional scale analysis

We moved from individual item analysis to a multidimensional scale analysis of the study children's answers about how they gauged how well they were performing at school to see if the items were grouped in ways which would show some underlying approaches. This analysis yielded the matrix below. The horizontal axis shows a gradient from easy and effortless (on the left), to effort (on the right). The vertical axis is less clear-cut, but seems to show a gradient from external markers of achievement at the top, to more internal markers at the bottom, though none of the quadrants is "pure" with respect to these 2 axes. The fact that there are 2 axes rather than 1, and that the groups are not entirely pure accords with the growing focus in research on motivation and attribution on context- and interest-specific responses from students (Pintrich and Schunk, 1996).

Figure 18 Children's views of progress



The children's views of their learning fell into the 4 groups indicated in the figure:

Easy – in the lower left quadrant, with an emphasis on ease and external markers of achievement.

This group comprised the items: nothing hard to do, others get things wrong, and I don't have to try.

Seventeen percent of the study children agreed with these items, 51 percent had mixed views, and 32 percent disagreed with these items.

Competitive – in the top left quadrant, with an emphasis on external markers of achievement, at a high level. This group comprised the items: the only one able to answer questions, knowing more than the others, and getting the highest test marks.

Thirty-six percent of the study children agreed with these items, 43 percent had mixed views, and 21 percent disagreed with these items.

Diligence – in the top right quadrant, with an emphasis on hard work and largely intrinsic rewards. This group comprised the items: work really hard, do my very best, what I learn makes sense, and I solve a problem by working hard.

Ninety-two percent of the children agreed with these items, 8 percent had mixed views, and none disagreed with all of them.

Understanding – in the bottom right quadrant, with an emphasis on gaining knowledge and understanding. This group comprised the items: when something makes me think, I learn something interesting, I get a new idea of how things work, and friends help each other.

Fifty-two percent of the children agreed with these items, 44 percent had mixed views, and 4 percent disagreed.

We cross-tabulated these 4 views of learning progress against 4 key factors related to children's cognitive competency levels, 2 related to children's activities, 1 related to family resources, and 1 to school resources: children's enjoyment of reading, their current hours spent watching television, maternal qualification, and school socio-economic decile. There were no differences related to children's scores on the *Competitive* or *Understanding* groupings. Children whose mothers had no qualification and those in decile 1–2 schools were more likely to agree with the *Easy* grouping. Children who did not enjoy reading were more likely to disagree with the *Diligent* grouping.

We also cross-tabulated these 4 views with the teachers' overall assessment of the children's learning progress. There were no associations in relation to the *Competitive*, *Understanding* groupings, but there were consistent trends in relation to the *Diligent* grouping, with proportions of children disagreeing with the items in this group twice as high among those making below average progress than among those making very good/excellent progress, and in relation to the *Easy* grouping, with 42 percent of those making very good/excellent progress disagreeing with the items in this group, compared with 16 percent of those making below average progress.

Relation of attitudes to school with earlier competency levels and problem-solving

One of the research questions for the age-14 phase focused on the links between earlier habits and attitudes and the study children's current attitudes to school and their competency levels. It was:

How are children's earlier competency levels in perseverance, communication, and individual responsibility, parent and teacher reports of their dispositions and ability to cope with problems, related to their competency levels at age 12, and their attitudes to school, including motivation and engagement?

We used the 2 factors related to school engagement described earlier in this section, the 4 groups of views of learning described above, and the clusters formed from teachers' current judgment of the children's classroom behaviour (described in the next section) as outcome variables, and age-10 Perseverance, Communication, and Individual Responsibility scores and age-10 parental reports on children's experience of upsets, and how these were coped with, as input variables. We did not use age-10 parental reports of children's happiness, since we had found little association with competency levels, and we did not use age-10 teacher descriptions of children's classroom behaviour, since we would have been increasing the amount of inherent variability in the data by analysing age-10 clusters against age-12 clusters.

We cross-tabulated the age-10 variables with the age-12 variables, and used chi-squared tests for statistical significance, followed by a canonical correlation analysis.

The cross-tabulations showed a few relations between age-10 scores and children's school behaviour and attitudes to progress at age 12.

Children who were in the lower quartiles for Perseverance at age 10 were more likely to:

- feel distressed at school at age 12;
- be in the “steady” and “patchy” clusters of their age-12 teacher views of the classroom behaviour (rather than in the “solid” and “mature with edges” clusters); and
- less likely to see school progress in terms of the easiness of the work.

Children who were in the lower quartiles for Individual Responsibility at age 10 were more likely to:

- be in the “patchy” clusters of age-12 teacher views of classroom behaviour;
- feel less engaged in school; and
- less likely to see school progress in terms of the easiness of the work.

Children who were in the lower quartiles for Communication at age 10 were more likely to:

- be in the “steady” and “patchy” clusters of their age-12 teacher views of the classroom behaviour (rather than in the “solid” and “mature with edges” clusters); and
- to see school progress in terms of the easiness of the work.

The canonical correlation analysis focused only on the age-10 competencies, and the children's attitudes to school and views of progress at age 12. Variables that had low loadings in the canonical variables were excluded. There were 2 pairs of significant canonical variables.⁵³ The figure below gives the first 2 canonical coefficients. The age-10 group of variables account for 84.5 percent of their own variance (they were relatively highly correlated), and 9.8 percent of the age-12 group's variance; the age-12 group of variables account for 36.4 percent of their own variance and 3.1 percent of the age-10 group's variance.

⁵³ Statistically significant, with p -values < 0.0001 and 0.0075, respectively.

Figure 19 **Age 10 dispositions and communication and children’s age 12 attitudes to school**

| | Age-10 variables | | | Age-12 variables | |
|------------------|---|---------|-------------------|-------------------------------------|---------|
| | Standardised canonical coefficients ⁵⁴ | | | Standardised canonical coefficients | |
| | V1 | V2 | | W1 | W2 |
| Perseverance10 | 0.1944 | 1.1876 | School Engage12 | -0.4605 | 0.5921 |
| IndividRespons10 | 0.2164 | -1.6526 | School Distress12 | 0.2447 | 0.3240 |
| Communic10 | 0.6886 | 0.3891 | Compete12 | 0.2667 | -0.4899 |
| | | | Easy12 | 0.5499 | 0.4586 |
| | | | Diligent12 | -0.4240 | -0.2526 |
| | | | Understand12 | 0.2174 | 0.4527 |

The first pair of canonical variables (V1 and W1, with an adjusted canonical correlation of 0.33) shows a correlation between age-10 Communication scores, levels of engagement in school at age 12 and thinking that one is doing well at school when one is diligent (since the latter 2 were scored 1=high, a - sign here indicates a high score), but not when the work is easy. Children who had high scores for age-10 Communication were more likely at age 12 to engage in school, and see their progress in terms of diligence rather than ease.

The second pair of canonical variables (V2 and W2, with an adjusted canonical correlation of 0.18), show a relationship between low Perseverance and Individual Responsibility scores at age 10, and low engagement in school at age 12, and not seeing progress in learning in terms of competition, ease, or understanding.

School mobility

By age 12, only 25 percent of the children remained in the same school they had started in, reflecting the break that comes for most at the end of Year 6. Fifty-one percent were at their second school, and 16 percent at their third school. Thus, most of the study children had attended 3 schools at most. Eight percent had attended 4 or more schools, with the highest being 8 schools.

Children whose mother had no qualification were less likely to have attended only 1 school (18 percent compared with 31 percent of those whose mother had a university qualification), and 10 percent had attended 4 or more schools by age 12 compared with 6 percent for others. Family income levels had no relationship with whether children had attended only one school, but did with whether they had attended 4 or more schools. Nineteen percent of children from low-income homes had attended 4 or more schools, compared with 5 percent of others.

⁵⁴ Canonical coefficients are the loadings for the original variables in making up a new variable, and can take values higher or lower than 1.

Although there is a relationship between individual family resources and school mobility, school socio-economic decile shows some mixed patterns. School stability is greatest for those in decile 9–10 schools (41 percent had attended only 1 school). School stability was also higher for the study children in decile 3–4 schools (27 percent). Yet the highest proportion of study children who had attended 4 or more schools was also found in decile 3–4 schools (14 percent).

We also looked at whether there were different patterns of school mobility in relation to the study children's current school characteristics. We found the greatest stability among the children who were attending a state integrated school: 42 percent had attended only 1 school, compared with 23 percent of those who attended a state school, and 15 percent of those who attended a private school. Twelve percent of the latter had attended 4 or more schools, and 8 percent of those attending a state school at age 12, compared with 4 percent of those attending a state integrated school.

Children's overall current attitudes to school, as parents reported them, were unaffected by how many schools they had attended in their school career, perhaps because views of their current teacher were much the same no matter how many schools they had attended. However, the proportion of children who had had teachers they did not like rose from 38 percent of those who had remained in one school since they started, to 61 percent of those who had changed schools. This could mean that difficulties in teacher-child interaction may be a reason to change schools. This raises the question of the reasons behind school change. If better relationships and a better learning environment can be established in another school, then school mobility *per se* may not be the issue. Parents of those who had changed schools more than 3 or 4 times were just as satisfied with their child's overall progress as those whose children had stayed at one school, or made only a single change.

Parental involvement in the school showed mixed associations with the number of times a child had moved schools. On the one hand, parents of those who had attended 4 or more schools were just as likely as others to have regular talks with their child's teacher, attend parent-teacher interviews, or be a board of trustees' or parents' association member. On the other, it was the parents of children who had spent their entire school life in a single school who were more likely to undertake voluntary work in classrooms, though their overall rates are not high: 14 percent compared with 6 percent of those whose children had shifted school at least once. Other volunteer work around the school was also more likely in this group: 42 percent, decreasing to 21 percent of those whose child had been to 4 or more schools by the time they were aged 12. Eight percent of this group were employed at their child's school, compared with 2 percent of those whose children had shifted school at least once.

There were some relationships between the number of schools attended by children and their competency scores. On the whole, children who had attended a single school tended to have higher average scores than others for reading and writing, and children who had attended 4 schools or more by the age of 12 to have lower than average scores for mathematics. These associations remained after taking into account family income and maternal qualification, though they were somewhat diluted.

Table 144 Number of schools attended and children's competencies at age 12

| Number of schools attended [®] | 1 | 2 | 3 | 4 or more | Prob. of F-value from ANOVA | Percent variance accounted for |
|---|-------------------------|-------------------------|-------------|-------------|-----------------------------|--------------------------------|
| Age-12 competency [̄] | Mean (n=125) | Mean (n=255) | Mean (n=78) | Mean (n=38) | | |
| Curiosity | 65.4 | 61.9 [^] | 60.5 | <i>55.1</i> | 0.026 | 1.9 |
| Social Skills with Peers* | 69.9 | 72.5[^] | 68.6 | <i>67.7</i> | 0.043 | 1.6 |
| Mathematics** | 55.3 | 50.6 | 50.3 | <i>40.3</i> | 0.011 | 2.2 |
| PAT Reading Comprehension | 58.1[^] | 53.9 ^{^^} | 53.0 | <i>47.0</i> | 0.029 | 1.8 |
| Writing | 54.0 | 50.9 | 52.0 | <i>48.1</i> | 0.005 | 2.6 |
| Reading Age (yrs, mo) | 13.2[^] | 12.7 [^] | 12.7 | <i>12.2</i> | 0.003 | 2.9 |
| Logical Problem-Solving* | 72.6 | 69.8 | 69.6 | <i>68.1</i> | 0.058 | 1.5 |
| Composite Competency* | 68.2[^] | 66.0 ^{^^^} | 65.6 | <i>61.8</i> | 0.028 | 1.9 |
| Composite Cognitive Competency | 62.7[^] | 59.3 ^{^^^} | 59.1 | <i>54.3</i> | 0.003 | 2.8 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Three fewer in this mean.

^{^^^} Four fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Summary

Attitudes to school and teachers

Parents' perceptions

According to their parents, 75 percent of the study children enjoyed school at age 12. Girls were slightly more enthusiastic than boys. Children's overall attitudes to school were most related to maternal qualification. They were also related to their current achievement levels, with lower average scores for children who were bored or unhappy.

It was reasonably common for children to strike at least one teacher that they did not like in their school career: 43 percent of the children had done so, and a further 14 percent had had some teachers they had mixed views about. According to the parents, 77 percent liked their current teacher. Liking the teacher was unrelated to family characteristics, but was related to gender. Children's views about their current teacher do not seem to affect their mathematics, literacy, Logical Problem-Solving, or curiosity. But children are picking up something in that relationship that is reflected in teacher ratings of their dispositions and social skills. There are similar trends in looking at the associations with views of previous teachers.

Children's perceptions

Overall, the children were positive about their experiences of school: most usually enjoyed themselves, they felt teachers helped them, and they had good friends. Seventy-one percent had high scores on a factor of items related to engagement in school, which drew together experiences of enjoyment, support,

fairness, and belief in the value of the work of school. Just over half said they usually did interesting things at school, liked their teachers,⁵⁵ and learnt most things pretty quickly.

However, 16 percent showed mid-high scores on a factor relating to feeling distress at school. Boys were somewhat less positive about their school experience than girls, and showed less engagement. Some feelings about school were associated with maternal qualification; there were no associations with family income, and only a few with ethnicity. School characteristics were not associated with differences in student views of their experiences, indicating that differences in the school characteristics included here (decile, type, and ownership) do not lead to quite distinct experiences of schooling.

Engagement in school is related to whether children enjoy reading, and how much television they watch: another example of the Matthew effect, where activities outside school which complement school experience do not compensate for negative experiences or reactions, but are likely to reflect and enhance them. Distress at school does not show these relations.

Children's views of their school experience, and reactions to it, are related to their competency levels at age 12. The views with the most widespread associations are those which relate to the actual work of school, and either alienation or identification with its structure and what it offers. Views which were associated with around two-thirds of the competency measures were related to the student's interaction with their teacher, with some items relating to peer relations, and some on the student's engagement with the work of learning and achieving. All the other views showed some associations. There were more associations with the social and attitudinal competencies than the cognitive competencies overall, and most of the associations with mathematics scores were found in the first set of views.

Comparing the children's views of their classrooms at age 12 with their views of their classrooms at ages 8 and 10, we found that enjoyment levels were lower at age 12, but so too were competition and the difficulty of the work.

Problem-solving

At age 12, children continue to look to teachers for help and advice if they strike a problem in their work. Few children would do nothing or give up if faced with a difficulty in a project, or finding a book in the school library.

⁵⁵ This may seem lower than parental reports of whether their child liked their teacher. However, we asked the children to rate the frequency of their experience, and we asked parents to give a global view.

Homework

Children's views

Most of the study children did homework at least 2 days a week: 57 percent said they did homework on 4 or 5 days, and 32 percent, on 2 or 3 days each week. Nine percent said they did homework on 1 day a week, and one percent said they never did homework. The average time spent on homework was 3.31 hours a week. Time on homework reflected maternal qualification and family income levels; and was slightly higher for girls. Children who did homework more often spent more time on it.

Children who spent at least an hour a week on homework had higher average scores for the cognitive competencies than those who did not. While children who thought homework was important gave it more time, average hours spent on homework were unrelated to difficulties in completing it. Just over half the study children found some difficulty getting their homework done, mainly related to their own out-of-school interests, the difficulty of the work, or family obligations.

Just under half the study children thought it was very important to do homework (49 percent). But children's views on the importance of homework were unrelated to their competency levels.

Around two-thirds of the study children liked doing at least some of their homework, including 24 percent who liked doing most or all of what they were given. While maternal qualification is unrelated to views of homework, enjoyment of reading and working with numbers is.

Teacher views

Around three-quarters of the study children always did their homework. Homework completion was related to gender and levels of maternal qualification and family income, but not ethnicity. Children who always did their homework had higher average scores for the competencies.

Parent views

Ninety-four percent of the parents said they or someone else in the household gave their child some help with their homework, mostly "as needed", with the provision of resources, or supervision. There were some differences in the kind of homework given which reflected family resources. Projects or research were thought to be the kind of homework students got the most value from, followed by mathematics.

Talking about school at home

Three-quarters of the study children talked to their mothers most about their school experiences; and 28 percent, their fathers. They were almost twice as likely to talk about work itself as social activities or interesting or unusual events.

Children's views on doing well at school

Age-12 children's views of how they judge how well they are doing at school do not show clearcut groupings in terms of attributions to either their own (unchanging) ability, or effort, or in terms of extrinsic signs or intrinsic gauges. While we found that children who performed below average according to their teachers were more likely than those who are doing well to use ease and diligence as signs they are doing well, they are just as likely as others to also see their achievement in terms of understanding. We did not find that children whose achievement is lower than others do not get excited by understanding, thinking about things, or getting a new idea about how things work. Boredom and lack of challenge were just as likely to be cited as reasons for dissatisfaction by parents whose child's achievement was below the average level, as by parents of children achieving at the top level. This suggests that while low performers need tailored attention focused on the particular aspects that they find difficult, they also need stimulation and the opportunity for understanding and connection (rather than 'the basics' only).

However, there were some signs that children whose family resources may disadvantage them in terms of school experience put more emphasis on extrinsic signs, and ease, a further disadvantage since we found lower average scores on the competency measures for those who saw doing well at school in terms of not having anything hard to do.

Traces of earlier attitudes to school work

There are indications from the analysis that children's levels of Communication, Perseverance, and Individual Responsibility at age 10 did have a bearing on their levels of engagement in school at age 12.

School mobility

By age 12, only 25 percent of the children remained in the same school they had started in, reflecting the break that comes for most at the end of Year 6. Fifty-one percent were at their second school, and 16 percent, at their third school. Thus most of the study children had attended 3 schools at most. Eight percent had attended 4 or more schools, with the highest being 8 schools. The proportion of children who had had teachers they did not like was almost double for those who had changed schools compared with those who had stayed in the same school. This may indicate that this was a reason to change schools, rather than an effect *per se* of school mobility. On the whole, children who had attended a single school tended to have higher average scores for reading and writing, and children who had attended 4 or more schools by the time they were aged 12 to have lower than average scores for mathematics. Family resources diluted the strength of these associations.

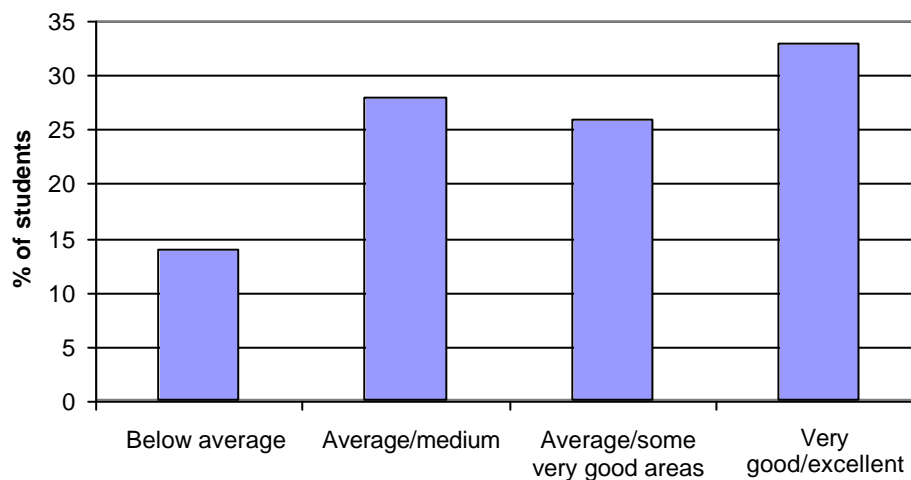
Section Fourteen

Teachers' perspectives on the children's progress

In this section we look at teachers' assessments of the study children's overall achievement levels and estimates of their reading age, their views of the children's curriculum strengths and weaknesses, and their behaviour around the school.

Children's overall progress

Figure 20 Teachers' study assessments of children's overall achievement level



Teachers do think of average in a different way from mathematicians. Mathematically, one might expect around 198 students to be seen as below average, rather than the 67 in this study. The distribution of global assessments was similar for all ages – 6, 8, 10, and 12; that is, teachers were including similar proportions of children in each category at each year level. This could simply reflect the Competent Children sample, which has a somewhat lower proportion of children from low-income families than the national average. However, we do see a more normal distribution of judgments in relation to the children's mathematics performance (Figure 22, p. 243).

Teachers' perspectives on the children's progress

Teachers' global assessments of children's overall level of achievement show consistent associations with their competency levels at age 12, as we measured these, whether through tasks done by the children, or through teacher ratings. These associations remain after taking family income and maternal qualification into account.

Table 145 Teacher view overall achievement in 4 levels and children's competencies at age 12

| Teacher view overall achievement in 4 levels® | Achievement below average | Achievement average/medium | Achievement average but v.good in some areas | Achievement very good/excellent | Prob. of F-value from ANOVA | Percent variance accounted for |
|---|---------------------------|----------------------------|--|---------------------------------|-----------------------------|--------------------------------|
| Age-12 competency [¯] | Mean (n=67) | Mean (n=138) | Mean (n=129) | Mean (n=161) | | |
| Curiosity | <i>41.0</i> | 56.0 | 63.7 | 74.7 | < 0.0001 | 33.4 |
| Perseverance* | <i>44.5</i> | 62.0 | 71.1 | 83.9 | < 0.0001 | 35.3 |
| Individual Responsibility* | <i>58.8</i> | 72.0 | 76.0 | 84.0 | < 0.0001 | 17.0 |
| Social Skills with Peers* | <i>59.2</i> | 69.3 | 70.6 | 77.2 | < 0.0001 | 15.6 |
| Social Skills with Adults* | <i>63.2</i> | 72.9 | 77.8 | 84.4 | < 0.0001 | 15.3 |
| Communication* | <i>47.3</i> | 62.4 | 72.1 | 81.5 | < 0.0001 | 40.4 |
| Mathematics** | <i>29.3</i> | 40.0 | 52.9 | 67.7 | < 0.0001 | 33.3 |
| PAT Reading Comprehension | <i>31.4</i> | 44.4 [^] | 58.8 [^] | 68.7^{^^} | < 0.0001 | 38.7 |
| Burt Word Reading* | <i>59.1</i> | 70.8 | 81.5 | 85.8 | < 0.0001 | 37.9 |
| Writing** | <i>42.6</i> | 49.1 | 51.9 | 57.3 | < 0.0001 | 22.8 |
| Reading Age (yrs, mo) | <i>10.4</i> | 11.11 | 13.3 | 13.11[^] | < 0.0001 | 47.2 |
| Logical Problem-Solving* | <i>59.6</i> | 66.6 | 72.3 | 76.4 | < 0.0001 | 23.2 |
| Composite Competency | <i>49.1</i> | 60.8 [^] | 67.8 [^] | 76.6^{^^} | < 0.0001 | 56.5 |
| Composite Cognitive Competency | <i>44.2</i> | 53.5 [^] | 61.8 [^] | 69.9^{^^} | < 0.0001 | 46.5 |
| Composite Social & Attitudinal Competency* | <i>52.3</i> | 65.8 | 71.9 | 80.9 | < 0.0001 | 39.3 |

* In these cases the squared model was a better fit.

** In these cases the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

We also looked back to see whether teachers' assessments of the children's progress at age 6, at the end of their first year of school, were still associated with their levels of competency 6 years later.⁵⁶ They are, though they account for less of the variance than current teachers' assessments. The associations shown remain after taking family income and maternal qualification into account.

⁵⁶ This analysis was done for the "original" sample only, i.e. those for whom we collected data at age 6.

Teachers' perspectives on the children's progress

Table 146 Teacher view overall achievement at age 6 and children's competencies at age 12

| Teacher view overall achievement at age 6 in 4 levels® | Achievement minimal or slow | Achievement average/medium | Achievement average but v.good in some areas | Achievement Very good/Excellent | Prob. of F-value from ANOVA | Percent var. acct. for |
|--|-----------------------------|----------------------------|--|---------------------------------|-----------------------------|------------------------|
| Age-12 competency ⁻ | Mean (n=50) | Mean (n=74) | Mean (n=57) | Mean (n=87) | | |
| Curiosity | <i>51.8</i> | 61.1 | 66.0 | 69.2 | < 0.0001 | 11.8 |
| Perseverance* | <i>52.9</i> | 67.0 | 72.0 | 78.9 | < 0.0001 | 16.2 |
| Individual Responsibility* | <i>64.4</i> | 74.4 | 78.4 | 82.6 | < 0.0001 | 11.2 |
| Social Skills with Peers* | <i>65.0</i> | 71.8 | 70.0 | 74.5 | 0.002 | 5.4 |
| Social Skills with Adults* | <i>72.2</i> | 74.9 | 80.3 | 80.7 | 0.007 | 4.5 |
| Communication* | <i>60.0</i> | 66.0 | 73.3 | 77.6 | < 0.0001 | 16.6 |
| Mathematics** | <i>35.5</i> | 42.8 | 54.3 | 64.6 | < 0.0001 | 22.2 |
| PAT Reading Comprehension | <i>42.6[^]</i> | 46.9 | 55.6 | 66.0[^] | < 0.0001 | 19.2 |
| Burt Word Reading* | <i>65.1</i> | 73.0 | 77.0 | 86.9 | < 0.0001 | 30.0 |
| Writing** | <i>43.6</i> | 48.9 | 50.9 | 56.4 | < 0.0001 | 21.6 |
| Reading Age (yrs, mo) | <i>11.7</i> | 12.5 | 12.10 | 13.10 | < 0.0001 | 23.0 |
| Logical Problem-Solving* | <i>61.2</i> | 67.9 | 72.0 | 76.6 | < 0.0001 | 23.5 |
| Composite Competency* | <i>56.1[^]</i> | 63.5 | 68.4 | 73.7[^] | < 0.0001 | 27.9 |
| Composite Cognitive Competency | <i>48.9[^]</i> | 54.9 | 60.9 | 68.6[^] | < 0.0001 | 32.3 |
| Composite Social & Attitudinal Competency* | <i>61.0</i> | 69.2 | 73.3 | 77.2 | < 0.0001 | 16.1 |

* In these cases the squared model was a better fit.

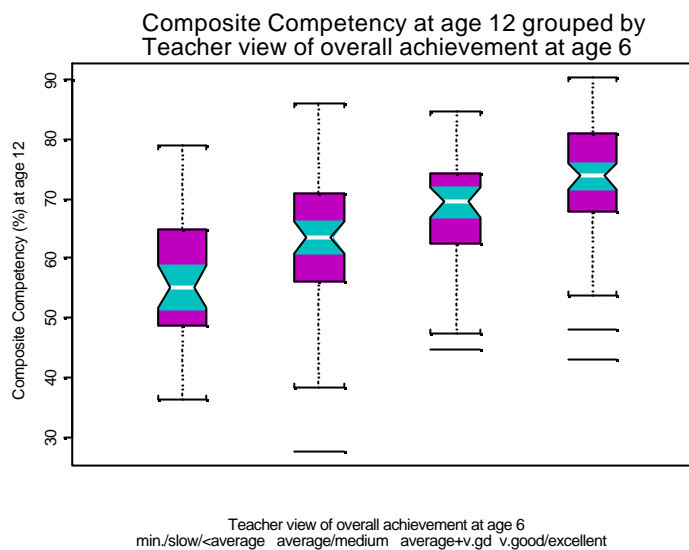
** In this case the square-root model was a better fit.

[^] One fewer in this mean.The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

This strength of association contrasts with the lack of association between parental satisfaction levels with their child's progress at age 6, and the child's performance on the study competency scores at age 12.

The next figure shows some overlaps in the range of scores for the top 3 groups; note also some individuals who were seen as below average at age 6 had overall competency levels at age 12 which were as high as those who were seen as achieving at the top end at age 6, and vice versa. This is consistent with the analysis in Section Three showing that earlier performance is not a watertight predictor of later performance (and that therefore effort should be made with students who are struggling, as well as with those whose performance starts to deteriorate).

Figure 21 Teacher views of children's overall achievement and Composite Competency at age 12



Other aspects related to teachers' overall assessments

Children whose achievement levels were below average had slightly lower attendance rates: 87 percent had good attendance compared with 96 percent of those described as making better than average progress. Twenty-two percent of the former group were also reported to have health problems, compared with 9 percent of the very good/excellent achievers, and were somewhat more likely to vary in their happiness, or be unhappy (25 percent compared with 12 percent overall).

Completion of homework was related to teachers' overall assessments, with those described as making very good or excellent progress twice as likely to always complete their homework as those who were making below average progress.

Teachers' overall assessments appeared to draw on their estimate of their reading age, and their mathematics performance. Eighty-five percent of those seen as at the below average or minimal level were seen to be reading below their chronological age, compared with 40 percent of those seen as average or medium, 11 percent of those seen as average but very good in some areas, and 4 percent of those who were seen as at the very good or excellent level. Eighty-one percent of those who were seen as below average or minimal levels were seen to be performing below average in mathematics, as were 20 percent of those seen as average or medium overall, 4 percent of those who were average but very good in some areas, and one child who was rated at the very good/excellent level.

We cross-tabulated children's scores for the factor "*Engagement in school*", drawn from their responses to individual items about their school experience (see Section Thirteen), in terms of whether they were highly engaged (71 percent of the children),⁵⁷ or not. There was some correspondence between a child's

⁵⁷ This was based on the average score out of 3 for each of the items which made up the factor.

Teachers' perspectives on the children's progress

level of engagement in school, and their overall achievement level, as described by their home teacher (rising from 60 percent of those whose level of achievement was less than, average to 80 percent of those whose achievement level was very good/excellent). The *"Distress at school"* factor did not show quite the reverse picture. Sixteen percent of the study children had middle to high levels of distress; but the proportion of these in each achievement level was much the same other than the highest, where it was 9 percent.

Teachers were less sanguine about the difference they could make in the learning of those they saw as making below average progress. Teachers of 31 percent of these children thought they could make a lot of difference as a teacher to their learning, compared with 58 percent of the children thought to be making average or better progress.

Seventy-one percent of those described as at the very good/excellent level were not experiencing difficulty in any curriculum area, compared with 49 percent of those described as being at the average/very good in some areas level, 20 percent of those described as average, and 3 percent of those described as less than average.

Overall assessments were also related to their description of children's curriculum strengths: only in physical education were children who were seen as below average equally likely to be seen as having strength. The curriculum aspects in which those who were seen as average but very good in some areas differed from those who were seen as average were reading, mathematics, spelling, oral language, music or art, and lateral thinking or problem-solving. The similarities between those who were seen as average but very good in some areas, and those who were seen as very good or excellent overall, came in the curriculum aspects of handwriting or printing, oral language, music or art, drama and technology.

There were no differences related to school decile or ownership. Children described as making better than average progress were more likely to be involved in cultural or performing arts activities. This was the only difference related to extracurricular activities at school.

Boys were more likely to be seen as making average or below progress (47 percent compared with 35 percent of girls).

Teachers' perceptions of the level of home support for children's schoolwork was also related to their assessment of their overall performance. The higher the children's performance, the higher the level of home support for their learning was likely to be rated. Fifty-seven percent of the children seen as making very good/excellent progress had home support rated at the top of the 5- point scale we used, declining to 19 percent of those making less than average progress.

As in earlier years, maternal qualification levels were linked to teacher views of overall progress at age 12. Fifty percent of those whose mothers had a university qualification were seen to be making very good/excellent progress, compared with 35 percent of those whose mothers had a trade or tertiary qualification, 29 percent of those whose mothers had a school-level qualification, and 15 percent of those whose mothers had no educational qualification. Two percent of those whose mothers had a university qualification were seen to be making below average progress, compared with 27 percent of those whose mothers had no qualification.

Current family income levels were also associated: 7 percent of the children from high-income homes were seen to be making below average progress, compared with 21 percent of those from low-income homes.

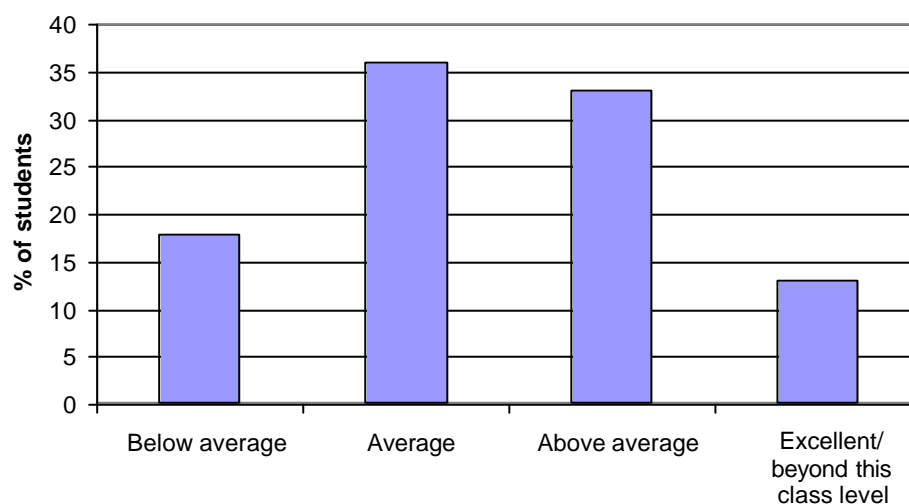
Pākehā/European and Asian children were more likely to be seen as making very good/excellent progress (35 percent), than Māori or Pasifika (19 percent).

Mathematics and reading age

The teachers gave this picture of the study children's mathematics performance, relative to their class level. Note that the teachers' responses have a more symmetric (normal) distribution than the teacher perception of children's overall performance (Figure 21, p. 241).

The teachers' gauge of the study children's mathematics performance relative to their class level was consistent with their performance on our mathematics measure.

Figure 22 Study children's mathematics performance relative to their class level



Maternal qualification and family income were the family factors related to teachers' assessments of children's mathematics performance relative to their class level. Ethnicity was unrelated to teachers' assessments of children's mathematics performance relative to their class level.

Sixty-six percent of the study children whose mothers had university qualifications were seen as performing above average/excellent, compared with 43 percent of those children whose mothers had a trade or tertiary qualification, 49 percent of those whose mothers had a school qualification, and 24 percent of those whose mothers had no qualification. The trends were similar in relation to family income.

Most of the 12-year-olds in the study who were thought to be reading below their chronological age were also thought to be reading below their chronological age when they were 10 years old (86 percent). Reading age was unrelated to school ownership, but did show some relationship to school decile.

Teachers' perspectives on the children's progress

Students from decile 1–2 schools were more likely to be seen as reading 2 years or less below their chronological level (19 percent compared with 7 percent overall), and less likely to be seen as reading 2 years or more above their chronological level (12 percent compared with 33 percent overall).

Curriculum strengths

All but 5 percent of the study children had at least one area of the curriculum offered at their school in which they showed strength.

Table 147 Children's areas of strength in the curriculum: ages 6, 8, 10, and 12

| Curriculum area ⁻ | Strength | | | |
|----------------------------------|-----------------------|-----------------------|------------------------|------------------------|
| | Age 6 (n=297) % | Age 8 (n=523) % | Age 10 (n=507) % | Age 12 (n=496) % |
| Reading | 43 | 44 | 56 | 46 |
| Mathematics | 48 | 44 | 46 | 40 |
| Physical education | 26 | 32 | 44 | 41 |
| Oral language | 26 | 31 | 35 | 33 |
| Story writing | 35 | 40 | 35 | 31 |
| Spelling | 12 | 22 | 24 | 28 |
| Science | 19 | 23 | 26 | 26 |
| Presentation | – | – | – | 26 |
| Other writing–letters/reports | 0 | 18 | 24 | 25 |
| Art or music | 32 | 33 | 29 | 24 |
| Social studies | 11 | 16 | 22 | 24 |
| Handwriting/printing | 20 | 17 | 23 | 23 |
| Problem-solving/lateral thinking | 0 | 0 | 21 | 22 |
| General knowledge | – | – | – | 22 |
| Technology | 0 | 15 | 22 | 18 |
| Information technology | 0 | 0 | 14 | 18 |
| Information skills | – | – | – | 18 |
| Drama | 0 | 12 | 16 | 17 |
| Health | 0 | 5 | 7 | 11 |
| Te Reo | 0 | 4 | 5 | 6 |
| Religious studies | 0 | 2 | 3 | 6 |
| Nothing | 5 | 3 | 3 | 5 |

– = not asked.

There are some gender differences in teachers' descriptions of the study children's curriculum-related strengths.

The areas where boys and girls were seen as equally strong⁵⁸ were:

Maths, oral language, drama, te reo Māori, religious studies, health, general knowledge, and problem-solving/lateral thinking.

This is a somewhat different set of strengths than when the study children were age 10: that set included social studies, music and art, and did not include maths or problem-solving (where more boys were seen as having strengths), or health (where more girls were seen as having strengths).

Areas where a higher proportion of boys were reported as having strengths were:

Science, technology, physical education, and information technology.

Areas where a higher proportion of girls were reported as having strengths were:

Reading, story writing, other (non-story) writing, handwriting or printing, spelling, social studies, and presentation.

Maternal qualification is the family factor most related to teachers' descriptions of some curriculum strengths of the study children at age 12. Those whose mothers had a university qualification were more likely to be seen to have curriculum strengths in reading, mathematics, story writing, oral language, science, problem-solving/lateral thinking, and information skills than those whose mother had a tertiary/trade or school qualification, who in turn were more likely to be seen to have curriculum strengths in these areas than those whose mother had no qualification. Those whose mothers had no qualification were less likely to be seen as having a strength in general knowledge (10 percent).

Family income and ethnicity were largely unrelated to the teachers' descriptions of the curriculum strengths of this sample. Pasifika and Māori students were more likely to be seen as having strengths in art or music (44 and 36 percent respectively), Māori students in te reo (21 percent), Pasifika students in presentation (48 percent), and Pākehā/European students in problem-solving/lateral thinking (24 percent compared with 10 percent for others), and in general knowledge (25 percent compared with 11 percent for others).

There were few school-related differences in teacher reports. Private school teachers were more likely to report drama as a student strength (33 percent), and least likely to report mathematics (25 percent). State integrated teachers were most likely to report religious studies (29 percent) as a student strength. Decile 1–2 teachers were more likely to report te reo Māori (19 percent), and religious studies (15 percent) as student strengths. These differences are likely to reflect different curriculum emphases as well.

⁵⁸ This was in response to an open-ended question, so teachers were not asked to rate each child on each of the areas mentioned here, but volunteered those areas of particular strength they saw in each of the study children.

Children's areas of difficulty in the curriculum

Forty-two percent of the study children were thought to have no difficulties with any of the curriculum areas.

Table 148 **Children's areas of difficulty in the curriculum: ages 6, 8, 10, and 12**

| Curriculum area ⁻ | Difficulty | | | |
|----------------------------------|-----------------------|-----------------------|------------------------|------------------------|
| | Age 6 (n=297) % | Age 8 (n=523) % | Age 10 (n=507) % | Age 12 (n=496) % |
| Nothing | 45 | 36 | 38 | 42 |
| Spelling | 14 | 24 | 27 | 24 |
| Mathematics | 9 | 24 | 22 | 21 |
| Handwriting/printing | 15 | 19 | 21 | 21 |
| Story writing | 26 | 24 | 19 | 18 |
| Other writing–letters/reports | 0 | 12 | 13 | 16 |
| Reading | 28 | 17 | 15 | 14 |
| Presentation | – | – | – | 13 |
| Problem-Solving/lateral thinking | 0 | 0 | 10 | 12 |
| Oral language | 14 | 9 | 7 | 10 |
| Science | 2 | 2 | 5 | 7 |
| Te Reo | 0 | 1 | 3 | 6 |
| Physical education | 8 | 8 | 8 | 5 |
| General knowledge | – | – | – | 5 |
| Social studies | 2 | 3 | 3 | 4 |
| Information skills | – | – | – | 4 |
| Art or music | 5 | 4 | 5 | 3 |
| Drama | 0 | 2 | 3 | 2 |
| Technology | 0 | 1 | 4 | 1 |
| Information technology | 0 | 0 | 4 | 1 |
| Health | 0 | 1 | 2 | 1 |
| Religious studies | 0 | 1 | 0 | 1 |

– = not asked.

Fifty-one percent of the girls had no difficulty evident to their teachers in any curriculum area, compared with 34 percent of the boys (both slightly up from 47 percent and 30 percent at age 10). Boys' main areas of difficulty were related to literacy and presentation.

Children whose mothers had no qualification were less likely to be seen as having no difficulties (24 percent). Asian students in the sample were more likely to be seen as having no difficulty with any area of the curriculum (79 percent). Family income levels were unrelated to teachers' perceptions of curriculum-related difficulties for the study children at age 12.

The areas of curriculum difficulty are not a complete mirror image of the areas of strength. However, the same trends were evident for reading, mathematics, writing, oral language, social studies, and problem-solving/lateral thinking in relation to maternal qualification levels. Pasifika students were more likely to be seen as having difficulty with problem-solving or lateral thinking (28 percent). There were no differences related to school ownership.

Teachers' views of children's non-curriculum strengths and weaknesses

We also asked teachers to describe to us the children's strengths and weaknesses in those aspects of school life that are not formally taught, though they are implicit in some of the curriculum aims.

Strengths

At age 12, around half the children were seen as mature, reliable, kind, or well-behaved, an increase from previous ages. At age 12, the study children were more likely to be described as having a sense of humour and liking a challenge than they were at younger ages.

Table 149 Teachers' views of children's non-curriculum strengths: ages 6, 8, 10, and 12

| Strength ⁻ | Age 6 | Age 8 | Age 10 | Age 12 |
|--|--------------|--------------|--------------|--------------|
| | (n=298) % | (n=523) % | (n=507) % | (n=496) % |
| Mature/independent/confident | 26 | 40 | 40 | 50 |
| Reliable/sensible | 43 | 29 | 33 | 49 |
| Kind/warm-hearted/tolerant/patient | 55 | 42 | 42 | 49 |
| Well-behaved/courteous/polite | – | 45 | 42 | 47 |
| Willing | 46 | 20 | 23 | 34 |
| Outgoing/popular | 31 | 30 | 30 | 33 |
| Tries hard | 43 | 19 | 16 | 33 |
| Sense of humour | – | 12 | 15 | 32 |
| Happy/at ease | – | – | – | 29 |
| Organised/concentrates/not easily distracted | 19 | 19 | 24 | 29 |
| Likes a challenge | – | – | – | 20 |
| Creative/inventive | – | 8 | 6 | 14 |
| Leader | 14 | 10 | 14 | 13 |
| None | 3 | 2 | 2 | 2 |

In terms of character strengths which were evident in the classroom, boys were more likely to be seen as having a sense of humour (38 percent compared with 24 percent), as they were at age 10. Girls were more likely to be seen as mature (59 percent compared with 42 percent of boys), reliable or sensible (57 percent compared with 43 percent of boys), well-organised or able to concentrate (39 percent compared with 21 percent of boys), kind-hearted, tolerant, or patient (54 percent compared with 45 percent of boys), and at ease (34 percent compared with 25 percent of boys). There were no gender differences evident in relation to character strengths of being well-behaved or courteous, popular, willing, trying hard, showing leadership, being creative, or liking a challenge.

In contrast to curriculum-related areas, social characteristics of the study children were not widely related to teachers' perceptions of their class and school behaviour.

Children whose mothers had a university qualification were most likely to be seen as leaders (22 percent), creative/inventive (21 percent), or liking a challenge (29 percent). Popularity/outgoing nature were more likely to be mentioned for Māori and Pasifika students (53 and 44 percent respectively). Independence, maturity, or confidence were less likely to be mentioned for the Pasifika students in the sample (28 percent). There was no relationship with family income levels.

Teachers' perspectives on the children's progress

There were no differences related to school ownership, and only 1 related to school decile. Teachers of the students attending decile 1–2 schools were more likely to mention popularity or outgoing nature for their students (50 percent).

Some of these attributes were related to teachers' view of individual children's overall achievement levels. Students whose achievement level was seen as very good or excellent were twice as likely as those described as making average progress or less to be described as having strengths of maturity, independence, or confidence, and 3 times as likely to be seen as organised and able to concentrate, or as leaders. They were most likely to be seen as being reliable or sensible, creative or innovative, and to like a challenge.

However, the qualities of kindness, warm-heartedness, tolerance, or patience, of willingness, being well-behaved, trying hard, having a sense of humour, and being happy or at ease, were found at much the same levels for all achievement levels.

Weaknesses

The weaknesses identified by the children's teachers at age 12 were more likely than the strengths identified at this age to occur in similar proportions as at earlier ages.

Table 150 Teachers' views of children's non-curriculum weaknesses: ages 6, 8, 10, and 12

| Weakness ⁻ | Age 6 | Age 8 | Age 10 | Age 12 |
|--|--------------|--------------|--------------|---------------|
| | (n=298) % | (n=523) % | (n=507) % | (n=4967) % |
| Poor work habits | – | 26 | 30 | 24 |
| Passive (shy, too dependent) | 26 | 22 | 23 | 19 |
| Poor self-concept/low self-esteem/insecure | 18 | 18 | 16 | 18 |
| Self-centred/wilful | 16 | 14 | 15 | 13 |
| Immature/dependent | – | 14 | 13 | 16 |
| Aggressive | 9 | 11 | 5 | 3 |
| Does not try | 7 | 7 | 4 | 6 |
| Lives in own world | 5 | 5 | 3 | 7 |
| Impatient | 13 | 4 | 1 | 4 |
| Bossy | – | 3 | 4 | 4 |
| Unreliable | 7 | 2 | 2 | 4 |
| Spoilt | 1 | – | – | 3 |
| Over-anxious | – | – | – | 6 |
| Lacks friends | 7 | – | – | – |
| Thin-skinned/oversensitive | – | – | – | 4 |
| Rude | – | – | – | 4 |
| None | 28 | 24 | 19 | 27 |

Also mentioned were dishonest (2 percent), and depressed/melancholic (1 percent).

Thirty-two percent of the boys were seen as having a difficulty with poor work habits, compared with 14 percent of the girls, and 22 percent as immature or easily led astray compared with 10 percent of the girls. Some differences which were apparent at age 10 were no longer evident – boys at age 12 were no more likely than girls to be seen as aggressive or living in their own world.

There was only 1 difference related to maternal qualification: children whose mothers had no qualification were more likely to be seen as immature (27 percent). There were no relationships with family income or ethnicity, school decile or school ownership.

There were differences related to teachers' view of children's overall achievement. Those who were making less than average progress were around 4 times more likely to be seen as aggressive, 3 times as likely to have poor work habits and be immature or easily led astray, and twice as likely to be seen as living in their own world, having low self-esteem, or being unreliable.

Bossiness, rudeness, being self-centred, and not trying, were found at much the same levels across all achievement levels.

How do non-curriculum strengths and weaknesses relate to each other?

We undertook a cluster analysis to see how these perceptions of children's non-curriculum strengths and weaknesses related to each other. The clustering method used was a divisive hierarchical clustering of the children, which indicated an acceptable categorisation of 4 clusters of children. We then checked on the typical characteristics of each cluster with respect to the variables used in the cluster analysis, totalled over all the age 6 to 12 data, giving 4 levels (very high, high, moderate, and low).

These clusters are shown in the next table, using only those characteristics which had a significance level of above 0.01, using a chi-square test. There were no significant differences between the clusters in their total scores from ages 6 to 12 in relation to: creativity, passivity, being self-centred, impatient, bossy, outgoing, or a leader, having low self-esteem or no strengths, or not trying, or living in one's own world.

The 4 clusters could be described as:

- "solid" – having very high scores over the years for reliability, being organised, being willing, and well-behaved;
- "mature with edges" – having high scores for reliability, being organised, and being willing, but low scores for being well-behaved;
- "steady" – having a low score for maturity, moderate scores for the dispositions and habits above, but high scores for being well-behaved, and low scores for a sense of humour; and
- "patchy" – low scores for these dispositions and habits, but a very high score for sense of humour.

Table 151 Clusters of children's classroom behaviour

| Characteristic | Cluster 1 – "solid" | Cluster 2 – "mature with edges" | Cluster 3 – moderate" | Cluster 4 – "patchy" |
|------------------|---------------------|---------------------------------|-----------------------|----------------------|
| Mature | High | Very high | Low | Moderate |
| Reliable | Very high | High | Moderate | Low |
| Leader | Moderate | High | Low | Moderate |
| Kind | High | Moderate | High | Low |
| Organised | Very high | High | Moderate | Low |
| Willing | Very high | High | Low | Low |
| Tries | Very high | Moderate | Moderate | Low |
| Outgoing | Low | High | Low | High |
| Nothing positive | Low | High | Moderate | Very high |
| Well-behaved | Very high | Low | High | Moderate |
| Sense of humour | High | Moderate | Low | Very high |
| Creative | Very high | Low | Moderate | High |
| Passive | Very high | Moderate | High | Low |
| Aggressive | Low | Moderate | Moderate | High |
| Unreliable | Low | Low | Moderate | High |
| Self-centred | Low | Moderate | Moderate | Very high |
| Don't try | High | Low | Low | Very high |
| Low self-esteem | Low | Moderate | Very high | Moderate |
| Spoilt | Low | High | Low | High |
| Impatient | Low | High | Moderate | Very high |
| In own world | Moderate | Low | Moderate | Very high |
| Nothing negative | Very high | High | Low | High |
| Poor work habits | Moderate | Low | Very high | High |
| Immature | Low | Low | High | High |

We used 1-way ANOVAs to test the relationship between these clusters of children's dispositions as teachers had observed them in the classroom, and the competency measures.⁵⁹ We found significant relationships ($p < 0.0001$) between the clusters and the competency measures, but with notable effect sizes (R^2 (Adjusted)) only for the social and attitudinal competencies, which were also teacher-rated. This may indicate simply that teachers drew on the same pool of observations and experiences for both their answers to open-ended questions about the children's strengths and weaknesses, and for their rating of the children in response to our specific questions. However, the fact that the study children did fall into 4 discernible groups in terms of a small group of dispositions and habits underlies the importance of these for the *work of teaching* albeit that they are not directly connected to children's performance on the literacy and mathematics measures.

⁵⁹ The competency scores were examined and, where necessary, were transformed so that their distributions were approximately symmetric, and had an acceptable degree of kurtosis (how fat and flat or tall and thin the

distribution is). The transformations used were where $y = \frac{x^k - 1}{k}$ $0.1 \leq k \leq 5$. The transformations are given in Appendix Three.

Table 152 **Relations of clusters of children's classroom behaviour with their competency scores**

| Achievement score | p | R ² (Adjusted) |
|--------------------------------|----------|---------------------------|
| Burt Word Reading | < 0.0001 | 0.03 |
| Mathematics | < 0.0001 | 0.04 |
| PAT Reading Comprehension | < 0.0001 | 0.06 |
| Writing | < 0.0001 | 0.05 |
| Communication | < 0.0001 | 0.20 |
| Curiosity | < 0.0001 | 0.08 |
| Perseverance | < 0.0001 | 0.31 |
| Individual Responsibility | < 0.0001 | 0.29 |
| Social Skills with Peers | < 0.0001 | 0.19 |
| Social Skills with Teachers | < 0.0001 | 0.19 |
| Logical Problem-Solving | < 0.0001 | 0.04 |
| Mean Composite Score | < 0.0001 | 0.27 |
| Mean Cognitive Composite Score | < 0.0001 | 0.06 |
| Mean Social Composite Score | < 0.0001 | 0.32 |

Attendance

Ninety-three percent of the children had good attendance at school, 6 percent satisfactory, and only 1 percent, poor attendance.

Unlike the picture at age 10, attendance levels at age 12 did not differ by school decile. The main reason for attendance other than good was illness or poor health (4 percent), with others being family commitments, lack of home supervision, and truancy (1 percent each).

Student attendance did not differ by maternal qualification, family income, or ethnicity. There were no differences related to school ownership.

Children's average scores for mathematics, literacy, and Logical Problem-Solving were not significantly related to attendance patterns, though the trend was for children whose attendance was seen as good to have higher scores.

The dispositional and social competencies did show significant relationships with the children's school attendance. These relationships remained after taking family income and maternal qualification levels into account.

Teachers' perspectives on the children's progress

Table 153 Attendance – teacher view, and children's competencies at age 12

| Attendance – teacher view [®] | Good Mean (n=461) | Satisfactory or poor Mean (n=34) | Prob. of F-value from ANOVA | Percent variance accounted for |
|--|----------------------------|---|-----------------------------------|---|
| Age-12 competency [–] | | | | |
| Curiosity | 62.9 | <i>50.6</i> | 0.0003 | 2.7 |
| Perseverance | 70.4 | <i>52.0</i> | < 0.0001 | 4.5 |
| Individual Responsibility | 76.0 | <i>63.2</i> | 0.0002 | 2.7 |
| Social Skills with Peers* | 71.4 | <i>63.6</i> | 0.002 | 1.8 |
| Social Skills with Adults | 77.4 | <i>65.9</i> | 0.001 | 2.2 |
| Communication* | 69.7 | <i>60.4</i> | 0.003 | 1.8 |
| Composite Competency* | 66.8^{^^^^} | <i>58.2</i> | 0.0001 | 3.0 |
| Composite Social & Attitudinal Competency* | 71.3 | <i>59.3</i> | < 0.0001 | 3.7 |

* In these cases the squared model was a better fit.

^^^^ Four fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Teacher views of children's highest qualification

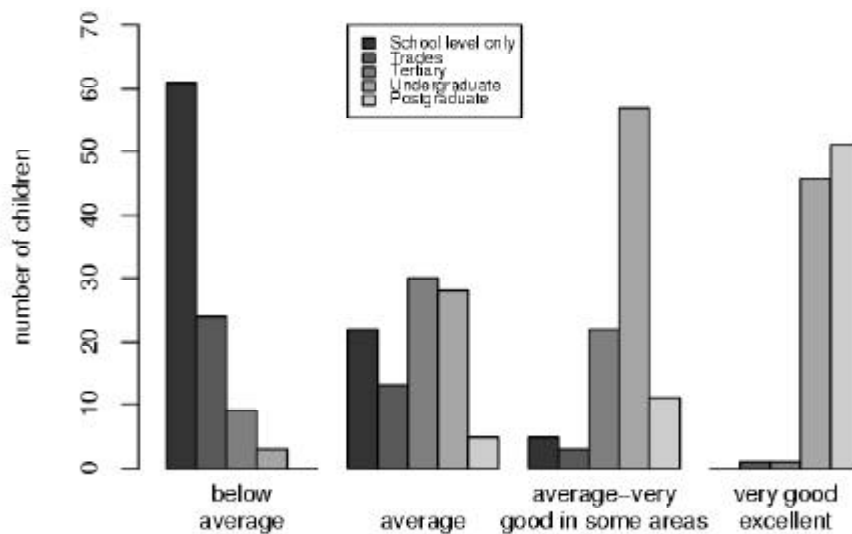
We asked the teachers for the highest level of qualification which they thought the study children they taught were likely to achieve. Only 15 percent of the children were thought likely to achieve a school-level qualification, or none, as their highest qualification. Twenty-one percent were thought likely to achieve a postgraduate university degree, 38 percent an undergraduate university degree, 16 percent a tertiary diploma, and 8 percent, a trades qualification.

The teachers' views generally reflected their assessment of the children's overall performance at age 12.

Table 154 Teachers' views of study children's likely highest qualification in relation to current performance level at age 12

| | School- level only % | Trades % | Tertiary % | Undergrad % | Postgrad % |
|--------------------------------------|----------------------------|-------------|---------------|----------------|---------------|
| Below average | 61 | 24 | 9 | 3 | 0 |
| Average | 22 | 13 | 30 | 28 | 5 |
| Average-very good (in some areas) | 5 | 3 | 22 | 57 | 11 |
| Very good/excellent | 0 | 1 | 1 | 46 | 51 |

Figure 23 Teachers' views of children's likely highest qualification level in relation to their views of their overall progress at age 12



More of the study girls were thought by their teachers likely to complete their education with an undergraduate university degree (43 percent compared with 33 percent of the boys), and more boys, a trades qualification (12 percent compared with 3 percent of girls). Otherwise, teacher views of the study children's likely highest qualification levels were similar for both genders.

Teachers of decile 1–2 students were more likely to think their highest qualification would be school-level, or none (35 percent). However, they estimated similar proportions of children who would attain trades qualifications, tertiary diplomas, and undergraduate degrees. The decile 9–10 students were thought most likely to attain a university undergraduate degree (46 percent compared with 33 percent for students from decile 1–8 schools).

Linked to this, teachers of private school students were more likely to think they would complete an undergraduate university degree (56 percent compared with 41 percent of state integrated school students, and 35 percent of state school students), though proportions who were likely to achieve a postgraduate university degree were unrelated to school type.

There is also a relationship with maternal qualification and family income, but not with ethnicity. In terms of family income, the children from the highest-income homes were expected to achieve at a higher level than others. Maternal qualification levels showed a more graduated relationship with teachers' views of the children's likeliest highest qualification.

While the proportions of children who might attain no qualification were similar across all levels of maternal qualification, and for trades qualifications, they are rather different for school qualifications, and university. Most of the 12-year-olds whose mothers had a university qualification were expected by their teachers to gain a university qualification themselves, almost half at the post graduate level.

Teachers' perspectives on the children's progress

Table 155 **Table Maternal qualification and teachers' view of children's likely highest qualification**

| Maternal qualification ⁻ | University (n=86) % | Trade/tertiary (n=184) % | School (n=152) % | None (n=68) % |
|-------------------------------------|---------------------------|--------------------------------|------------------------|---------------------|
| School-level | 3 | 9 | 18 | 28 |
| Undergraduate university | 47 | 44 | 34 | 22 |
| Postgraduate university | 41 | 19 | 18 | 7 |

Not surprisingly, views of overall achievement at age 12 – linked as we have seen to differences in children's ways of conducting themselves in the classroom, and ability to take individual responsibility for learning at this age, also reflected in teacher views of obstacles to the children's final level of educational achievement. What this also shows is that the teachers did not think that there was necessarily a direct link between age-12 achievement levels, and later qualifications, though the odds were much higher for those who were already doing well, and had mastered the appropriate skills as well as knowledge.

No obstacles were seen for 61 percent of those regarded as making very good/excellent progress at age 12, for 36 percent of those who were very good in some areas, 24 percent of those who were making average progress, but only 3 percent of those making below average progress.

Table 156 **Teachers' perceptions of the main obstacle to children's educational achievement at age 10 and 12**

| Weakness ⁻ | Age 10 (n=507) % | Age 12 (n=496) % |
|----------------------------------|------------------------|------------------------|
| None | 32 | 36 |
| Poor self-management skills | 28 | 25 |
| Low self-esteem/confidence | 25 | 21 |
| More interested in other things | 8 | 13 |
| More interested in being popular | 6 | 13 |
| Poor social skills | 10 | 9 |
| Lack of family resources/support | 4 | 8 |
| Not emotionally robust | – | 4 |
| Family values | – | 3 |
| Poor health | 3 | 2 |
| Lack of academic skills | 7 | – |
| Lack of family support | 3 | – |

– = not asked.

There were no obstacles to achieving their full potential in education for 45 percent of the girls in the study, compared with 29 percent of the boys at age 12. The main obstacles identified for boys were poor self-management skills (38 percent), and their greater interest in things other than education (21 percent compared with 5 percent of the girls). The proportion of boys whose main obstacle was poor self-management skills was the same at ages 10 and 12, but declined for girls from 18 percent at age 10 to 12

percent at age 12. Somewhat higher proportions of boys and girls were more interested in things other than education at age 12 than at age 10 (15 percent of the boys, and one girl).

Teachers of decile 1–2 students were more likely to see poor self-management skills (38 percent) or lack of family resources (17 percent) as the main obstacle to their achieving their full potential in education. Teachers of students attending private schools were more likely to think they faced no obstacles to achieving their full potential in education (56 percent of these students, compared with 39 percent of students in state integrated schools, and 33 percent of those in state schools). Part of this may be linked to confidence and family resource levels, which were more likely to be seen as obstacles for students in state and state integrated schools.

Not surprisingly, there was a link with maternal qualification. No obstacle to a child achieving their full potential was seen for 47 percent of those whose mother had a university qualification, compared with 27 percent of those whose mother had no qualification. Family resources were most likely to be seen as an obstacle also for the latter group (18 percent).

Similar trends were evident in relation to current family income levels. No obstacle was evident to teachers for 46 percent of the children from high and very high-income homes, compared with 26 percent of those from moderate-income homes, and 23 percent of those from low-income homes. Family resources were seen as an obstacle for 24 percent of the latter.

The difference teachers thought they could make for children

Sixty percent of the children had teachers who thought they could make lots of difference to children's learning, 39 percent had teachers who thought they could make some difference, depending on the child, and 1 percent had teachers who thought they could make only a little difference to children's learning.

When we asked the teachers to think about the study children in particular, they were slightly less sanguine, with 55 percent of the children having teachers who thought they could make lots of difference in that child's learning, 37 percent having teachers who felt they could make some difference, and 8 percent had teachers who felt they could make only a little difference.

However, there were some interesting differences when it came to considering individual children, with 31 percent of those whose teachers thinking that the difference they could make depended on the child thinking they could make a lot of difference for this particular individual, and conversely, 26 percent of those whose teachers thought they could generally make a lot of difference overall thinking that In this case, they could make only some difference.

There were no differences in teacher views of their ability to make a difference to learning which were related to school decile, ownership, or type.

Teachers' views of the difference they could make for the study children as individuals were also unrelated to the children's gender, maternal qualification, family income, or ethnicity.

Summary

Teachers' overall assessments

Teachers' overall assessments of the study children's overall performance have not been symmetrically distributed. Teachers place fewer students below average performance than one would expect if performance was normally distributed. This has implications for communication with parents, if "average" is used as a benchmark, and parents and teachers have different understandings of what that means. However, teacher assessments of the study children's mathematics' performance relative to their class level were more symmetric.

The categories the children were assigned to by their teachers are consistent with the children's performance on the Competent Children's project competency measures, with clear gradations between each category, for the cognitive competencies, which were tests done by the children, as well as the ratings given by teachers for the social and attitudinal competencies.

Teachers' overall assessments of how children are doing at school also reflected their homework completion, attendance, health, and happiness, their particular strengths and difficulties related to the curriculum, and the children's level of engagement in school, and experience of distress (as given by the children). They did not reflect differences in school characteristics, but did reflect teachers' perceptions of the level of home support for a child, maternal qualification, family income, gender, and to a lesser extent, ethnicity.

Teachers were less sanguine about the difference they could make in the learning of those they saw as making below average progress.

Curriculum strengths and difficulties

Ninety-five percent of the study children had at least one area of strength in their class curriculum. There were some differences related to gender and maternal qualification, but family income and ethnicity were largely unrelated to perceptions of curriculum strengths, as were school characteristics. Around two-fifths of the study children were seen to have strengths in at least one of reading, mathematics, or physical education.

Forty-two percent of the study children had no areas of difficulty in the class curriculum. Around a fifth had difficulty with at least one of spelling, mathematics, handwriting, and story writing. Difficulty was more likely to be experienced by boys and children whose mothers had no qualification.

Behavioural strengths and difficulties

At age 12, around half the study children were seen as having at least one of the characteristics of being mature, reliable, kind, or well-behaved. This is an increase from previous ages. They were more likely to be described as having a sense of humour and liking a challenge than they were at younger ages. There

were some differences in gender, and fewer related to maternal qualification, but greater confidence among children whose mother had a university qualification.

Teachers' overall views of the children's achievement were related to some of these behaviours: children whose achievement level was seen as very good or excellent were twice as likely as those described as making average progress or less to be described as having strengths of maturity, independence, or confidence, and 3 times as likely to be seen as organised and able to concentrate, or as leaders. They were most likely to be seen as being reliable or sensible, creative or innovative, and to like a challenge.

However, the qualities of kindness, warm-heartedness, tolerance, or patience, of willingness, being well-behaved, trying hard, having a sense of humour, and being happy or at ease, were found at much the same levels for all achievement levels.

Around a fifth of the study children were seen as having at least one of poor work habits, being passive, or having low self-esteem. Gender was the characteristic associated with different patterns of behavioural difficulty.

There were differences related to teachers' view of children's overall achievement. Those who were making less than average progress were around 4 times more likely to be seen as aggressive, 3 times as likely to have at least one of poor work habits and be immature or easily led astray, and twice as likely to have at least one of the traits of being seen to live in their own world, having low self-esteem, or being unreliable. Bossiness, rudeness, being self-centred, and not trying, were found at much the same levels across all achievement levels.

Based on teachers' reports of children's positive and negative behaviour over the years 6 to 12, it was possible to group the children into 4 clusters. These clusters had associations with cognitive competency scores, and showed somewhat stronger association with their scores for communication, Perseverance, and Individual Responsibility. The 4 clusters could be described as:

- "solid" – children having very high scores over the years for reliability, being organised, being willing, and well-behaved;
- "mature with edges" – children having high scores for reliability, being organised, and being willing, but low scores for being well-behaved;
- "steady" – children having a low score for maturity, moderate scores for the dispositions and habits above, but high scores for being well-behaved, and low scores for a sense of humour; and
- 'patchy' – children having low scores for these dispositions and habits, but a very high score for sense of humour.

Children in the "solid" and "mature with edges" clusters tended to have higher achievement scores than those in the "steady" and "patchy" clusters. Children in the "solid" cluster had the highest scores overall, and children in the "patchy" cluster, the lowest scores overall.

Attendance

Ninety-three percent of the study children had good attendance at school, with little difference related to school or family characteristics. Children whose attendance was lower than others had lower average scores for the social and attitudinal competencies, but not the cognitive competencies.

Teacher views of the study children's likely highest qualification

Only 15 percent of the children were thought likely to achieve a school-level qualification, or none, as their highest qualification. Twenty-one percent were thought likely to achieve a postgraduate university degree, 38 percent an undergraduate university degree, 16 percent a tertiary diploma, and 8 percent, a trades qualification.

Views of children's highest qualification level were linked to views of their overall progress at age 12. They also reflected differences in gender, family characteristics, and school characteristics. Some obstacles to children achieving this likely level were seen for 64 percent of the study children. Poor self-management, low self-esteem, a greater interest in other things, and more interest in being popular were the main obstacles identified. Like parents (see Section Sixteen), teachers see more obstacles in achieving the highest educational level they appeared capable of for boys than girls, based on their attitudes and what they want to do. Teachers also see children from homes with fewer family resources as facing greater obstacles.

Teachers making a difference for children

Home support and resources do seem to be factors in teachers' perceptions of children's progress at school, and in their likely future progress. Gender also plays a part. This is probably why not all the teachers thought they could make a lot of difference to the study children's learning. Fifty-five percent of the study children had teachers who thought they could make a lot of difference to their learning, 37 percent had teachers who felt they could make some difference, and 8 percent had teachers who felt they could make only a little difference. However, when we directly cross-tabulated teachers' views here with gender and family characteristics, we found no associations. What does seem to matter more is children's overall level of performance in their class; the family characteristics and gender therefore play a "backroom" role rather than a directive role in teacher views about their own likely efficacy in their teaching. It shows us that teachers feel more confident in working with those who are already working well, and less comfortable about their ability to improve the performance of those who are struggling.

Parental contact with the school

Home support for schoolwork – teachers’ perspectives

We asked teachers to rate on a 5-point scale the degree of support that the study children were receiving at home for their schoolwork. Thirty-eight percent of children were said to be receiving the maximum amount of support, 40 percent very good support, and 16 percent an average amount of support. Four percent of the children were said to be poorly supported at home. Only 1 percent of the children were said to receive no support at home for their schoolwork. The average score on the 5-point scale was a high 4.10.

Views of home support were related to teachers’ assessments of children’s overall progress: 19 percent of those judged as making below average progress were seen to be receiving the maximum amount of home support, compared with 58 percent of those judged to be making very good or excellent progress.

Children whose home support was rated 5 out of 5 by teachers had higher scores than other children for all the competency measures. However, there was some confounding of these relationships with family income and maternal qualification. This is not surprising: 50 percent of the children whose mothers had a university qualification had homes with this rating, compared with 25 percent of those whose mothers had no qualification. Forty-four percent of the children from high and very high-income homes had homes with this rating, compared with 34 percent of children from moderate-income homes, and 21 percent of those from low-income homes.

There were no differences in teachers’ view of home support related to children’s ethnicity.

Table 157 Teacher view of home support for schoolwork and children's competencies at age 12

| Teacher view of home support for schoolwork® | Support none or infrequent Mean (n=25) | Support sometimes Mean (n=80) | Support mostly v.good Mean (n=199) | Support fantastic Mean (n=190) | Prob. of F-value from ANOVA | Percent variance accounted for |
|--|--|-------------------------------------|--|--------------------------------------|-----------------------------|--------------------------------|
| Age-12 competency ⁻ | | | | | | |
| Curiosity | 51.2 | 52.1 | 61.9 | 67.8 | < 0.0001 | 9.4 |
| Perseverance | 54.8 | 55.2 | 67.8 | 78.3 | < 0.0001 | 15.5 |
| Individual Responsibility | 62.4 | 63.6 | 74.2 | 82.7 | < 0.0001 | 13.5 |
| Social Skills with Peers* | 60.1 | 67.8 | 69.2 | 75.1 | < 0.0001 | 7.3 |
| Social Skills with Adults* | 65.0 | 69.3 | 75.0 | 82.8 | < 0.0001 | 10.2 |
| Communication* | 59.4 | 58.6 | 68.2 | 75.7 | < 0.0001 | 13.0 |
| Mathematics** | 45.0 | 40.6 | 51.6 | 55.4 | < 0.0001 | 5.0 |
| PAT Reading Comprehension | 45.3 [^] | 46.8 | 55.0 [^] | 57.7^{^^} | 0.0002 | 4.0 |
| Burt Word Reading* | 70.2 | 73.0 | 76.7 | 79.7 | 0.0004 | 3.6 |
| Writing | 49.2 | 48.8 | 51.8 | 52.9 | 0.014 | 2.2 |
| Reading Age (yrs, mo) | 11.10 | 11.11 | 12.9 | 13.1 | < 0.0001 | 6.4 |
| Logical Problem-Solving* | 65.1 | 66.3 | 71.1 | 71.9 | 0.0003 | 3.7 |
| Composite Competency* | 57.6 [^] | 58.2 | 65.7 [^] | 71.1^{^^} | < 0.0001 | 15.2 |
| Composite Cognitive Competency | 55.1 [^] | 53.9 | 60.2 [^] | 62.3^{^^} | < 0.0001 | 5.4 |
| Composite Social & Attitudinal Competency* | 58.8 | 61.1 | 69.4 | 77.1 | < 0.0001 | 16.9 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean.

^{^^} Two fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

The proportion of students seen as getting average support was higher in decile 1–2 schools (29 percent), but the proportion of those getting maximum support was just as high as for students in other decile schools. Teacher views of student support were unrelated to school ownership.

Contact with parents and teacher views of their relationship with parents

Regular contact with children's parents seems to be a sign of good home support for teachers. Children whose teachers saw their mothers regularly were more likely to rate their home support as maximum (64 percent, decreasing to 14 percent for those whose teachers never saw their parents). This pattern also held in relation to seeing fathers, with teachers of 65 percent of those whose fathers they saw regularly rating their home support at the maximum, decreasing to 30 percent of those they saw rarely or never. Views of home support were unrelated to whether teachers had contact with any other adults from the student's family.

If the home support was very good or maximum, teachers were somewhat more likely to think they could make lots of difference to a child's learning (58 percent compared with 41 percent of those who rated the support as average or less). They were also more likely to see no difficulties with the child achieving their

full potential in education (43 percent compared with 12 percent of those who rated the support as average or less).

Teachers were more likely to feel they had very good or excellent relationships with the parents of the children who were achieving at very good or excellent levels (52 percent compared with 34 percent of other children).

Teachers of the children at age 12 were less likely to meet their parents than the teachers of the children when they were younger. They had not met 17 percent of the mothers of the study children we asked them about, compared with 10 percent at age 10, and 6 percent at age 8. They see only 27 percent of the study children's mothers regularly, compared with 38 percent at age 12, and 43 percent at age 8. However, patterns of contact with fathers have stayed much the same through ages 8 to 12.

The next table shows how often the teachers of the study children saw the children's parents.

Table 158 **Frequency of teachers' meetings with parents**

| | Seeing mother % | Seeing father % |
|-----------|--------------------|--------------------|
| Regularly | 27 | 11 |
| Sometimes | 38 | 24 |
| Rarely | 18 | 21 |
| Never | 17 | 44 |

Teachers were somewhat more likely to see the fathers of the study boys than the fathers of the study girls (38 percent saw them regularly or sometimes compared with 31 percent of the girls).

Other family members had also been seen by the teachers of 11 percent of the study children. These were mainly step-parents and grandparents.

It was rare for teachers to see both parents regularly (7 percent), or to see neither parent (11 percent). Teachers were more likely to see other adults in the student's family if they saw the mother either regularly or never (16 percent compared with 7 percent of those whose mother they saw sometimes or rarely), or if they also saw the father regularly (24 percent compared with 11 percent overall).

Maternal qualification was linked to how often teachers saw the children's mothers. They were much more likely to see the mothers who had university qualifications (41 percent were seen regularly, compared with 30 percent of those with trades/tertiary qualifications, 20 percent of those with a school qualification, and 13 percent of those with no qualification). While family income was not related to whether teachers saw mothers regularly, they were more likely to report they had no relationship with the mothers from low-income homes (29 percent).

Teachers described their relationships with the children's parents as being very good or excellent for 40 percent of the children, and good for 32 percent. Relationships between teachers and parents were seen as satisfactory for 15 percent, and difficult for 1 percent. Teachers felt they had no relationship at all with the parents of 12 percent of the children. This pattern is slightly less positive than it was when the children were aged 10 and 8.

Teachers who saw children's mothers regularly were more likely to describe their relationship with a child's parents as very good or excellent (69 percent, decreasing to 15 percent of those whose mother they saw rarely or never). The same pattern held in terms of whether they saw the student's father, with 83 percent of those who did so regularly describing the relationship as very good or excellent, decreasing to 28 percent of those who saw the father rarely or never.

Not surprisingly, maternal qualification was linked to teachers' views of the relationship they had with the child's parents: it was described as very good or excellent for half the mothers who had a university qualification, compared with 25 percent of those mothers who had no qualification. The teachers thought they had no relationship with 24 percent of those with no qualification, compared with 3 percent of those with a university qualification. The teacher-parent relationship was less likely to be very good/excellent for parents from low-income homes (24 percent).

There were no gender or ethnic-related differences in patterns of seeing the study children's mothers or fathers, or in teachers' view of their relationships with the child's parents.

There were no decile-related differences in patterns of teachers seeing mothers or fathers, or others from the students' families. Relationships were more likely to be described as (only) satisfactory for decile 7–10 students (17 percent), compared with 10 percent of decile 1–6 students), but fewer decile 9–10 students had teachers who said they had no relationship with the student's parents (7 percent compared with 14 percent of decile 1–8 students).

Teachers of private school students were more likely to either see mothers of the study children they taught regularly (38 percent compared with 27 percent overall), or not at all (25 percent compared with 16 percent overall). They were more likely to see fathers of the study children regularly (25 percent compared with 11 percent overall). However, their views of their relationship with the study children's parents were much the same as other teachers.

Parents and teachers working together for the child

Most parents said they felt comfortable talking with their child's teacher about their child (88 percent). Only 2 percent were not. Another 3 percent were comfortable talking about some things, but not others. Seven percent had not met their child's teacher. The main reason for feeling uncomfortable was that the parent had no confidence in the child's teacher (3 percent). Other reasons were that the parent lacked confidence to approach the teacher, or had no time to get to know the teacher (1 percent each). Parental views of their comfort in talking with their child's teacher were unrelated to the teacher's assessment of the child's overall achievement level.

The older the children in the sample, the less likely were their parents to work with their child's teacher to resolve problems encountered by their child. At age 12, 43 percent did so, lower than the 50 percent at age 10, or the 65 percent at age 8. Forty-seven percent said their child had not experienced any problems, and 3 percent had had problems they did not share with their child's teacher. Academic problems were raised by 23 percent of the parents, and social-emotional problems by 20 percent. One percent raised

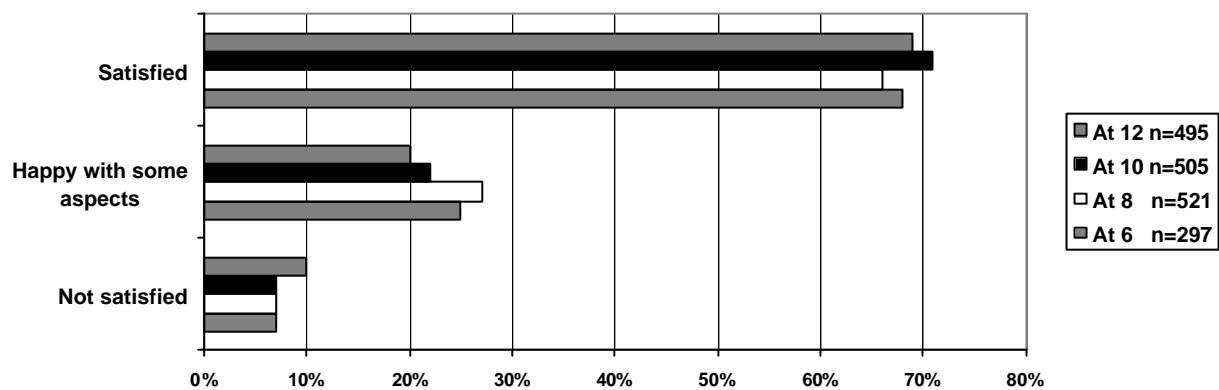
health problems. Three percent said that though they worked together, they had not been able to resolve the problem.

Parents were more likely to have worked with the child's teacher if their child was making below average progress (70 percent compared with 35 percent of those whose child was making very good/excellent progress). Forty-four percent had raised a concern about academic matters compared with 16 percent of those whose children were making very good/excellent progress. However, concerns about the children's social-emotional health were just as likely to be raised whatever the child's overall level of achievement.

Parental satisfaction with their child's progress at school

Parental views on their child's progress at school remained largely positive. Sixty-nine percent were satisfied, 20 percent were largely satisfied but had some reservations, and 10 percent were unsatisfied: a slightly higher proportion compared to the 7 percent for ages 6, 8, and 10.

Figure 24 Parental satisfaction with their child's progress at school



Parental satisfaction levels with their child's progress were unrelated to differences in family characteristics.

The main reason for parents feeling dissatisfied or having reservations about their child's school progress was that their child was not making good progress (18 percent). Nine percent thought their child was bored or not being sufficiently extended. Other reasons were the teacher, child's lack of confidence or unhappiness, behaviour problems in the class, a class that was too large to give their child individual attention, the child's friends, and not being given enough information about the child's progress (2-3 percent each).

Two things which seem to tip the balance between having mixed views about one's child's progress and definite dissatisfaction are lack of progress itself (83 percent of those who were dissatisfied compared with 47 percent of those who had mixed views), and views about the teacher (15 percent compared with 7 percent of those who had mixed views). Otherwise, parents in these 2 groups were equally likely to mention student boredom, lack of confidence, behaviour problems, and class size.

Parents who were dissatisfied with their child's progress, or whose satisfaction was qualified, were more likely to have very little or irregular contact only with their child's school (26 percent) compared with those who were satisfied with their child's progress (15 percent). However, the proportions of those who had no involvement at all in their child's school were similar for all 3 groups.

Those who were dissatisfied with their child's progress were more likely to:

- work with their child's teacher to sort out a problem experienced by the child (82 percent compared with 57 percent of those who expressed qualified satisfaction, and 39 percent of those who were satisfied);
- be uncomfortable talking with the teacher about the child (33 percent compared with 18 percent of those who expressed qualified satisfaction, and 7 percent of those who were satisfied); and
- want to change something about what happened in their child's class (54 percent compared with 34 percent of those who expressed qualified satisfaction, and 24 percent of those who were satisfied). It is interesting that satisfaction with child's progress does not translate into complete satisfaction with all that is happening in that child's classroom.

Parental satisfaction with boys' progress has varied over time: they were less satisfied than the parents of girls at age 8, but not at ages 6 and 10; and at age 12, 65 percent of boys' parents were satisfied with their son's progress, compared with 75 percent of girls' parents. However, boys' parents were as comfortable talking to their teacher as girls' parents, and just as likely to have worked with their current teacher to sort out a problem. They were marginally more likely to have taken a cognitive or academic problem to the teacher (26 percent compared with 19 percent of girls' parents). However, the proportion of boys taking a remedial school-related subject in lessons outside school was no higher than for girls.

We did not analyse parents' current satisfaction with children's progress in relation to their competency levels at age 12, largely because our analyses in previous years had shown that there were consistent associations: children whose parents were satisfied with their progress scored more highly than others. However, there were no significant differences between those whose parents were dissatisfied, and those who had some reservations, for Mathematics, Social Skills with Peers, Social Skills with Adults, or Fine Motor Skills.

In looking for factors which might contribute to children's competency levels at age 12 (rather than reflect them), it seemed more useful to return to previous parental satisfaction levels. We analysed parental satisfaction levels at age 10, and at age 6 (after the first year of school).

Children's average performance at age 12 did reflect parental satisfaction levels with their child's progress at age 10. These associations remained after taking family income and maternal qualification levels into account. For most of the competencies, the differences are mainly between the group whose parents were not satisfied with their progress 2 years earlier, with little difference between those whose parents expressed satisfaction or who qualified this satisfaction. The 3 groups are different only when analysing the composite competencies.

Parental contact with the school

However, there were also some children who achieved at the high levels in all 3 groups, including parents who had not been satisfied with their child's progress at age 10, and some who achieved at low levels in the group of parents who were satisfied with their child's progress 2 years earlier. Indeed, at age 10, 45 percent of those whose parents were satisfied scored below the median score on the study measure of mathematics and 44 percent below the median for the PAT Reading Comprehension test. A similar trend was evident 2 years later.

Table 159 **Parental satisfaction with child's progress at 10 and children's competencies at age 12**

| Parent satisfied with child's progress at 10 [®] | Yes Mean (n=352) | Qualified yes Mean (n=110) | No Mean (n=34) | Prob. of F-value from ANOVA | Percent variance accounted for |
|---|---------------------------|-------------------------------------|----------------------|--------------------------------------|---|
| Age-12 competency [™] | | | | | |
| Curiosity | 63.7[^] | 59.3 | <i>53.7</i> | 0.003 | 2.3 |
| Perseverance | 71.8[^] | 63.8 | <i>59.2</i> | < 0.0001 | 3.8 |
| Individual Responsibility | 76.6[^] | 72.7 | <i>68.5</i> | 0.025 | 1.5 |
| Social Skills with Peers* | 71.7[^] | 70.0 | <i>64.8</i> | 0.026 | 1.5 |
| Social Skills with Adults | 77.8[^] | 75.1 | <i>69.1</i> | 0.016 | 1.7 |
| Communication* | 71.4[^] | 65.1 | <i>58.6</i> | < 0.0001 | 4.6 |
| Mathematics** | 53.0 | 48.4 | <i>38.2</i> | 0.001 | 2.8 |
| PAT Reading Comprehension | 56.4^{^^^} | 51.7 [^] | <i>40.5</i> | < 0.0001 | 4.0 |
| Burt Word Reading* | 78.4 | 76.2 | <i>63.5</i> | < 0.0001 | 6.1 |
| Writing | 52.7 | 50.3 | <i>44.3</i> | < 0.0001 | 4.6 |
| Reading Age (yrs, mo) | 12.11^{^^} | 12.3 | <i>11.5</i> | < 0.0001 | 6.5 |
| Logical Problem-Solving* | 71.2 | 69.1 | <i>65.6</i> | 0.030 | 1.4 |
| Composite Competency* | 67.8^{^^^} | 63.7 [^] | <i>57.4</i> | < 0.0001 | 5.7 |
| Composite Cognitive Competency | 61.2^{^^^} | 57.9 [^] | <i>50.0</i> | < 0.0001 | 5.2 |
| Composite Social & Attitudinal Competency* | 72.2[^] | 67.7 | <i>62.3</i> | < 0.0001 | 3.8 |

* In these cases the squared model was a better fit.

** In this case the square-root model was a better fit.

[^] One fewer in this mean. ^{^^} Two fewer in this mean. ^{^^^} Three fewer in this mean. ^{^^^} Four fewer in this mean.

The mean scores are percentages, not raw scores. The highest scores for each competency are in **bold** type, the lowest in *italics*.

Parental satisfaction levels ranged from 22 percent of those whose children were making minimal or very low progress, to 80 percent of those considered to be very good/excellent. Student progress at school, as rated by their teachers, was also substantially reflected in the teacher perceptions of children's class behaviour, and by the teacher's relations with parents, and view of parental support for the child's learning. This is described more fully in the next section.

We turn next to research question 9 for this phase:

What consistency is there between the child's school progress and children's judgments of their school experiences, parental satisfaction with their child's school, their involvement in the child's school, and teacher perceptions of the child's school engagement, their relations with the parents, and parental support for the child?

On the whole, we find that there is a consistency between the child's school progress and child views of their school experience (described in the previous section), parental satisfaction levels, and teacher's perceptions of children's classroom behaviour and attendance, the parental support for their learning, and the teachers' relations with their parents. Whether all 3 parties are aware of this consistency is another matter. It does suggest that the relations between the triangle of parent, child, and teacher are important, and that when we look at classroom behaviour and engagement in work, it is useful to remember that interactions are involved, rather than one party holding sole responsibility.

Parental interest in change in their child's class

Twenty-nine percent of the parents would like to make some changes to what happened in their child's class, and 9 percent were unsure. The pattern of desired changes was similar to that found when the study children were aged 10. Changes to the class programme content or resources were mentioned by 13 percent, the disciplinary climate, class composition or class size by 5–7 percent, and teacher-student or teacher-parent relations by 3–4 percent.

Parental involvement in their child's school

Very few parents of children aged 12 were involved in voluntary classroom work. To some extent this reflects parental employment patterns. Only 17 percent of the mothers of the children were not employed, and a further 9 percent worked for 10 hours a week or less. Only 6 percent of the fathers were not employed, with only 1 father working 10 hours a week or less.

Parent-teacher interviews were the main form of involvement that parents identified in response to an open-ended question; this category was used more than the less formal "regular talks with teacher" at age 10.

Table 160 Parental involvement at their child's school ages 8, 10, and 12

| | At age 8 (n=521) | At age 10 (n=505) | At age 12 (n=496) |
|--|---------------------|----------------------|----------------------|
| Parental involvement ^a | % | % | % |
| Parent-teacher interviews | - | - | 65 |
| Voluntary work at school – classroom | 42 | 17 | 8 |
| Attendance at school meetings and functions | 8 | 21 | 26 |
| Regular talks with teacher | 11 | 46 | 23 |
| Irregular contact/very little | 23 | 14 | 19 |
| No involvement | 9 | 7 | 10 |
| Voluntary work at school other than classroom | 29 | 46 | 34 |
| Board of Trustees'/Parents' Association member | 13 | 13 | 8 |
| Paid work at school | 4 | 5 | 3 |
| Partner is involved | 2 | 1 | - |

Maternal qualification levels made little difference to the attendance of parent-teacher interviews or school meetings, being a member of the board of trustees or parents' association, being employed at the school, or having only irregular contact. However, children whose mothers had no qualification were more likely to have a parent who had no involvement in their school (16 percent), and less likely to have regular talks with their teacher (16 percent). There were consistent trends in relation to voluntary work in the school, rising from 4 percent of the parents in families where the mother had no qualification undertaking voluntary classroom work to 11 percent of the parents where the mother had a university qualification, and for other voluntary work, from 21 percent to 47 percent.

Family income levels were less related to forms of parental involvement in schools, though parents from the very high-income families were more likely to do non-classroom-related voluntary work (43 percent), and parents from low-income families, less likely to attend school meetings (17 percent).

We analysed specific forms of parental involvement in school in relation to the study children's competency scores at age 12 (without including family income and maternal qualification into the model), as well as the total number of their kinds of involvement.

We found only a few significant associations:

- Children whose parents said they did some voluntary work in the classroom had higher average scores for mathematics (61 percent compared with 50 percent for those whose parents did not), and for writing (57 percent compared with 51 percent).
- However, children whose parents did other voluntary work for their child's school also showed higher scores for Communication, mathematics, writing, and Reading Age compared with those whose parents did not. Only 12 percent of this group also undertook voluntary work in the classroom.
- Children whose parents had little or no involvement in the school had lower scores for mathematics after taking into account family income, but the association was reduced to an indicative level after taking into account maternal qualification.

Summary

Teacher perspective

Seventy-five percent of the study children were thought by their teachers to be getting very good support or better from home for their work at school. Teachers' views of the home support children were getting reflected family income and maternal qualification levels, but not ethnicity. The proportion of study children getting maximum home support was much the same across differences in school deciles and in school ownership.

One source of information teachers use in relation to gauging home support may be student achievement; another may be whether they have regular contact with children's parents. If children have very good or maximum home support, teachers were more likely to think they could make a lot of difference to a child's learning, and less likely to see difficulties in a child achieving their full potential in education.

The parent that teachers usually interact with is the mother. At age 12, the study children's teachers had less regular contact with mothers than previously: they saw 27 percent of the mothers of the children regularly, compared with 38 percent at age 10, and 43 percent at age 8. They had never met either parent of 11 percent of the study children. Their patterns of contact with fathers, which were less frequent, stayed much the same as they had since the children were age 8. The higher the level of maternal qualification the more likely the teacher was to see the mother regularly. Student gender, ethnicity, and family income were unrelated to how regularly teachers saw mothers, but they were more likely to have no relationship with mothers from low-income homes. Twenty-eight percent of the parent-teacher relationships were seen by the study children's teachers as either being less than good, or non-existent. There are some broad decile-related differences, but on the whole, any differences in the parent-teacher relationship most reflect differences in maternal qualification, and likely ease in formal educational environments, and interest in education. There may be some confounding here with children's achievement levels, since these tend to reflect maternal qualification levels at the extremes.

Parent perspective

Eighty-eight percent of the parents said they felt comfortable talking with their child's teacher about their child. Seven percent said they had not met their child's teacher. Fewer parents worked with teachers to resolve a child's problem at age 12 – 43 percent compared with 50 percent at age 10, and 65 percent at age 8. The problems were almost evenly divided between academic issues, and social-emotional problems. Academic issues were more likely to be raised by the parents of children who were making below average progress (though not all of them); social-emotional problems were unrelated to children's progress.

Sixty-nine percent of the parents were satisfied with their child's school progress, 20 percent had some reservations, and 10 percent were dissatisfied, a somewhat larger proportion than in previous ages. Parental satisfaction was unrelated to family characteristics. It was related to children not making progress, or being bored. Parents who were dissatisfied or whose satisfaction was qualified were more likely to work with teachers to solve problems, but be uncomfortable talking with their child's teacher about the child, and want to change something in the classroom. But a quarter of those who were satisfied with their child's progress would also like to change something in their child's classroom. Twenty-nine percent of the parents would like to make some change, and a further 9 percent were undecided. The most frequent changes desired were changes to class programme or resources.

While children whose parents were dissatisfied with their progress 2 years earlier were more likely to have lower average scores at age 12, there are low scorers in the group whose parents were satisfied with their progress, with just under half of those whose parents expressed satisfaction with their progress scoring below the median for the study measure of mathematics and the PAT Reading Comprehension test at age 12. However, parental satisfaction levels are reasonably consistent with teacher judgments of their child's overall achievement level.

Maternal qualification was unrelated to parental satisfaction with their child's progress or comfort talking to the child's teacher, any joint-parent-teacher work in sorting out problems, talking to their child about

school, or views of their child's attitude to school. However, interest in changing something about their child's class was highest for families where the mother had a university qualification (38 percent), and lowest in those with no qualification.

Most parental involvement in their child's school now consisted of parent-teacher interviews, with a third providing some voluntary work, but only 8 percent now doing that in classrooms, down from 17 percent at age 10, and 42 percent at age 8. Maternal qualification levels were related to voluntary work, in and out of classrooms. We found no associations in relation to the total number of kinds of parental involvement in a child's school, and some associations between specific forms of parental involvement in their child's school suggesting that voluntary work in the school was associated with higher mathematics and Communication scores for the children of parents who did this; and lack of involvement, with lower mathematics scores. Both these patterns suggest different signals about the importance of education to children, and parental comfort in the formal educational environment.

Section Sixteen

Secondary school choice, educational, and occupational aspirations

In this section, we describe decision-making about the study children's secondary school, and parent and children's views of the reasons for the choice. We then draw this information together with information on current school and parental satisfaction with their child's education from previous sections to answer the research question:

Do different population sub-groups show different patterns of school choice and satisfaction with their child's school progress?

We finish by describing the parents' aspirations for their children's education, and the parents' and children's ideas for the children's future occupations.

Choice of secondary school

At age 12, many of the study children were moving onto secondary school in the next school year. Only 12 percent of the parents said the decision was yet to be made on what secondary school their 12-year-old child would attend. This was related to year level, with 16 percent of the parents of Year 7 children saying they had not made the choice, compared with 9 percent of the Year 8 children's parents.

Sixty-seven percent of the parents had made their decision, and 20 percent were considering 2 or more schools. (This compares with 37 percent who had already made this decision when their child was aged 5, 39 percent at age 6, 46 percent at age 8, and 55 percent at age 10.)

Secondary school choice, educational, and occupational aspirations

The next table shows the characteristics of the schools chosen for the children when they were age 12. The patterns are in fact very similar with the characteristics of those mentioned by those who made decisions at earlier ages,⁶⁰ with one interesting exception which might be related to enrolment zones. As the decision on secondary school looms large, there was a decrease in the proportion of those thinking of decile 9–10 schools.

Table 161 Characteristics of secondary schools already chosen by children's parents

| School characteristics ↓ | Parental choice age 12 (n= 420) % | Parental choice age 10 (n= 278) % | Parental choice age 8 (n=240) % | Wellington region secondary & composite schools (n=48) % | National secondary & composite schools (n=451) % |
|--------------------------------------|---|---|---------------------------------------|--|--|
| Affiliation | | | | | |
| State | 66 | 64 | 63 | 50 | 67 |
| State integrated | 26 | 27 | 26 | 31 | 20 |
| Private | 8 | 9 | 11 | 19 | 13 |
| School decile | | | | | |
| Decile 1–2 | 7 | 6 | 7 | 8 | 17 |
| Decile 3–4 | 6 | 8 | 3 | 17 | 19 |
| Decile 5–6 | 12 | 9 | 13 | 13 | 22 |
| Decile 7–8 | 25 | 17 | 10 | 21 | 19 |
| Decile 9–10 | 48 | 59 | 66 | 33 | 17 |
| No decile | | | | 8 | 6 |
| Roll size | | | | | |
| <500 | 13 | 16 | 15 | 40 | 49 |
| 500–799 | 28 | 28 | 31 | 33 | 22 |
| 800+ | 52 | 57 | 53 | 25 | 28 |
| Proportion of Māori enrolment | | | | | |
| <8 percent Māori on roll | 47 | 53 | 43 | 42 | 34 |
| 8–14 percent Māori on roll | 27 | 23 | 37 | 23 | 17 |
| 15–29 percent Māori on roll | 23 | 19 | 17 | 27 | 24 |
| 30 percent+ Māori on roll | 3 | 6 | 3 | 6 | 24 |
| Type | | | | | |
| Year 9–15 | 81 | | | 60 | 53 |
| Year 7–15 | 10 | | | 19 | 20 |
| Composite | 8 | | | 21 | 27 |

Family characteristics and secondary school choice

Differences in family characteristics are reflected in some different patterns of choice of secondary school. They largely follow along the lines of the different patterns of primary schools attended: a greater choice of high-decile and private schools among the very high-income families. What may be of

⁶⁰ We have not analysed for this report the consistency of school choice across time, but intend doing so for a separate paper on patterns of school choice and decision-making.

Secondary school choice, educational, and occupational aspirations

particular interest in the table following is that while the proportion of very high-income families who name a decile 9–10 school is twice as high as the proportion of low-income families naming a decile 9–10 school, nonetheless, a third of the latter group wanted their child to attend such a school. A similar tendency is evident in relation to maternal qualification. Another interesting tendency is that high-income and Pasifika families who were deciding on a non-state school were choosing state integrated rather than private schools, possibly reflecting the cost of private schools, as well as allegiances.

Table 162 **Family characteristics and characteristics of their child's chosen secondary school**

| School decile chosen | 1–2 | 3–4 | 5–6 | 7–8 | 9–10 |
|---------------------------------|-------|------------------|---------|-----|------|
| <i>Income %</i> | | | | | |
| Very high | 1 | 2 | 9 | 20 | 68 |
| High | 6 | 6 | 11 | 29 | 41 |
| Medium | 12 | 10 | 14 | 23 | 42 |
| Low | 11 | 11 | 16 | 33 | 33 |
| <i>Maternal qualification %</i> | | | | | |
| None | 16 | 14 | 11 | 19 | 37 |
| School | 7 | 9 | 15 | 29 | 40 |
| Tertiary/trades | 7 | 5 | 11 | 23 | 54 |
| University | 0 | 0 | 11 | 26 | 63 |
| <i>Ethnicity %</i> | | | | | |
| Pākehā/European | 5 | 6 | 12 | 26 | 51 |
| Māori | 14 | 7 | 12 | 24 | 43 |
| Pasifika* | 16 | 12 | 16 | 24 | 32 |
| Asian* | 10 | 0 | 0 | 30 | 60 |
| School ownership chosen | State | State integrated | Private | | |
| <i>Income %</i> | | | | | |
| Very high | 53 | 26 | 20 | | |
| High | 65 | 35 | 0 | | |
| Medium | 75 | 22 | 3 | | |
| Low | 78 | 21 | 2 | | |
| <i>Maternal qualification %</i> | | | | | |
| None | 61 | 35 | 4 | | |
| School | 68 | 28 | 4 | | |
| Tertiary/trades | 63 | 26 | 11 | | |
| University | 71 | 16 | 13 | | |
| <i>Ethnicity %</i> | | | | | |
| Pākehā/European | 67 | 24 | 9 | | |
| Māori | 79 | 21 | 0 | | |
| Pasifika* | 48 | 52 | 0 | | |
| Asian* | 45 | 36 | 18 | | |

* N.B. The size of these groups is small (Pacific=25, Asian=10), and the data should be viewed with caution.

We can see whether these choices of secondary school at age 12 actually occurred when we analyse the data from the age-14 phase, when the study sample were all at secondary school, and if not, whether students with particular family characteristics did not go on to their intended school.

Secondary school choice, educational, and occupational aspirations

Decisions on secondary school were more likely to have been made for the boys in the study when they were 10 than the girls,⁶¹ but at age 12, there were no gender differences. Two or more schools were more likely to be being considered for students whose mothers had a tertiary, trades, or university qualification (23 percent compared with 15 percent of those whose mothers had a school or no qualification).

Student views were similar: 67 percent said they knew which secondary school they would be going to, 18 percent were not sure, and 15 percent did not yet know. The student who was already being home-schooled would continue to be home-schooled.

However, student and parent views were not totally in agreement: 81 percent of the students and parents agreed that the decision had been made on the next secondary school, but only 35 percent of the students whose parents said the decision had not been made agreed with their parents. This indicates that students may have made decisions that their parents were not yet aware of.

Decision-making

Many of the students took part in this decision-making about their next school. Students are somewhat more likely to see themselves involved in the decision than are their parents, but their overall views are not dissimilar.

Table 163 Decision-making about secondary school

| | Student (n=496) % | Parent (n=496) % |
|--------------------|-------------------------|------------------------|
| Student & parent/s | 60 | 51 |
| Parent/s only | 22 | 28 |
| Student only | 15 | 8 |
| Not sure | 2 | 1 |

Girls and boys gave similar answers. Māori children were more likely to see that they had made the decision on their own (27 percent). Pasifika children were marginally more likely to say their parents had made the decision (40 percent, $p = 0.06$). Those whose mother had a school or no qualification were more likely to say that their parents only were making the decision (28 percent compared with 17 percent of those whose mother had a tertiary or university qualification). This is consistent with the patterns found looking at the parental answers about the decision.

⁶¹ This may reflect the higher proportion of boys who gave family tradition as a main reason for their secondary school choice.

Secondary school choice, educational, and occupational aspirations

Children's views

There are similar proportions of parents and children who give family tradition and friends' choice as their main reasons for choosing their secondary school. Students were much less likely to mention the school's reputation, and less likely to mention the proximity of the school, or other reasons. There were no associations between the reason for the choice, and who was involved in the decision-making.

Table 164 Parental and student reasons for choice of secondary school

| Reasons ⁻ | Student % | Parent % |
|-----------------------------------|--------------|-------------|
| Good reputation | 23 | 46 |
| Closest school | 21 | 31 |
| Family tradition | 26 | 27 |
| Friends go there | 21 | 23 |
| Subject choice | 5 | 14 |
| Single-sex | 1 | 10 |
| Size | 2 | 8 |
| Already attends | – | 7 |
| Religion | – | 7 |
| Facilities/uniform | – | 3 |
| School ethos/values | – | 3 |
| School type other than single sex | – | 3 |
| Only one I can get into | 1 | 1 |
| Māori | – | 1 |
| Cost | – | 1 |

Other reasons included the quality of the sport and music, and the chance to make new friends. Boys were slightly more likely to mention family tradition as a reason (30 percent compared with 22 percent of girls), or that the chosen school was the closest school to them (25 percent compared with 17 percent of girls). There were no ethnic differences, but some trends which might have become clearer with a larger sample, with Asian children more likely to mention the reputation of the school (43 percent), and Pasifika children more likely to mention family tradition (40 percent). There were no differences related to maternal qualification.

School reputation was more likely to be mentioned by children whose family income was \$60,000 or more (28 percent compared with 15 percent of others). It was also mentioned more by those who were going on to a decile 9–10 school (33 percent compared with 10 percent of those going on to a decile 1–2 school), and by those going on to a private school (47 percent compared with 31 percent of those going on to state integrated schools, and 20 percent to state schools). The lack of association between school reputation as a reason for choice and maternal qualification levels suggests that school “reputation” may be as much a matter of a school's socio-economic associations – of students or price – as anything else. School reputation was the only reason that differed in terms of the socio-economic decile of the secondary school the student was likely to be attending.

There were only 2 other differences in student answers about the reasons for the choice of school for their secondary education that were related to school ownership. Children going on to a state school were more

Secondary school choice, educational, and occupational aspirations

likely to mention that it was the closest school (30 percent compared with 6 percent of those going on to state integrated schools, and 13 percent of those going on to private schools); and those going on to state integrated schools, more likely to mention religion (13 percent).

Looking at parental responses, there was only 1 significant difference related to maternal qualification, with friends' decisions mentioned most for children whose mothers had a university qualification (31 percent). There are no family income-related differences for the major reasons for secondary school choice, but some differences for minor reasons: single-sex schools were more likely to be chosen by high and very high-income families (13 percent compared with 6 percent of mid-low-income families), and for girls (16 percent compared with 4 percent of boys). Religion was a reason for 1 percent of the low-income families, compared with 7 percent of others.

Twenty-seven percent of those who had chosen private schools, and 24 percent of those who had chosen state integrated schools for their secondary education were already attending those schools.

The association between school reputation and school ownership found for the children's answers was not evident in the reasons parents gave for the choice of secondary school. Like the children though, there were associations with proximity and religion, and associations with size and single-sex schooling. State schools were more likely to be chosen because they were the closest school (46 percent of these choices compared with 16 percent of choices of state integrated schools, and 13 percent of choices of private schools), and less likely to be chosen for their size (6 percent compared with 17 percent of choices of state integrated schools, and 13 percent of private schools), or offering single-sex schooling (8 percent of choices, compared with 17 percent of choices of state integrated schools and 18 percent of private schools). Choices of state integrated schools were most likely to include religion as a reason (27 percent).

There were few differences associated with school socio-economic decile. Those parents who had mentioned a decile 1–2 school were just as likely as those who had mentioned a decile 9–10 school to give as their reasons the reputation of the school, the fact that it was the closest school, family tradition, or subject choice. This suggests either that parents are not operating with a single “league table” based on only one kind of criterion – or that these reasons are operating within the range of schools they see as available in terms of their location and the cost of transport. (We did not ask parents or students to list all the schools they had considered, or ones they had wondered about but ruled out of consideration, which would give a richer context for understanding school choice and what affects it.) Single-sex was more likely to be a reason for choosing a decile 9–10 school (17 percent) and religion, a decile 1–2 school (17 percent).

Do different population sub-groups show different patterns of school choice and satisfaction with their child's school progress?

The simple answer is yes, in terms of current school attendance and the characteristics of chosen future secondary schools. The patterns are as one would expect: more attendance and choice of low-decile schools by low-income families and those where the mother has no qualification, and conversely, more attendance at, and choice of, high-decile schools by high-income families and those where the mother has a university qualification. But these differences are clearest at either end of the decile spectrum, and in

Secondary school choice, educational, and occupational aspirations

relation to private schools; there are no significant distinctions in the decile 5–8 schools. Pākehā/European children were less likely to be looking ahead to decile 1–2 secondary schools, but there were otherwise no significant ethnic differences in our sample.

On the whole, the existing differences in patterns of current school attendance related to differences of family resources are set to continue in the secondary schools attended by the study children, though there are not widespread differences related to family resources in the reasons given by parents and children. While there are some expected differences, they are not consistent across both parents and children, and are not clearcut in relation to school decile. School reputation was just as likely to be mentioned by parents whose child was looking to attend a low-decile as a high-decile school. This may be related to the lack of difference in parental satisfaction levels with their child's education among parents with different educational and income levels, and from different ethnic backgrounds.

Children were perhaps more conscious of assumptions that high socio-economic meant high quality, and the differences between children's and parents' views, given that both played a part in most of the decision-making about the next secondary school, certainly underlines the importance of finding out more about how children see schools, and what they use as evidence about school quality.

Looking forward to secondary school

Fifty-nine percent of the 12-year-olds were looking forward to going to secondary school, and 26 percent fluctuated or were unsure. Only 15 percent were definitely not looking forward to moving on to secondary school. Boys were more likely to vary in their feelings about going on to secondary school (67 percent compared with 50 percent of girls), while girls were more definite that they were not looking forward to secondary school (34 percent compared with 19 percent of boys). There were no differences related to family resources.

The main reasons why students felt positive about going on to secondary school were that they felt ready for a change (32 percent), they thought they would learn interesting things or have more challenge (25 percent), and they looked forward to having more choice and being more independent (22 percent). Nine percent mentioned friends who were already attending secondary school, and 5 percent, sporting opportunities.

Those who were not looking forward to secondary school, or who felt unsure about it, thought the work could be too hard (18 percent), or they feared the social environment of secondary school (14 percent). Thirteen percent felt confused about moving on, and thought they did not know what to expect.

In the age-14 analysis, we will see how these feelings about secondary school are related to actual experiences and engagement.

Parental aspirations

The study children's parents see value in education. At age 5, 29 percent of the children's parents wanted them to have a tertiary education. At age 6, this increased to 45 percent. At age 12, 50 percent wanted their children to have this education, a similar figure to that at ages 8 and 10. Thirty-eight percent wanted their child to go *as far as they could*, a drop from 48 percent at age 10. Five percent wanted the *best of everything*. Only 3 percent settled for the end of secondary school, and 1 percent, for School Certificate. Two percent wanted enough to be worthwhile. Aspiration levels are much the same for boys and girls.

Parents' aspirations reflected ethnicity, maternal qualification, and family income levels. Māori parents were less likely to aspire to university or other tertiary education for their child (29 percent compared with 50 percent overall).

Seventy percent of the very high-income parents expected their child to go on to a university or tertiary education, compared with 51 percent of the high-income parents, and 37 percent of the mid-low-income parents.

Where mothers have no qualification, the aspirations – or expectations – are unlikely to be for tertiary study. However, though there are more of this group who focus on the end of secondary school only, the rest do not have specific aspirations that are more limited than for children of mothers who have some form of qualification. They are simply more vague, and dependent on the child. But this group is also more aware of the costs of post-school education, with 37 percent citing lack of money as an obstacle which could prevent their child from getting the education they would like them to have.

Table 165 **Maternal qualification and educational aspirations for child at age 12**

| Maternal qualification → | None | School qualification | Tertiary/trade | University |
|--------------------------|------|----------------------|----------------|------------|
| Aspiration ↓ | % | % | % | % |
| University/tertiary | 18 | 46 | 58 | 70 |
| As far as wants to go | 53 | 41 | 33 | 28 |
| The best/the lot | 16 | 5 | 3 | 0 |
| End of secondary | 7 | 3 | 3 | 1 |

Parental aspirations have been found in some research to make a difference to the achievement of children from low-income homes (Pilling, 1990). In the Competent Children study, with a wider range of children, we found no relationship between parental aspirations for their child when the child was aged 5 with children's competency levels at age 10, once maternal qualification and family income were taken into account. In this phase we looked at current parental aspirations, with the caveat that these may well reflect children's current performance as much as a desire to see them do well. We found some differences related to mathematics and the PAT Reading Comprehension test, with children whose parents wanted them to go on to tertiary education scoring higher than others; and those whose parents had non-specific aspirations ("as far as wants to go") scoring higher than those who opted for secondary school completion or a vague "the best".

Secondary school choice, educational, and occupational aspirations

Thirty-eight percent of the parents did not see anything getting in the way of their child having the education they would like them to have. The main obstacles seen when the children were aged 12 was the child's own choice (24 percent), lack of money (21 percent, somewhat lower than the 30 percent at age 10, and the 38 percent at age 8), and the child's attitude or temperament (15 percent, an increase from 10 percent at age 10). Other obstacles mentioned by 2–3 percent each were limited skills or ability, health, peer pressure, possibility of early pregnancy, government policy changes, and curriculum or teachers who were not responsive to the child's needs. One percent mentioned a lack of choice in school or course. There were no significant differences in these obstacles related to family characteristics (given that there are some family-related differences in educational aspirations).

However, boys were somewhat more likely to be seen as making choices or having attitudes that could stop them getting the kind of education their parent would like them to receive. Twenty-eight percent of the boys were seen as potentially lacking the desire to go on to further education, compared with 20 percent of the girls, and 20 percent as potentially lacking the attitude or temperament to continue, compared with 10 percent of the girls.⁶² This may be why parents were more likely to be saving for girls' education after primary school than boys': 50 percent compared with 40 percent for boys.

Forty-five percent of the parents said they were saving for their child's post-primary education, slightly increased from the 40 percent at ages 8 and 10. Three percent said that another relative was saving for this education, slightly down on the 6 percent at age 10. Saving was most likely to be occurring for children whose mothers had a university qualification (60 percent), and in the very high-income families (56 percent compared with 26 percent of the low-income families). Pasifika and Asian families were also more likely to be saving for their child's education after primary school (62 percent compared with 43 percent of Pākehā/European and Māori).

Occupational interests

The next table compares student and parent views of the kind of occupation the student might do when they are an adult. Just under a fifth of the parents did not have a clear view of this, compared with 7 percent of the students. Other than that, the overall views are similar, with the exception of sport: 22 percent of the students thought they might earn money through sport when they were adult, compared with 6 percent of their parents.

⁶² That parents of some boys were seeing potential conflict between educational participation and the boys' own attitude to education is interesting, since this perspective is consistent with boys scoring less well on some of the classroom behaviour items in the competency measures.

Secondary school choice, educational, and occupational aspirations

Table 166 Children's and parents' views on children's future occupations

| Occupation ⁻ | Children % | Parents % |
|---|---------------|--------------|
| Professional | 18 | 19 |
| Don't know | 7 | 19 |
| Design/art | 9 | 11 |
| Teaching | 7 | 8 |
| Entertainment | 11 | 8 |
| Animals | 11 | 7 |
| Computers | 7 | 7 |
| Journalism/writing | 6 | 6 |
| Sports | 22 | 6 |
| Science | 5 | 6 |
| Uniform – police/armed forces/ambulance | 6 | 5 |
| Business/entrepreneur/own company | 6 | 4 |
| Cooking | 6 | 4 |
| Trade | 5 | 4 |
| Medicine | 4 | 4 |
| Outdoor work | 3 | 3 |
| Indoor work | 5 | 2 |
| Discovery/travel | 2 | 1 |
| Hypnotherapist | 2 | 0 |

Although maternal qualification and family income levels were related to differences among parents in terms of educational aspirations, we found no significant differences in relation to the kinds of work they think their children would be interested in doing. This may have been because we had a wide range of responses, giving relatively small numbers in most groups. Thus there are some trends which may be significant in a larger sample:

- less mention of professional occupations for those whose mother had no qualification (13 percent);
- more mention of uniformed services and trades for those whose mothers had a school or no qualification (7 percent each); and
- more mention of science and entertainment for those whose mother had a university qualification (9 and 11 percent respectively).
- Pasifika and Asian parents were marginally more likely to mention a professional job as the kind of occupation they could see their child doing as an adult (31 percent compared with 18 percent of Pākehā/European and Māori, $p = 0.07$).

The student responses give similar indications, and stronger ones in terms of professional aspirations:

- Most mention of professional occupations (31 percent compared with 16 percent of others), and science-related occupations (14 percent compared with 3 percent of others) by those whose mother had a university qualification;
- more interest from the children whose mothers had a tertiary/trades or school qualification in having their own business (8 percent compared with 3 percent of those whose mothers had no qualification

Secondary school choice, educational, and occupational aspirations

or a university qualification), or working with animals (13 percent compared with 7 percent of the others);

- most interest in the uniformed services from those whose mother had a school qualification (9 percent compared with 4 percent of others); and
- least interest in teaching among children whose mothers had no qualification (2 percent compared with 8 percent of others).

In relation to family income levels, there were fewer differences:

- most interest in science among children from very high-income families (9 percent compared with 3 percent of others);
- most interest in trades among children from low-income families (10 percent); and
- least interest in entertainment (4 percent) among children from low-income families.

Note that the differences that are evident are not in relation to the new careers opened up by ICT, mass media, and the commercialisation of sport; they are there in terms of what children may be familiar with, what may be talked about in their own home or known to them through their relationships with family networks, rather than through the Internet.

Maternal qualification seems more relevant than family income to children's thoughts – at the age of 12, before they may be aware of particular educational and cost pathways – about their future occupation. When we looked at whether these aspirations differed in relation to family income levels, we found only 3 trends – greater interest in professional occupations among those whose family incomes were high or very high, consistent trends of interest increasing with income level for journalism/writing, and decreasing for trades.

Thoughts of future occupations also show some gender differences. Girls were much more likely to be seen by their parents as interested in:

- teaching (15 percent compared with 2 percent of boys);
- journalism or writing (9 percent compared with 3 percent of boys);
- entertainment (13 percent compared with 3 percent of boys);
- animals (11 percent compared with 4 percent of boys); or
- medicine (6 percent compared with 2 percent of boys).

Boys were much more likely to be seen as interested in:

- sports (9 percent compared with 3 percent of girls);
- computers (11 percent compared with 3 percent of girls);
- uniformed forces (e.g. police, army) (8 percent compared with 1 percent of girls);
- outdoor work (7 percent compared with no girls); or
- trade (6 percent compared with 2 percent of girls).

Summary

Choice of secondary school

The choice of secondary school had been made or narrowed down to a selection from 2 or 3 schools for 91 percent of the Year 8 students, and 84 percent of the Year 7 students. Twenty-seven percent of those who had chosen private schools, and 24 percent of those who had chosen state integrated schools for their secondary education were already attending these schools.

The school characteristics of the chosen schools are similar to those chosen by the study parents when their children were younger, but with a decrease in the proportion choosing decile 9–10 schools, and a corresponding increase in those choosing schools in the adjacent decile band, 7–8. This shift may reflect the reality of school enrolment policies as the time to move on to secondary school became close.

Differentiation in the patterns of primary school attended in relation to family income and maternal qualification occurred largely at the ends of the socio-economic decile spectrum, and in relation to private schools. The same pattern is evident in relation to choice of secondary school. However, there were still substantial proportions of parents from low-income families and those where the mother had no qualification who wanted their child to attend a decile 9–10 school. Very high-income families deciding on a non-state school were likely to favour a private school; while high-income and Pasifika families opted for state integrated schools. Two or more schools were being weighed against each other by a higher proportion of families where the mother had a post-school qualification.

School decision-making was largely a shared process. However, students were more likely than their parents to see this decision as shared between student and parents, or to see the decision on school as theirs alone. It was more likely for parents to make the decision on their own for children whose mother did not have a post-school qualification, and there were indications that this was also the case for Pasifika children.

Parents were twice as likely as age-12 children to mention a good reputation as one of their main reasons for the secondary school they chose, and somewhat more likely to mention the proximity of the school. Just over a quarter of both parents and children mentioned family tradition, and just under a quarter of each group, the fact that friends would be or were already going there. There were no associations between the reasons given, and who had been involved in the decision-making.

Maternal qualification levels were not reflected in the reasons given by children for the choice of secondary school, but family income was, with school reputation mentioned more by those with high or very high-incomes. School reputation was also more likely to be mentioned as a major reason by those going on to decile 9–10 schools: this was the only difference in reason related to school socio-economic decile. Children going on to private schools were more likely to mention reputation; those going on to state schools, proximity, and those going on to state integrated or private schools, religion.

Family income differences were not reflected in the most frequent reasons given by parents for choice of secondary school, but were in relation to single-sex and religion. Single-sex schools were more likely to

Secondary school choice, educational, and occupational aspirations

be chosen for daughters than sons. Maternal qualification was largely unrelated to parental reasons, though friends' decisions were mentioned most for children whose mothers had a university qualification. Among parents, there was no association between school decile and reputation.

On the whole, the existing differences in patterns of current school attendance related to differences of family resources are set to continue in the secondary schools attended by the study children, though there are not substantial differences related to family resources in the reasons given by parents and children. While there are some expected differences, they are not consistent across both parents and children, and are not clearcut in relation to school decile.

Attitudes to secondary school

Fifty-nine percent of the 12-year-olds were looking forward to going to secondary school, and 26 percent fluctuated or were unsure. Only 15 percent were definitely not looking forward to moving on to secondary school. Boys varied more in their feelings, but twice as many girls as boys were not looking forward to secondary school.

The main reasons why students felt positive about going on to secondary school were that they felt ready for a change, they thought they would learn interesting things or have more challenge, and they looked forward to having more choice and being more independent (22 percent). Those who were not looking forward to secondary school, or who felt unsure about it, thought the work could be too hard, or they feared the social environment of secondary school. Thirteen percent felt confused about moving on, and thought they did not know what to expect.

Parental aspirations

Half the parents now wanted their child to have a tertiary education, and only 4 percent settled for secondary school only. Parents' aspirations reflected ethnicity, maternal qualification, and family income levels. Māori parents were less likely to aspire to university or other tertiary education for their child, as were those where the mother had no qualification. The latter tended to be more aware of the costs of post-school education as a potential obstacle to their child getting the education they would like them to have. Otherwise, there were no differences in the obstacles seen that were related to differences in family characteristics. The main obstacles foreseen were the child's own choice, lack of money, and the child's attitude or temperament, with boys more prone than girls to not realising their parental aspirations through their own choice or attitude.

Aspirations for the children at age 12 that included tertiary education were highest among the very high-income families, and those where the mother had a university qualification.

Forty-five percent of the parents said they were saving for their child's post-primary education, slightly increased from the 40 percent at ages 8 and 10. Saving was most likely to be occurring for children whose mothers had a university qualification, and in the very high-income families, and in Pasifika and Asian families.

Occupational interests

Around a fifth of the study children were interested in professional occupations, and in sports. Only 7 percent of the children could not think of an occupation that they would like to do as an adult. Maternal qualification and family income levels were not significantly related to parental views of what would interest their child, though there were some trends which are consistent: more mention of professional occupations, and science for those whose mothers have a university qualification; science was also more likely to be mentioned by children from very high-income homes. The uniformed services appealed more to those whose mothers had a school-level qualification, or none. Gender made some difference to the parents' ideas of future occupations, but not the children's.

Section Seventeen

Fitting it all together

In this section, we present 2 sets of analysis which aim to bring as much of the data as possible into single models, to form an overall picture of the main factors related to children's performance at age 12, and to answer the following research question:

What weight do these aspects of children's lives play in their competencies compared to each other: family resources, school experiences, home-based and out-of-school activities, and early-childhood education experiences?

The purpose of models is to provide a picture which accounts for as much of the variance in children's performance as possible. Often, the final model selected is "parsimonious" in that it aims to include only variables making a statistically significant improvement to the model. In this study, we have gathered as much material as feasible on the study children's activities, home and school resources, and early childhood education. To some extent, this gives us an embarrassment of riches when it comes to the building of "overall picture" models, not the least because many of the variables are likely to occur together in the reality of children's lives, and their co-occurrence makes it difficult to clearly see the individual contribution of each specific variable once the variables are included in the same model. The variables that "survive" in a final model are likely to be ones which have greater association with the outcome variable/s than others. Their presence has a double meaning, and needs interpretation both in terms of the variable itself, and what it may be connected with. Often the type of variable – whether it is continuous or categorical, and if the latter, how many possible values it has – has a bearing on whether it can be used in particular kinds of analysis, and how it "behaves" in the analytical process.

We provide 2 kinds of model in this section, each providing a different vantage point on the relation of these key aspects of the study children's lives with their competency levels at age 12. The first uses ANOVA analysis, which is restricted to a single outcome variable with many explanatory variables. The second uses structural equation modelling, which is not restricted to a single outcome variable, but where the restrictions on the variable types can be limiting.

Results from ANOVA analysis

To start our modelling process, we first compiled summary pictures of all the variables which seemed most related to mathematics, the PAT Reading Comprehension test, Perseverance, Communication, and Individual Responsibility scores at age 12. We based our selection on whether the ANOVA analyses showed sizeable differences in percentage points scores between different categories of a variable. These summary pictures are given in Appendix 4. We used the models developed in the previous Competent Children phase as a starting point, and then added the “history factors” and the variables showing sizeable differences with age-12 competency levels, one at a time, to see whether the new variable added to the variance accounted for by the model, and whether it displaced an existing variable in the model. We also added family income and maternal qualification, and for mathematics and the PAT Reading Comprehension test, earlier levels of performance, at age 5 and age 10.

We have used ANOVA analysis (also known as regression using dummy variables) as it is the most appropriate analysis for data where the outcome variable (achievement of some kind) is approximately continuous, and the explanatory variables are measured on, at best, an ordered categorical scale.⁶³

For each factor considered, we are posing the question, “Does this factor of interest show any signs of RESIDUAL impact after accounting for all the other factors which we acknowledge are occurring in our sample at differing levels for the different children we have in each subgroup of the children relative to the factor of interest?” The model in effect adjusts the individual scores to account for these differing levels of each of the other factors before considering if there is or is not some impact associated with the factor in question. This provides a stringent test for the significance of an association. If there is such residual impact then this suggests the factor of interest could be “important” in some way. It is contributing something extra beyond all of the other factors in explaining the variation seen in the whole sample. A corollary to this is the suggestion that when a factor shows no residual impact, its effects have already been accounted for by the earlier factors (at least to the extent that what is left cannot be differentiated from “noise” or background variability). In such a case, for example for maternal qualification, the suggestion is that the earlier factors pick up a similar structure in the data as we see associated with the maternal qualification factor. From this we may suggest that at least part of what it is that the more educated mothers are supporting or encouraging for their children is being expressed through those earlier factors (such as some of the mathematics activities, for example). These situations

⁶³ See the Glossary in Appendix 1 for an explanation of these terms. A paper on NZCER’s website, *Some comments on ANOVA and Regression Models*, by David Harte, a consultant statistician from Statistics Research Associates Ltd., discusses the different types of analysis possible in the family of linear models, the types of data appropriate for use with such models, and demonstrates the equivalence of “analysis of variance” and “regression with dummy variables”.

give us some insight into what it is about having a highly-educated mother or about being in a high-income family that is contributing to a difference for these children.⁶⁴

In the descriptions below, we give both the initial and final models, since the displacement of one variable by another adds further insight into the underlying processes which are occurring over time, and allows a comparison with the models which accounted for the most variance in scores at age 10.

Mathematics

Our starting model accounted for 43.5 percent of the variance in age-12 mathematics scores. Five of the 8 variables in this model are to do with actual use of mathematics at home 2 years earlier; the other 3 can be thought of as standing in their own right but also as “indicator” variables. Enjoyment of reading, for example, signals the use of time to read (to gain knowledge, understanding, and make connections). We found at age 10 that the ECE socio-economic mix was linked to the incidence of the quality indicators which were associated with children’s competency levels (Wylie and Thompson, 2003). That children who always help out at home, rather than often, tells us something about the costs of lack of time available for other activities which may better support or foster mathematics knowledge and understanding.

Table 167 **Starting model for effects of variables in model accounting for variance in age 12 mathematics scores**

| Variable (comparison in brackets, first level given is “the best”) | | p-value from ANOVA with this variable fitted last | Size of largest contrast | s.e. | Prob for this contrast |
|--|----------------------------------|---|--------------------------|------|------------------------|
| ECE socio-economic status | (middle-class vs. wide) | < 0.0001 | 14.0 | 2.7 | < 0.0001 |
| | (middle-class vs. low-to-middle) | | 14.1 | 3.1 | < 0.0001 |
| | (middle-class vs. low) | | 13.8 | 4.0 | 0.0006 |
| Helps out at home at 10 | (often cf. always) | 0.014 | 9.9 | 3.0 | 0.001 |
| At home tells the time at 10 | (yes cf. no) | 0.024 | 8.5 | 3.7 | 0.024 |
| Child enjoys reading at 10 | (yes cf. qualified yes) | 0.001 | 9.8 | 3.2 | 0.002 |
| | (yes cf. no) | | 7.8 | 3.1 | 0.011 |
| At home uses proportions (other than ½ and ¼) at 10 | (yes cf. no) | 0.021 | 6.3 | 2.7 | 0.021 |
| Home maths – tables over 10 at 10 | (yes cf. no) | 0.0005 | 8.8 | 2.5 | 0.0005 |
| At home uses scales to weigh at 10 | (yes cf. no) | 0.0007 | 8.7 | 2.5 | 0.0007 |
| At home uses ruler to measure | (yes cf. no) | 0.032 | 7.2 | 3.4 | 0.032 |

After fitting current variables showing sizeable associations, most of the “history” factors, and variables from earlier phases which had shown associations with children’s mathematics scores, and finally fitting

⁶⁴ In this model, we are not attempting to fit interactions between all of the factors, because we would have many empty cells. Such a model would require an estimate for each and every cell in the whole cross-classification, and would be difficult to interpret.

family income and maternal qualification separately, we ended with the model below, which accounted for 67.8 percent of the variance. Family income and maternal qualification did not displace any of the variables or add to the model's power. Thus, the categories of the variables below provide a guide to the kinds of experience which are associated with higher performance, whatever the level of family income and maternal qualification.

Table 168 **Final model for effects of variables accounting for variance in age 12 mathematics scores**

| Variable (comparison in brackets) | | p-value from ANOVA with this factor fitted last | Size of largest contrast (% points contrast) | s.e. of this diff. | prob for this contrast |
|---|--|--|--|--------------------------|------------------------------|
| Length of ECE experience | (≥48 mths cf. <24 mths) | p=0.012 | 10.1 | 3.4 | 0.004 |
| | (≥48 mths cf. 24–35 mths) | | 5.4 | 2.9 | 0.066 |
| | (≥48 mths cf. 36–47 mths) | | 7.2 | 2.9 | 0.013 |
| Talks about fractions at age 6 | (yes cf. no) | p=0.002 | 6.0 | 2.0 | 0.003 |
| Computer ownership at age 8 | (yes cf. no) | p=< 0.0001 | 11.3 | 2.2 | < 0.0001 |
| Home writing at age 8, does word puzzles | (yes cf. no) | p=0.025 | 5.1 | 2.2 | 0.025 |
| At home uses proportions (other than ½ and ¼) at 10 | (yes cf. no) | p=0.004 | 7.0 | 2.4 | 0.004 |
| Home maths – tables over 10 at 10 | (yes cf. no) | p=< 0.0001 | 9.1 | 2.2 | < 0.0001 |
| Lessons out of school in fine arts, age 10 | (yes cf. no extra lessons) | p=0.002 | 21.0 | 5.8 | 0.0004 |
| | (yes cf. extra lessons but not in fine arts) | | 18.4 | 5.7 | 0.001 |
| School socio-economic decile at age 10 | (9–10 cf. 1–2) | p=0.014 | 16.0 | 7.2 | 0.029 |
| | (7–8 cf. 1–2) | | 16.6 | 6.4 | 0.011 |
| | (5–6 cf. 1–2) | | 22.6 | 7.1 | 0.002 |
| | (3–4 cf. 1–2) | | 22.0 | 6.6 | 0.001 |
| At home at age 12 student can do what likes | (rarely/never cf. always) | p=0.005 | 9.9 | 4.5 | 0.029 |
| | (usually cf. always) | | 8.0 | 3.6 | 0.029 |
| | (rarely/never cf. occasionally) | | 8.8 | 3.8 | 0.022 |
| | (usually cf. occasionally) | | 6.8 | 2.4 | 0.006 |
| At home at age 12 student feels close to family | (usually cf. always) | p=0.005 | 11.6 | 3.0 | 0.0001 |
| At school at age 12 the rules are fair | (usually cf. rarely/never) | p=0.018 | 14.7 | 5.8 | 0.012 |
| | (occasionally cf. rarely/never) | | 11.9 | 6.1 | 0.053 |
| At school at age 12, could do better if tried | (rarely/never cf. usually) | p=0.037 | 8.5 | 3.4 | 0.012 |
| Home maths at 12 uses ruler to measure accurately | (yes cf. no) | p=0.0008 | 7.9 | 2.3 | 0.0008 |
| Time spent on homework at age 12 given it is done | (3.5–4hrs cf. 0.5–1) | p=0.017 | 9.8 | 3.5 | 0.006 |
| | (3.5–4hrs cf. 1.25–2) | | 8.4 | 3.3 | 0.010 |
| | (3.5–4hrs cf. 2.25–3) | | 7.9 | 3.2 | 0.014 |
| | (3.5–4hrs cf. 6+) | | 9.7 | 4.4 | 0.028 |
| | (4.5–5hrs cf. 0.5–1) | | 9.0 | 3.9 | 0.022 |
| | (4.5–5hrs cf. 1.25–2) | | 7.7 | 3.7 | 0.039 |
| | (4.5–5hrs cf. 2.25–3) | | 7.1 | 3.6 | 0.052 |
| (4.5–5hrs cf. 6+) | 8.9 | 4.6 | 0.054 | | |
| Enjoys reading at age 12 | (yes cf. no/not really) | p=0.008 | 8.6 | 3.1 | 0.006 |
| | (yes cf. Qualified yes) | | 5.7 | 2.7 | 0.038 |
| History of school socio-economic decile | (high cf. mostly 1–2) | p=0.0008 | 34.5 | 7.7 | < 0.0001 |
| | (medium cf. mostly 1–2) | | 31.9 | 7.0 | < 0.0001 |
| | (mixed cf. mostly 1–2) | | 28.6 | 6.6 | < 0.0001 |

* "High" for history of school decile means high (9–10) at ages 5, 6 & 8 and high or medium (3–10) at age 12.

* "Medium" for history of school decile means deciles 3–8 at ages 5, 8, 10, & 12.

The mean scores are percentages, not raw scores. The differences between the categories for each variable in the model are those which exist after allowing for all the other variables in the model.

In this model, we see all the main categories of the variables which could affect children's age-12 performance: children's activities – their use of mathematics, their enjoyment of reading, the time spent on homework, and whether the help they give at home takes time from other activities which involve mathematics more; family resources in the form of earlier computer ownership, the school socio-economic decile (related to where families live as well as money available for transport), and in the form of the child's sense of support at home; school resources related to socio-economic decile and how fairly students feel treated; and early childhood education, in the form of total length of experience.

Both previous and current experience and responses occur in this model. The continuing contribution of ECE and early knowledge of fractions (proportions and patterns) to mathematics performance at age 12 is consistent with our finding (Section Three) on the importance of mathematics and related knowledge and practice occurring early in children's lives.

Model with age-10 score for mathematics

When we added age-10 scores for mathematics to the model,⁶⁵ 4 of the variables in the model were displaced, indicating that they were subsumed in age-10 mathematics performance. They were:

- length of early childhood education;
- home writing at age 8 – word puzzles,
- uses proportions (other than $\frac{1}{2}$ and $\frac{1}{4}$) at home at age 10; and
- fine arts lessons out of school at age 10.

The size of the contrasts between different categories of the variables was also reduced. This model accounted for 71.4 percent of the variance in children's mathematics scores at age 12.

When we added age 5 scores for mathematics to the model, 3 of the variables were displaced. The length of early childhood education was not one of them, which is consistent with the 1-factor ANOVA analysis showing it making a contribution to age-12 scores. The displaced variables were:

- school socio-economic decile at age 10;
- home writing at age 8 – word puzzles; and
- student feels they could do better at school if they tried.

This model accounted for 67.6 percent of the variance, somewhat less than the model which included age-10 performance.

⁶⁵ The variables in the existing model can be thought of as “fixed” effects (one either has talked about fractions or one has not); the scores on the competency measures are snapshot measures of something which they may not exactly measure or capture, and so they can be thought of as “random”. Mixing fixed and random effects would pose problems if we were trying to provide an exact estimate of the effects of the model, but we have used these “mixed” models to add further insight into our interpretation of the processes that are at work in children's performance.

Reading comprehension

The model which accounted for the highest proportion of variance in the children's PAT Reading Comprehension scores at age 10 (53.9 percent) included these variables:

| | |
|---|---|
| Homework | (yes cf. no) |
| Early childhood education socio-economic mix | (middle class cf. low) |
| TV watching at age 10 | (none cf. 2–3 hours daily) |
| Parental support for class | (fantastic cf. little) |
| Child feels they are doing well at school through solving a problem by working hard | (agree cf. not sure) |
| Child enjoys reading | (yes cf. qual. yes or no) |
| Child read library books at age 6 | (yes cf. no) |
| ECS was a print-saturated environment | (4 th quartile rating cf. 1 st quartile rating) |
| At home uses proportions other than ½ and ¼ | (yes cf. no) |
| Home maths – tables over 10 | (yes cf. no) |

These variables accounted for 48.2 percent of the age-12 PAT Reading Comprehension test scores.

After working through all the age-12 variables that showed a sizeable association, the history factors, and variables from earlier phases which had shown associations, family income, and maternal qualification, the final model (below) accounted for 61.8 percent of the variance in age-12 PAT Reading Comprehension test scores.

Table 169 Final model of variables accounting for variance in PAT Reading Comprehension test scores at age 12

| Variable (comparison in brackets) | p-value from ANOVA with this factor fitted last | Size of largest contrast (% points contrast) | s.e. of this diff. | Prob for this contrast | |
|---|---|---|--------------------|------------------------|-------------|
| ECE was "print-saturated" environment | | (4 th quartile cf. 1 st quartile) | 9.4 | 3.6 | 0.010 |
| | | (3 rd quartile cf. 1 st quartile) | 10.8 | 2.6 | < 0.0001 |
| | | (2 nd quartile cf. 1 st quartile) | 7.9 | 2.8 | 0.004 |
| Did home writing at age 5 | (yes cf. no) | p=0.002 | 6.4 | 2.1 | 0.002 |
| Talks about fractions at age 6 | (yes cf. no) | p=0.003 | 6.7 | 2.2 | 0.003 |
| Read comics at age 8 | (yes cf. no) | p=0.035 | 10.2 | 4.8 | 0.035 |
| Home maths at age 8 – uses fractions | (yes cf. no) | p=< 0.0001 | 10.5 | 2.4 | < 0.0001 |
| Feel doing well at school when solve hard problem at 10 | (agree cf. it depends) | p=0.043 | 8.0 | 3.9 | 0.042 |
| Lessons out of school in fine arts, age 10 | | (yes cf. no extra lessons) | 17.7 | 5.2 | 0.0009 |
| | | (yes cf. extra lessons but not in fine arts) | 12.8 | 5.3 | 0.016 |
| | | (some lessons but not fine arts cf. no extra lessons) | 4.8 | 2.1 | 0.021 |
| Bullying at age 10 | | (bully cf. victim) | 10.5 | 4.4 | 0.017 |
| | | (bully & victim cf. victim) | 7.7 | 4.4 | 0.080 (N.S) |
| | | (no involvement in bullying cf. victim) | 10.5 | 3.3 | 0.002 |
| Enjoyed reading at age 10 | | (yes cf. No) | 5.3 | 2.8 | 0.061 |
| | | (yes cf. qualified yes) | 6.8 | 3.1 | 0.031 |
| Home reading, encyclopaedia at age 10 | | p=0.051 | 4.4 | 2.2 | 0.051 |
| Feel doing well at school when get highest marks at 12 | (agree cf. disagree) | p=0.014 | 6.8 | 2.3 | 0.004 |
| Enjoy reading at age 12 | | (yes cf. no/not really) | 9.1 | 3.9 | 0.021 |
| | | (yes cf. qualified yes) | 8.8 | 2.4 | 0.0003 |
| Parental resolution of disagreement at 12 | | (parent wins cf. child wins) | 20.3 | 6.7 | 0.003 |
| | | (negotiation or no problems cf. child wins) | 25.0 | 6.1 | < 0.0001 |
| | | (mixed response cf. child wins) | 19.2 | 5.9 | 0.001 |
| | | (all/any of the strategies cf. child wins) | 23.1 | 6.1 | 0.0002 |
| Student helps out at home at 12 | | (usually cf. always) | 7.9 | 2.4 | 0.001 |
| | | (occasionally cf. always) | 7.0 | 2.8 | 0.013 |
| History of class size | | (all small cf. moving small to large) | 11.7 | 4.6 | 0.011 |
| | | (all small cf. varied) | 12.8 | 4.6 | 0.005 |
| | | (moving small to large cf. all large) | 5.2 | 2.6 | 0.045 |
| | | (all large cf. varied) | 6.3 | 2.6 | 0.018 |
| | | (moving large to small cf. varied) | 7.6 | 3.7 | 0.044 |

Again, we see a mixture of variables, but with more predominance here of children's actual activities and practices. While enjoyment of reading at both ages 10 and 12 seems a "natural" inclusion in the model, reading comics at age 8 does not – it may be pointing to omnivorous appetite (after other kinds of reading

have been tried in the model). There appears to be a “floor” in terms of ECE quality of being “print-saturated” which continues to have associations with children’s reading comprehension – 7 years later. Early use of symbols – through writing and fractions – is also important, perhaps pointing to the importance of a solid basis for later reading for understanding. Talking of fractions involves making comparisons and analytical thought. Fine arts lessons occur in the models for both reading comprehension and mathematics, suggesting value not just in eye-hand co-ordination (which also occurs in sport), but in the conceptual work that occurs in painting and drawing. However, there is also an indicative association favouring other kinds of lessons out of school compared to having none.

It is interesting that a view of doing well at school based on solving problems leaves a trace from age 10, but that the association between current views of how one does well are related to getting the highest marks, not problem-solving. This may simply indicate a greater use of marks in the students’ classes at age 12, and greater student awareness of what marks might mean.

Children’s experiences of home are not related here, but their winning disputes with parents is, perhaps indicating where children’s (and parents’) energy goes, rather than in reading, the use of symbols, the use of dialogue. Being at the other end of power relations also leaves traces. The inclusion of bullying experiences 2 years earlier is consistent with the analysis reported in Section Eleven, that this is one experience which can leave clear marks.

School resources are limited to the history of class size – suggesting that children whose class sizes varied tended to have lower average scores than others, and that perhaps other factors (for example, movements between schools) are involved in each of the categories (since there is no difference after all the other variables in the table have been accounted for between children whose class size has always been small and those who have always been in large classes). It is interesting that the associations with school decile evident for mathematics are not evident for reading comprehension. We have seen in the analysis of quartile movements across time that it is much harder for children from low-income homes or whose mothers have no qualification to progress from the bottom quartile for mathematics, with an indication that it is also harder for those in these categories to retain performance above the median. Perhaps what is happening for students in the decile 1–2 schools is that their teachers are working with a critical mass of students struggling with mathematics, rather than having a wider spread of performance to work with, and for whom mathematics may seem less relevant.

Model with age-10 score for reading comprehension

Including children’s age-10 PAT Reading Comprehension test score in the model subsumed a large number of the variables included in the final model above:

- Feel doing well at school when get highest marks at 12
- Feel doing well at school when solve hard problem at 10
- ECE was “print-saturated” environment
- Parental resolution of disagreement at 12
- Bullying at age 10
- Home reading, encyclopaedia at age 10

- Read comics at age 8
- Enjoyed reading at age 10
- Did home writing at age 5
- Enjoys reading at age 12.

None of the variables that remained were about reading itself. They were the fraction use at earlier ages, fine arts lessons, whether children always helped out at home, and the history of class size. The model which included age 10 scores accounted for 74.5 percent of the variance in age-12 PAT Reading Comprehension test scores. The size of the contrasts was reduced for the fraction and fine arts variables.

Models with age 5 and age-8 scores

Including age 5 scores for early literacy into the final model did not result in the displacement of any of the existing variables, and the size of the contrasts between categories of the variables remained much the same. The proportion of variance accounted for rose slightly to 64.3 percent. So the variables in the final model for age-12 PAT Reading Comprehension test were making some contribution past age 5, but most had been subsumed by age 10. We used the same model again but included age-8 PAT Reading Comprehension test scores to see when these variables might have become less important for later performance. Most of those that were no longer evident at age 10 had been displaced by age-8 scores (this model accounted for 61.1 percent of the variance in age-12 scores).

Communication

Our models for the social and attitudinal competencies account for much less of the variance in children's scores than those for mathematics and reading comprehension. We used the age-10 model which had accounted for 47.4 percent of the variance in children's age-10 Communication scores, taking out maternal qualification and the ECE socio-economic mix to include at the end of the model development. The resulting model accounted for 22 percent of the variance in children's age-12 Communication scores.

Table 170 **Starting model for effects of variables in model accounting for variance in age 12 Communication scores**

| Variable (comparison in brackets) | | p-value from ANOVA with this factor fitted last | Size of specified diff. | Approx s.e. of this diff. | Prob for this difference |
|---|------------------------|--|--------------------------------|----------------------------------|---------------------------------|
| Student had friends to play at home at age 10 | (often cf. never) | 0.0004 | 14.4 | 5.5 | 0.009 |
| | (often cf. sometimes) | | 6.5 | 1.9 | 0.0006 |
| Homework at age 10 | (yes cf. no) | < 0.0001 | 11.5 | 3.4 | 0.0007 |
| | (yes cf. varies) | | 7.6 | 1.8 | < 0.0001 |
| Student enjoyed reading at age 10 | (yes cf. no) | 0.0002 | 8.9 | 2.2 | < 0.0001 |
| | (qualified yes cf. no) | | 5.3 | 3.1 | 0.091 |
| Home maths – tables up to 10 at age 10 | (yes cf. no) | 0.0002 | 6.8 | 1.8 | 0.0002 |
| Student played a musical instrument at age 10 | (yes cf. no) | 0.006 | 4.6 | 1.6 | 0.006 |

All of the variables in this initial model are related to children’s activities, and they cover cognitive activities undertaken solo as well as interactions with peers, and, with homework, some interaction with parents.

The final model also included mostly children’s activities, with 2 factors relating to home support and resources. Interestingly, here paternal qualification remained in the model, but not with the same kind of effects as we have seen with maternal qualification: children with higher scores did not have fathers with the higher qualifications. It would be interesting to see what other variables were associated with fathers having a mid-school qualification that could account for their standing out here.

This model accounted for 54.8 percent of the variance in children’s age-12 Communication scores.

Table 171 **Final model for effects of variables in model accounting for variance in age 12 Communication scores**

| Variable (comparison in brackets) | | p-value from ANOVA with this factor fitted last | Size of specified diffs. | Approx s.e. of each diff. | Prob for each diff. |
|--|---|---|--------------------------|---------------------------|---------------------|
| Home support for school work at age 12 | (fantastic cf. none) | 0.0001 | 27.1 | 10.8 | 0.013 |
| | (fantastic cf. some) | | 9.4 | 3.0 | 0.002 |
| | (fantastic cf. mostly v.good) | | 8.1 | 1.9 | < 0.0001 |
| History of doing homework | (yes at 10 & 12 cf. none at 12) | 0.001 | 12.9 | 6.3 | 0.044 |
| | (yes at 10 & 12 cf. some at 12) | | 7.5 | 2.1 | 0.0005 |
| Student feels doing well at school when what s/he learns makes sense | (agree cf. disagree) | 0.005 | 12.9 | 3.9 | 0.001 |
| | (depends cf. disagree) | | 12.5 | 5.5 | 0.023 |
| History of participation in music | (yes at age 8 + either 10 or 12 cf. none) | 0.003 | 11.7 | 3.3 | 0.0005 |
| | (yes at ages 8, 10 & 12 cf. none) | | 8.5 | 3.7 | 0.026 |
| | (yes at age 8 + either 10, or 12 cf. just at 8 or not at 8) | | 7.6 | 2.8 | 0.006 |
| Paternal qualification | (mid-school cf. university) | 0.015 | 9.5 | 2.6 | 0.0004 |
| | (mid-school cf. tertiary) | | 6.2 | 3.2 | 0.057 |
| | (mid-school cf. trade) | | 7.7 | 2.7 | 0.005 |
| Enjoys reading at age 12 | (yes cf. no) | 0.005 | 7.4 | 3.3 | 0.026 |
| | (yes cf. qualified yes) | | 7.1 | 2.4 | 0.003 |
| Child plays at reading at age 5 | (no cf. yes) | 0.027 | 7.3 | 3.3 | 0.027 |
| Family activities involved maths and science at age 8 | (yes cf. no) | 0.013 | 7.1 | 2.8 | 0.013 |
| Participation in music at age 10 | (yes cf. no) | 0.025 | 6.4 | 2.8 | 0.025 |
| Child talks about halves and quarters at age 5 | (yes cf. no) | 0.0004 | 6.3 | 1.7 | 0.0004 |
| At school at age 12 student learns quickly | (usually cf. occasionally) | 0.016 | 5.1 | 2.0 | 0.011 |
| Child read library books at age 6 | (yes cf. no) | 0.027 | 4.4 | 2.0 | 0.027 |
| Uses calculator at home at age 12 to do complicated computations | (yes cf. no) | 0.025 | 3.8 | 1.7 | 0.025 |

Communication was a measure of children's oral fluency, and listening skills, which include the ability to make sense of what others are saying and interpret or reproduce it. All the activities which remain in this final model were related to reading, mathematics, and music, activities involving symbols, interpretation, and making connections. Some of the activities could be done solo; others involve interaction with others, or taking instruction, and asking questions to check understanding, such as participation in music (teachers, fellow musicians, or singers), and family activities at an earlier age involving mathematics and science. There are indications that early interest in ways of representing and gaining meaning (playing at reading at age 5, talking about halves and quarters at age 5) is beneficial for later fluency with words and

making sense of what others say. Children with higher scores for Communication have an interest in things making sense: this is how progress at school is seen.

Individual Responsibility

Of the 9 variables that were in the final model accounting for 58.9 percent of the variance in age-10 scores for Individual Responsibility, only 3 remained when we used them for our initial model at age 12. This model accounted for 20 percent of the variance in age-12 scores. Gender appears for the first time in relation to the accounting of variance. The other 2 variables relate to schoolwork.

Table 172 **Initial model for effects of variables in model accounting for variance in age 12 Individual Responsibility scores**

| Variable (comparison in brackets) | p-value from ANOVA with this factor fitted last | Size of largest diff. | Approx s.e. of this diff. | Prob for this difference |
|--|---|-----------------------|---------------------------|--------------------------|
| Homework at age 10 (yes cf. no) | < 0.0001 | 13.9 | 2.8 | 0.0003 |
| Gender (female cf. male) | < 0.0001 | 10.9 | 1.6 | < 0.0001 |
| At school student keeps out of trouble at age 10 (often cf. sometimes) | 0.005 | 6.7 | 2.0 | 0.001 |

Gender still appears in the final model. There are fewer activities than in the models for mathematics, the PAT Reading Comprehension test, and Communication. Higher teacher ratings for Individual Responsibility are likely to reflect evidence of commitment to school work, and acceptance of school and class rules. It is interesting to see the context of classroom emerging here for the first time in the final models, in relation to teacher ratings of the peer support that children in the class give one another. One suspects that the variable relating to current family income, showing higher average marks for children in a mid-high-income bracket, might be standing for other differences related to Individual Responsibility scores.

Table 173 **Final model for effects of variables in model accounting for variance in age 12 Individual Responsibility scores**

| Variable (comparison in brackets) | | p-value from ANOVA with this factor fitted last | Size of specified difference | Approx s.e. of each diff. | Prob for each difference |
|--|--|---|------------------------------|---------------------------|--------------------------|
| History of homework | (yes at 10 & 12 cf. no at 12) | < 0.0001 | 26.6 | 5.3 | < 0.0001 |
| | (yes, varies or no at 10 & yes or varies at 12 cf. no at 12) | | 19.2 | 5.5 | 0.0006 |
| | (yes at 10 & 12 cf. yes or varies at 12, regardless of 10) | | 7.5 | 2.1 | 0.0004 |
| Home maths, plays board games at age 8 | (yes cf. no) | 0.031 | 18.2 | 8.4 | 0.031 |
| Gender | (female cf. male) | 0 | 10.6 | 1.7 | < 0.0001 |
| Home support for schoolwork | (fantastic cf. infrequent) | 0.020 | 9.6 | 7.6 | 0.21 |
| | (fantastic cf. some) | | 9.2 | 2.8 | 0.001 |
| | (fantastic cf. mostly v.good) | | 4.5 | 1.9 | 0.019 |
| Class Peer Support | (fantastic cf. none or infrequent) | 0.003 | 9.1 | 5.9 | 0.12 |
| | (fantastic cf. sometimes) | | 9.4 | 3.6 | 0.009 |
| | (mostly v.good cf. none or infrequent) | | 7.7 | 5.6 | 0.17 |
| | (mostly v.good cf. sometimes) | | 7.9 | 2.3 | 0.0008 |
| Family activities maths and science related at age 8 | (yes cf. no) | 0.0005 | 9.0 | 2.6 | 0.0005 |
| Family Income at age 12 | (>\$50K–70K cf. >\$30K–50K) | 0.053 | 6.9 | 2.8 | 0.014 |
| | (>\$50K–70K cf. >\$70K) | | 5.6 | 2.3 | 0.015 |
| | (>\$50K–70K cf. up to \$30K) | | 4.4 | 2.7 | 0.11 |
| At school, rules are fair | (usually cf. rarely/never) | 0.064 | 10.7 | 6.8 | 0.12 |
| | (usually cf. occasionally) | | 4.2 | 2.2 | 0.052 |
| At school teacher treats student fairly | (usually cf. occasionally) | 0.058 | 5.3 | 2.2 | 0.018 |
| Read library books at age 6 | (yes cf. no) | 0.060 | 3.7 | 2.0 | 0.060 |

Perseverance

Of the 13 variables in the final model accounting for 50.5 percent of the variance in age-10 Perseverance scores, only 6 remained in the initial model for age 12, accounting for 29.4 percent of the variance in age-12 Perseverance scores.

Table 174 **Initial model for effects of variables in model accounting for variance in age 12 Perseverance scores**

| Variable (comparison in brackets) | | p-value from ANOVA with this factor fitted last | Size of largest difference | Approx s.e. of this diff. | Prob for this difference |
|---|--------------------------|---|----------------------------|---------------------------|--------------------------|
| Homework at age 10 | (yes cf. no) | 0 | 21.4 | 4.1 | < 0.0001 |
| At school teacher treats me fairly at age 10 | (often cf. sometimes) | 0.009 | 11.8 | 3.8 | 0.002 |
| Bullying at age 10 | (bully cf. bully&victim) | 0.015 | 11.7 | 4.5 | 0.010 |
| Child enjoys reading at age 10 | (yes cf. no) | 0.002 | 10.4 | 2.9 | 0.003 |
| Gender | (female cf. male) | < 0.0001 | 8.0 | 1.9 | < 0.0001 |
| Home maths, uses proportions other than ½ and ¼ at age 10 | (yes cf. no) | 0.002 | 5.3 | 1.7 | 0.002 |

Gender is also present in this model, as are 3 variables related to school: being treated fairly, doing homework, and bullying. There is 1 variable each related to mathematics and reading.

The final model bore some similarities to the final model for Individual Responsibility. There is a variable indicating that children's responses to situations can have a bearing on their willingness to persevere (how they coped with being upset). The variables related to children's responses to school – their view about whether the rules are fair, if teachers tell them when they do good work, whether they learn quickly at school, and whether they could do better work if they tried, suggest continuing disheartening interactions with teachers, and that awareness of the need to “try” is not enough on its own to change habits or instill optimism.

The final model accounted for 56.3 percent of the variance in age-12 scores.

Table 175 **Initial model for effects of variables in model accounting for variance in age 12 Perseverance scores**

| Variable (comparison in brackets) | | p-value from ANOVA with this factor fitted last | Size of specified contrast (% points difference) | s.e. of this diff. | Prob for this contrast |
|--|--|---|--|--------------------|------------------------|
| Home support for schoolwork | (fantastic cf. infrequent) | 0.0001 | 28.8 | 8.3 | 0.0006 |
| | (mostly v.good cf. infrequent) | | 22.5 | 8.9 | 0.012 |
| | (some support cf. infrequent) | | 17.8 | 9.3 | 0.055 |
| | (fantastic cf. none) | | 16.4 | 9.1 | 0.074 |
| | (fantastic cf. some) | | 11.0 | 3.1 | 0.0004 |
| | (fantastic cf. mostly v.good) | | 6.3 | 1.8 | 0.0005 |
| At school, rules are fair | (usually cf. rarely/never) | 0.014 | 24.4 | 10.7 | 0.023 |
| History of homework | (yes at 10&12 cf. none at 12 regardless of what done at 10) | < 0.0001 | 22.2 | 6.9 | 0.001 |
| | (yes at 10&12 cf. mixture: yes or varies at 12 but not yes at 10&12) | | 10.9 | 2.5 | < 0.0001 |
| Class peer support | (fantastic cf. sometimes) | 0.012 | 11.1 | 3.7 | 0.003 |
| Student upset or not at age 10 and how coped | (had upsets: coped cf. not) | 0.018 | 10.4 | 4.3 | 0.017 |
| Gender | (female cf. male) | < 0.0001 | 8.0 | 2.0 | < 0.0001 |
| Student could do better at school if he/she tried | (rarely/never cf. usually) | 0.005 | 7.9 | 2.5 | 0.002 |
| History of music | (at age 8 + at some other age cf. just at age 8 or not at 8 but later) | 0.059 | 7.0 | 3.5 | 0.045 |
| | (usually cf. Occasionally) | 0.055 | 6.7 | 2.8 | 0.019 |
| At school teacher tells student when s/he does good work | | | | | |
| Read library books at age 6 | (yes cf. no) | 0.012 | 5.4 | 2.1 | 0.012 |
| Student learns quickly at school | (usually cf. occasionally) | 0.022 | 5.4 | 2.1 | 0.011 |
| Home maths at age 12 – understands proportions | (yes cf. no) | 0.046 | 2.9 | 1.5 | 0.046 |

Path analysis

We used a path analysis to analyse a set of the age-12 data. Variable usage in these analyses was limited to those variables which were at least interval type, and which had an approximately normal distribution. Some ordinal variables were assembled into composite variables through factor analysis. The requirements for path analysis models did considerably narrow our use of the data collected. For example, we were unable to include school socio-economic decile since in this sample, the distribution was skewed toward the upper deciles. However, path analysis was useful for confirming the roles of maternal qualification and family income⁶⁶ in children's academic and non-academic achievement, and to see whether children's views of their school and home experience would stand separately. For

⁶⁶ We used family income at age 5; at age-12 our family income data were more skewed.

children's views of school we used the factors described in Section Thirteen, *engagement in school* and *distressed at school*, 2 factors from their views of how they could gauge how they were doing at school, and 3 factors drawn from their views of their classroom. Of these factors related to children's views of school, only the factor *engagement in school* remained in the model. Another factor called "*comfortable at home*", drawn from their views of home, did not remain, nor did the sum of the activities parents said they did with their children, the sum of the groups children belonged to, nor the number of things they had in their bedroom.

An advantage of using path analysis in this context is that we can allow for more than one outcome variable. That is, we can model mathematics, writing, and reading outcomes and so on, in the same model. Furthermore, path analysis allows for variables to take on an "intermediate" role, so we can regard reading performance, say, as being associated with or affected by maternal qualification, and in turn influencing mathematics performance. In this model we focused on mathematics, reading comprehension, writing, and Communication as outcome variables.

The model which emerged showed maternal qualification as having more and stronger direct "paths" than family income to the children's mathematics, Burt Word Reading test, PAT Reading Comprehension test, and writing scores at age 12. While family income is an important variable for accounting for mathematics performance over and above the effect of maternal qualification, it is not needed in addition to maternal qualification to account for PAT reading comprehension test performance. The correlation between maternal qualification and family income (shown by a curved double-headed arrow on the diagram), is accounted for by the model, as are other significant correlations between each of the exogenous (input) variables.

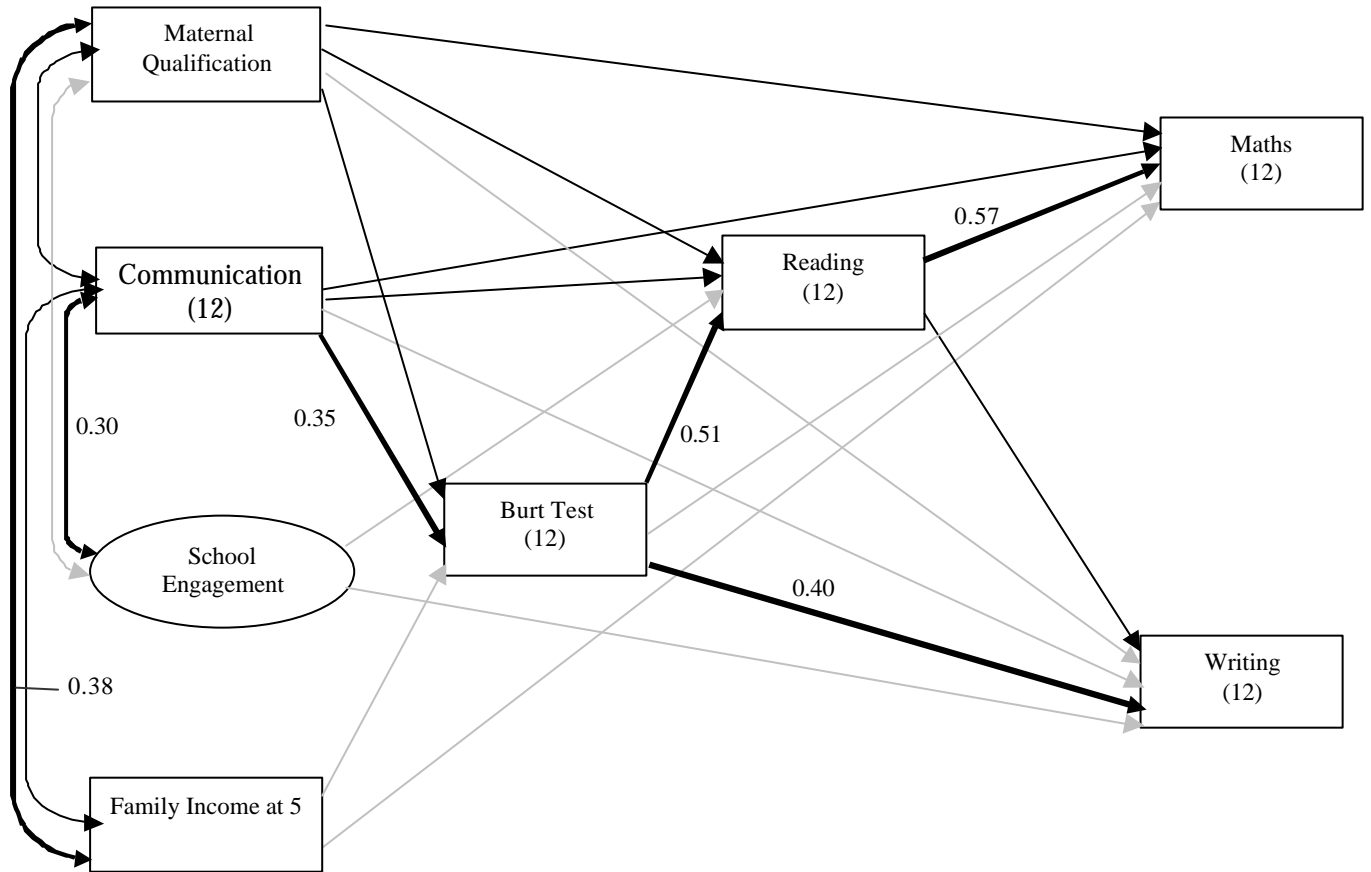
Engagement in school "fed into" both reading comprehension and writing scores, but none of the other literacy measures, or mathematics. Communication scores fed most strongly into the Burt Word Reading test scores (vocabulary), but also had direct links to mathematics, reading comprehension, and writing.

Overall, the model gives a strong sense of the role of language in children's performance at age 12 for mathematics and literacy, and shows that there is a considerable degree of interrelationship between language, engagement in school, maternal qualification, and family income.

The model below explained 55 percent of the variance in mathematics scores, 49 percent of the variance in reading comprehension scores, 40 percent of the variance in writing scores, but only 19 percent of the variance in the Burt Word Reading test scores.

In the graph that follows the strongest paths are shown with continuous black lines.

Figure 25 Paths between family resources, school engagement, communication, mathematics, and literacy



| Significant path coefficients | | | | |
|-------------------------------|----------------|--------------|--------------|------------|
| From: | To: | | | |
| | Burt Test (12) | Reading (12) | Writing (12) | Maths (12) |
| Maternal Qualification | 0.13 | 0.20 | 0.09 | 0.11 |
| Communication (12) | 0.35 | 0.19 | 0.11 | 0.13 |
| School Engagement | – | 0.06 | 0.10 | – |
| Family Income at 5 | 0.11 | – | – | 0.09 |
| Burt Test (12) | – | 0.51 | 0.40 | 0.17 |
| Reading (12) | – | – | 0.17 | 0.47 |
| R ² statistics: | 0.19 | 0.49 | 0.40 | 0.55 |

– = no significant path coefficient.

| Significant correlations between exogenous variables | | | |
|--|------------------------|--------------------|-------------------|
| | Maternal Qualification | Communication (12) | School Engagement |
| Communication (12) | 0.20 | 1 | |
| School Engagement | 0.18 | 0.30 | 1 |
| Family Income at 5 | 0.38 | 0.18 | – |

| Fit statistics | |
|--|--------|
| Pr > Chi-Square | 0.4808 |
| Bentler's Comparative Fit Index | 1.0000 |
| Bentler & Bonett's (1980) Non-normed Index | 1.0016 |
| Bentler & Bonett's (1980) NFI | 0.9927 |

Key factors in children's performance at age 12

In this final section, we have used statistical modelling to see if we can identify a set of key factors which make a difference to children's performance levels when they are twelve years old. When we apply models to our data to isolate the 'key' factors — resources, experiences, and understandings — which lie behind differences in the study children's performance levels at age 12, we come up against the very intertwined nature of the different facets of children's lives. For example, children who score highly for reading are likely to have taken part in a range of activities and experiences over the years which are related to age-12 reading scores. Some of these involve reading itself; some may be other kinds of activities, related to use of language, symbol, and communication. All of these have associations with their age-12 reading score, they are likely to co-occur, and so it is difficult to identify only one or two of these activities as 'key'.

Models do reduce this complexity, and can show us the inter-relationships which lie at the heart of differences in performance levels. However, we cannot be entirely confident that the specific variables (factors) that remain in these models are the only ones that count in some 'final' analysis, since often their inclusion at this stage also reflects strengths related to the structure of the variable factor, rather than its

content *per se*. Thus even these final models need some interpretation, or a reading of apparent underlying principles, rather than using them as a literal recipe for how to nurture children so that they are performing well at age 12.

Role of family resources

Like many other studies of children's development that have collected data on family resources as well as school and class-level data, we have found that family resources play a major role⁶⁷. They do not operate in a rigid manner, nor do they relate to children's competency levels in a lock-step fashion, with every single level of family income or maternal qualification corresponding with a higher level of performance by children on the cognitive competencies. But compare the proportions of those scoring at or above the median for reading and mathematics at age 12 for different family income levels when the study children were near age 5: around a third for those from low-income homes, around half for those from medium-income homes, and around two-thirds for those from high-income homes. The range is wider in relation to maternal qualification. Around a fifth to a quarter of those whose mothers had no qualification scored at or above the median for reading and mathematics at age 12, compared with around half for those whose mothers had a school-level, trade, or tertiary level qualification, and around three-quarters to four-fifths of those whose mothers had a university qualification.

In the ANOVA models reported in this section, we see little trace of maternal qualification or family income once we also include in the kinds of activities and experiences which were also associated with children's competencies at age 12. This tells us that the kinds of activities and experiences which remain in the model and provide a parsimonious accounting for the variation in children's performance at age 12 are related also to differences in family resources. They also provide a guide to the kinds of activities and experiences which can make a difference for children, whatever the level of maternal qualification.

Both the ANOVA and path analysis models give consistent and complementary pictures about the importance of language experience and use in everyday life, from an early age, for the development of not just comprehension in reading, but also of understanding and reasoning skills in mathematics. Language use and experience is also related to engagement in school, or the ability to make the most of what school work and interactions have to offer. And they are related to family resource levels, particularly maternal qualification levels. In previous sections, we have described some of the activities, behaviours and experiences which are associated with advantage in terms of family resources. These do include a greater use of reading and enjoyment of it, and more time spent in activities which are likely to extend knowledge, analytical skills, and communication skills. Some of these activities do not come cheaply, such as the performing arts. Other experiences include a greater parental interest in their children's education, an interest which is more likely to be informed by the parents' own educational experiences and confidence. And it includes more support for children to be assertive.

⁶⁷ See Nechbya, T., McEwan, P., and Older-Aguiler, D. (1999).

By treating family income and parental qualification levels separately rather than as components of a composite socio-economic status, we have been able to show that these factors do operate somewhat differently. Higher maternal qualification levels can act as a buffer for some of the disadvantages of low family income; less so in reverse. This may be because so many activities and experiences which co-occur with having some form of maternal qualification, particularly at the upper end, are the ones which co-occur with engagement with the work of school, particularly around reading and use of language in communication.

The role of participation and engagement

At the same time, there are also many similarities in the way that children from different backgrounds spend their time, react to adults and peers, and identify what is important to them. Though children whose mothers had a high qualification were likely to watch less television than those whose mothers had no qualification, they did watch some television, and their tastes in programmes were not clearly distinctive. Differences in children's activities and engagement were related more to gender than social class.

Children who were struggling with school, in a spiral of lack of achievement and lack of engagement (feeling supported, having trust, as well as interesting things to do), came from all family backgrounds. Children who had been bullied, who experienced isolation, who had poor social skills, and who struggled to gain more positive meaning out of friendships, also came from all family backgrounds. Gender was more important in relation to performance in the social and attitudinal competencies than family resources. What matters in the work of teachers and parents to arrest such negative spirals of reinforcing experience, actions, and reactions, is not so much children's social backgrounds, as their specific needs, and the patterns of experiences and habits that need to be reshaped.

The roles of current and early experiences

A longitudinal study can also compare the contribution of current and earlier experiences. There are two striking findings related to the importance of children's early experiences for their later performance. First, the continued contribution of aspects of early childhood education — and the fact that some of these have grown over time, rather than diminishing. Second, the greater contribution of family income levels in these early years to children's later competencies, than current or improved family income levels in the 7 years since. These findings indicate that when we weigh up the costs of providing support for children in their first few years, and therefore for their families, we need to take a long-term view. It would seem that some of the ground lost for some of the children in this study in those early years, is very difficult to be regained in later years. Children from homes with high maternal qualification found it easier to make up this ground than others. It is of concern that not only was it harder for children from homes with low levels of family resources to make up this ground, but also that children from these family backgrounds who had been early high performers were more likely to lose ground over time.

The difficulty of catching up was particularly marked in relation to mathematics. This may be because of the nature of mathematics, or it may be that we have historically as a country and education system put more emphasis on reading, and the teaching of reading.

While this study points to the importance of the early years, before children reach school, and then the first three years of school, as the best window of opportunity for children to gain solid foundations for continued learning, it also shows that adult responses to children's lack of engagement, lack of performance, or their being upset, is not age-limited in terms of making a difference for individuals. More children than we expected from our analysis of performance at earlier years moved from low levels of performance at age 10 to performing at or above the median at age 12. Most parents of the study children had worked with their child's teacher at some stage to sort out difficulties their child had experienced.

What is of concern is that teachers of the study children at age 12 were less confident that they could make a difference to the learning of children who were struggling in their learning. This underlines the importance of the government's strong emphasis on providing more curriculum, pedagogical, and assessment leadership and resources to support teachers in their work with students, and the need to give priority to learners who are struggling, in this support. We do need to ensure that engaging learning experiences are available for students who make have fewer home resources than others to complement and support the work of school.

The importance of understanding cumulative experiences

Much of the analysis of 'risk' and 'resilience' among children emphasises both the co-occurrence of risk and supportive factors, and the need to see risk and resilience in terms of clusters of co-occurring factors, rather than single decisive factors (Kalil, 2003). The value of a longitudinal study such as this one is that it can also show how this compounding in terms of occurrence can happen through time, and that an accumulation of positive or negative experiences can tip a balance. For example, children who experience a few changes of school are unaffected; in this study, it was the children who experienced more than 4 by the age of 12 who showed some areas of lower performance. Current class size is unrelated to children's competency levels; it is only when we look at experiences of class size over time that we see some trends. Current amounts of time spent watching television show fewer associations with children's competency levels than do the cumulative amounts. This does have implications for our understanding of the relationships between children's experiences and opportunities and their performance, if we are limited to current data only.

Many of the study children have been upset at different stages of the times when we have talked with their parents, but few at every stage; and most children do cope with being upset. Around half the study children have had a teacher they did not like, but this has not affected their performance at age 12. For many children, life has been a mixture of beneficial and less beneficial experiences, and it seems likely that it is having a mixture which includes some critical mass of beneficial experiences which is in itself protective.

References

- Alton-Lee, A., & Praat, A. (2000). *Explaining and addressing gender differences in the New Zealand compulsory school sector. A literature review*. Wellington: Research Division, Ministry of Education.
- Andersson, Bengt-Erik. (1993). *Long-term effects of early day care in relation to family type and children's gender*. Department of Child and Youth Studies, Stockholm Institute of Education.
- Broberg, A.G., Wessels, H., Lamb, M.E., & Hwang, C.P. (1997). Effects of day care on the development of cognitive abilities in 8-year-olds: a longitudinal study, *Developmental Psychology*, 33 (1), 62-69.
- Burtless, G. (1996). Introduction and Summary. In Burtless, G. (Ed.), *Does money matter? The effect of school resources on student achievement and adult success*. Washington, DC: Brookings Institution Press.
- Caygill, R. (1993). The students. In H. Wagemaker (Ed), *Achievement in reading literacy* (pp. 59-88). Wellington: Research section, Ministry of Education.
- Crooks, T., & Caygill, R. (1999). *New Zealand's national education monitoring project: Māori student achievement, 1995-1998*. Paper given at the combined NZARE/AARE conference, Melbourne.
- Currie, J. (2000). *Early childhood intervention programs: what do we know?* Joint Center for Poverty Research paper. Available on <http://www.jcpr.org>.
- Effective Pre-school and Primary Provision Project (2003), *The effective provision of pre-school education [EPPE] project – a longitudinal study funded by the DfES (1997-2003)*. Symposium at the European Early Childhood Educational Research Association (EECERA) Annual Conference, Glasgow, 3-6 September.
- Fergusson, D.M., Horwood, L.J., & M. T. Lynskey. (1994). A longitudinal study of early childhood education and subsequent academic achievement, *Australian Psychologist*, 29 (2), 110-115.
- Fergusson, D. M., & Horwood, L.J. (1997). Gender differences in educational attainment in a New Zealand birth cohort. *NZ Journal of Educational Studies*, 32(1), 83-96.
- Hyslop, D., & Mare, D. (2001). *Understanding changes in the distribution of household incomes in New Zealand between 1983-86 and 1995-98*. Wellington: Treasury working paper 01-21. Available on www.treasury.govt.nz/workingpapers/2001/01-21.asp
- Kalil, A. (2003). *Family resilience and good child outcomes – a review of the literature*. Wellington: Centre for Social Research and Evaluation, Ministry of Social Development. Available on www.msd.govt.nz.
- Kontos, S., & Wilcox-Herzog, A. (1997). Teachers' interactions with children: why are they so important? Research in review, *Young Children* 52 (2), 4-12.
- Marks, G.N. (1998). *Attitudes to school life: their influences on achievement and their effects on achievement and leaving school*. Longitudinal Surveys of Australian Youth, Research Report No. 5. Melbourne: Australian Council for Educational Research.
- Ministry of Education. (2003). *New Zealand Schools Ngā Kura o Aotearoa 2002. Minister of Education. A report on the compulsory schools' sector in New Zealand 2002*. Wellington: Author.
- Munton, T., Mooney, A., Moss, P., Petrie, P., Clark, A., & Woolner, J. (2002). *Research on ratios, group size and staff qualifications and training in early years and childcare settings*. London: Department for Education and Skills, Research report RR320.

- Nash, R. & Harker, R. (1994). *Progress at school*. Stage one final report. Palmerston North: Educational Research and Development Centre, Massey University.
- Nechbya, T., McEwan, P., & Older-Aguiler, D. (1999). *The impact of community and family influences on children's achievement in New Zealand: best evidence synthesis*. Wellington: Ministry of Education.
- NICHD Early Child Care Research Network. (2002). Child-care structure → process → outcome: direct and indirect effects of child-care quality on young children's development. *Psychological Science*, 13(3), 199–206.
- Norton, P., Sanderson, K., Booth, T., & Stroombergen, A. (2000). *A literature review of the effect of school resourcing on education outcomes*. Wellington: Research Division, Ministry of Education.
- Peisner-Feinberg, E.S., & Burchinal, M.R. (1997). Relations between preschool children's child-care experiences and concurrent development. *Merrill-Palmer Quarterly*, 43, 451–477.
- Pilling, D. (1990). *Escape from disadvantage*. London: Falmer Press, in association with National Children's Bureau.
- Pintrich, P.R., & Schunk, D.H. (1996). *Motivation in education: theory, research, and applications*. Englewood Cliffs, N.J: Merrill.
- Smith, A.B., Grima, G., Gaffney, M., Powell, K., Masse, L., & Barnett, S. (2000). *Early childhood Education – literature review for the Ministry of Education*. Dunedin: Children's Issues Centre, University of Otago.
- Smith, E. (2003). Failing boys and moral panics: perspectives on the underachievement debate. *British Journal of Educational Studies*, 51 (3), 282–295.
- Thrupp, M. (1999). *Schools making a difference: let's be realistic! School mix, school effectiveness, and the social limits of reform*. Buckingham: Open University Press.
- Wilkinson, I., Hattie, J.A., Parr, J.M., Townsend, M., Thrupp, M., Lauder, H., & Robinson, T. (2000). *Influence of peer effects on learning outcomes: a review of the literature*. Auckland: Auckland Uniservices, published by Research Division, Ministry of Education.
- Wylie, C. (1998). *Can Vouchers deliver better education? A review of the literature, with special reference to New Zealand*. Wellington: New Zealand Council for Educational Research.
- Wylie, C. (2003a). Longitudinal research: the Competent Children project. In Davidson, C., & Tolich, M. (Eds.), *Social science research in New Zealand*, 2nd edition, pp. 217–228. Auckland: Pearson Education New Zealand Ltd.
- Wylie, C. (2003b). *Beating the odds – factors which can make a difference for New Zealand children from low-income homes*. Paper given at Connecting policy, research and practice conference, April 29–30, 2003, Wellington. Available on www.nzcer.org.
- Wylie, C., Thompson, J., & Kerslake Hendricks A. (1996). *Competent Children at 5 – families and early education*. Wellington: New Zealand Council for Educational Research.
- Wylie, C., & Thompson, J. (2003). The long-term contribution of early childhood education to children's performance – evidence from New Zealand. *International Journal of Early Years Education* 11 (1), 69–78.

Appendix 1: Statistical techniques used

This section contains a description and justification of the statistical techniques used to analyse the age-12 data. A general glossary is included to explain what most of the statistical terms (jargon) mean.

In each of the rounds of data analysis the point of departure of the analyst has been that:

- The data should be allowed to speak, rather than be tested against preconceived hypotheses. For this reason exploratory data analysis (EDA) techniques were seen as particularly appropriate.
- The explanatory variables were measured on binary or ordinal scales, and so analysis of variance (ANOVA) techniques were more often appropriate than regression techniques (which assume the independent or explanatory variables are measured on at least interval scales).
- The analysis from the latest round of data collection should be as comparable with earlier analyses as possible.

The following sections describe each of the techniques that have been used, discuss briefly why that analysis was seen to be appropriate, and indicate where these techniques were used.

The techniques described below include those used “behind the scenes” as well as those directly reported on.

In all the modelling, we used the 1 percent level of significance. If the p -value (the probability of getting the observed result by chance alone) was between 0.01 and 0.06, we reported the result as being “indicative”; in other words there is a possibility that there is a difference, which may be revealed in further study, or might have been revealed had we had a larger sample.

Data preparation and exploration

Data cleaning is an ongoing task in the analysis of any large data set. Out-of-range values are fairly easy to spot early on, but other inconsistencies between responses are only found by exhaustive testing. EDA techniques do, among other things, help to bring such inconsistencies to light.

“Tukey (the father of EDA) suggested that we examine our data as a detective would examine the scene of a crime—not with a hypothesis (“I’ll bet the butler did it”) but with an open mind and as few assumptions as possible. By letting the data speak to us we hope to learn the truths hidden beneath the random fluctuations, errors, and general confusion seen in real data ... Recently,

growing interest in data mining has helped to fuel interest in ways to view data without preconceived hypotheses.” (Velleman)

EDA techniques (Tukey, 1977; Velleman and Hoaglin, 1981; Hoaglin, Mosteller et al., 1983) were primarily used to get an understanding of the nature of and underlying patterns in the data. The techniques used include:

- Plots to explore the distributions of the variables: stem-and-leaf plots, box plots, qq-plots (to illustrate the extent of the departure from normality of a variable, or of the residuals of a fitted model), and histograms (with and without the best-fitting normal distribution).
- Box plots to explore the distributional characteristics of a variable at different levels (factor levels) of another (explanatory or independent) variable. Notched box plots indicate between which levels of the explanatory variable there are likely to be significant differences in the dependent variable.
- Scatter diagrams to explore the strength and nature of the association between 2 variables. Jittering, or adding small amounts of “noise” to the variables, was used where one or both of the variables took on only a few values—this allows each observation to be visible, where otherwise observations with identical values are represented by only a single point on the plot.
- Pearson product-moment correlation coefficients were used to estimate the strength of linear associations between variables (where the corresponding scatter-plot indicated that this was appropriate).
- Partial correlation (Draper and Smith, 1998) was used to explore the relationship between pairs of variables where one or more other variables were expected to have an impact on the variables of interest. For instance, competency measures in mathematics at age 10 and 12 are expected to be correlated, but both are expected to be affected by or related to competency measures in mathematics at ages 5, 6, and 8. Partial correlation gives an estimate of the correlation between the age-10 and 12 measures after eliminating or accounting for the effects at ages 5, 6, and 8.
- Where a strong and linear relationship was found between variables, linear regression (Draper and Smith 1998) was used to obtain other measures of the strength of the relationship. The regression coefficients measure the amount of change in the dependent variable per unit change in the explanatory variable, and the coefficient of determination, R^2 , gives the proportion of the variance in the dependent variable that is explained by the model.

Association rather than causality

In social research, where one cannot control or limit the variables involved, or constrain the great variability that exists between individuals and the patterns of their experiences, it is particularly difficult to talk of relations found between variables as “causal”. The statistical techniques we have at our disposal were often designed for experimental environments, rather than real life.

In all of our analyses, and the interpretation of them, any significant effects found should be seen as indications of *association* between the explanatory and outcome variables, and should not be seen to be in any way *causal*. For instance, an association between Curiosity (a measure based on the judgment of the

child's teacher) and performance on the cognitive tests, where children with high scores on the Curiosity measure tended to do well on the cognitive tests, does not provide proof that it is the curiosity alone which has resulted in the above-average performance. Both may be manifestations of a child's general ability level, or be the result of the teacher's attention to the child, and the interaction between them.

Two variables (call them A and B) with such an association could have any one of the underlying patterns:

- changes in variable A are caused by variable B;
- changes in variable A are caused by changes in variable C, which also affects the values of variable B, but B itself has no direct effect on A;
- changes in both variables A and B are caused by changes in variable C, and changes in A are also directly related to changes in the value of B;
- there is no real association between A and B, the apparent association is an artefact of the way in which or the circumstances under which the variable/s were measured; or
- there is no real association between A and B, the apparent association is just chance.

In social data such as ours, which of the possibilities is actually true usually cannot be determined. It is in looking at consistencies between different particular associations found that one can build up a picture which provides some insight into the processes at work; but "proof" of relations between individual factors remains elusive given existing statistical techniques, and the sheer quantum of different aspects of individuals' daily and cumulative existence.

Effect size

Several different measures of effect size have been proposed. Among the most commonly used are:

- Cohen's d for the **difference between two means**. If M_1 and M_2 are the sample means and s_1^2 and s_2^2 the corresponding standard deviations, then:

$$d = \frac{M_1 - M_2}{s}$$

$$\text{where } s = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2}}$$

- The coefficient of determination, which is the square of the correlation coefficient, r^2 , measures the proportion of the variance accounted for by the relationship between the 2 variables, and is used to measure the effect size for correlation and regression.
- For analysis of variance, η^2 , the proportion of the total variance that is attributed to an effect can be used:

$$h^2 = \frac{SS_{\text{effect}}}{SS_{\text{total}}}$$

In a 1-way ANOVA $h^2 = R^2$.

A balanced analysis of variance is one in which there are equal numbers of observations at each level of a single factor, or at each of the possible combinations of factors where there are 2 or more factors. A balanced design allows the estimation of the main effects and interaction effects of the factors. In a balanced design, the sum of all the R^2 would equal R^2 , the coefficient of determination, as $R^2 = SS_{\text{model}}/SS_{\text{total}}$ and SS_{model} is the sum of the SS_{effect} terms.

In an unbalanced design (as all of our ANOVAs are—the number of boys was not equal to the number of girls; the number of children having mothers with no qualification was not equal to the number of children with mothers with school-level qualifications, and so on), the SS_{effect} terms are not additive, and the choices for effect size would seem to be either to use R^2 , for the whole model, or to use analysis of contrast means and Cohen's d (the only problem in this is the number of possible contrasts between all possible levels of all possible factors), or to estimate the effect of that factor *as if fitted last* in the model.

In this report, as in the earlier reports, we have given the p -value for the ANOVA tests, and the R^2 value, which can be thought of as an overall effect size for the whole model fitted.

Combined measures

Before combining items or variables as measured into scales (for instance, the competency measures), we used one or more of the following techniques:

- Principal components analysis (PCA) (Jackson, 1991) and factor analysis (FA) (Mardia, Kent et al., 1979; Krzanowski, 1988) were used to investigate the dimensionality of the sets of questions. For instance, we asked questions about the student's communication, and these fell broadly into the categories "receptive" (5 items) and "expressive" (5 items) communication (or how well the student received and gave information, respectively). The question we needed to ask was whether these 10 items could or should be combined into 1 or 2 composite communication variables.
- Cronbach's alpha was also used, typically after the PCA or FA, to measure the reliability of the composite measures.

Models used

Linear models

Most of the models fitted were ANOVA models, as these were felt to be the most appropriate.

Analysis of variance and linear regression models belong to the same family of models. In all these models it is assumed that:

- the sample is randomly and independently selected;
- the error variance is normally distributed; and

- the error variance is constant for all observations (at all values of, or levels of, any independent or explanatory variables).

The main difference between ANOVA, regression, and analysis of covariance (ANCOVA) models is that in

- ANOVA models all explanatory variables or factors that are categorical, taking 2 or more possible values within a very restricted range (gender, level of education, degree of satisfaction, etc). ANOVA models allow the estimation of the change in the mean value from the overall mean at each level of a factor. For instance, to explore how achievement in, say mathematics varies depending on level of family income, incomes can be grouped into 3 bands (“low”, “medium”, “high”) and we can use ANOVA to test whether mathematics achievement is the same for each broad income level or not. Further, if there are differences, it is possible to investigate which income levels have approximately equal mathematics achievement, and which have higher levels of achievement.
- Regression models usually have explanatory variables that are measured on an interval scale, and which can take many possible values, or are continuous. Regression models allow the estimation of the change in the dependent (response) variable for each unit change in the independent variable. For instance, with a regression model with achievement in, say, mathematics as the dependent variable and family income as the independent variable (in other words, where we try to explain achievement in mathematics by family income), the model will tell us by how much we could expect mathematics achievement to improve for each dollar increase in family income. In addition the model assumes that any increase in achievement is at a constant rate across all incomes (which may not be the case).
- ANCOVA models include both continuous co–variates (as regression models do) and discrete variables (as in ANOVA) in the same model.

ANOVA

One–factor ANOVA was used as an exploratory technique to see which of all the variables explained a satisfactory amount of the variability in the outcome or dependent variables of interest. Analysis of the previous rounds of data had revealed that 2 of the possible variables that explained a large amount of the variability were mother’s education and family income at age 5.

Residual plots were made to evaluate whether the assumptions of normality and equality of variance could be made. Where there were marked departures, the dependent variable was transformed. Most transformations involved squaring, or taking the square–root, or log of the dependent variable.

For those variables where the result was significant (the p –value was < 0.01), 2–factor ANOVAs were fitted. Typically, but not exclusively, mother’s education, or family income at age 5, was fitted first, and then the other factor of interest was fitted. This gave a measure of whether the variable of interest accounted for significantly *more* variability in the response variable than mother’s education or family income alone did. Other “controlling factors” were fitted first in some of the analyses.

Multifactor analysis of variance models were fitted, using variables that in the 1– and 2–factor models accounted for relatively large amounts of the variance in the dependent (outcome) variables. These

models were used to indicate some possible models in which all the independent or explanatory variables included together accounted for a substantial amount of the total variability in the dependent variable, with each able to contribute significantly after all the other variables in the model have been accounted for.

Analysis of contrasts

Results of the ANOVAs are presented in terms of contrasts between the effects for different levels of the factor of interest and the standard errors of these contrasts. For instance, for mother's education, the contrast might be the (model) difference in mean mathematics score between those whose mothers had no education, and those whose mothers had a university degree. For each contrast the estimated standard error is also given, calculated from the mean square error, and the number of observations in each group in the contrast. If the mean difference is more than twice the associated standard error, it can be assumed to be significant, or at least indicative.

These contrasts are closely related to the effect size (Cohen, 1988; Rosnow and Rosenthal, 1996) for the difference between the 2 means. There are several definitions of effect size, but they all involve the ratio between the difference between means (as above) and the *pooled estimate of the standard deviation*, or the estimate of standard deviation assuming that the samples come from populations with equal variances. In our report, we have an estimate of the standard error calculated from the error mean square, which is equivalent to a pooled estimate of variance.

Multivariate analysis

Multivariate techniques provide a range of methods to attempt to find patterns in data sets consisting of many inter-related variables.

We have used multivariate techniques for EDA, in particular classification and regression trees, and multidimensional scaling (MDS). We have used dimension-reducing techniques such as principal components analysis (PCA) and factor analysis (FA). These techniques are used to represent many variables (if there are 2 variables, then the data can be represented in 2-dimensional space, for example by a scatter-plot; if there are 20 variables, then the data can be thought of as being able to be represented in 20-dimensional space) by fewer new variables (and so in fewer dimensions). The new variables are typically the means or weighted means of the original variables.

Multidimensional scaling (MDS)

MDS (Cox and Cox, 1994) takes data measured in many dimensions (each variable represents a dimension), and attempts to portray it in 2 or 3 dimensions. The technique attempts to measure the distance between the original measures in k -space (if there are k variables), and by taking linear combinations of the original variables, to represent these distances in 2 dimensions (or 3).

MDS can be used on interval, or ordinal, or even binary (0-1 or "yes"/"no") data, or on a data set with variables measured on a different types of scale.

For example, we used it to investigate the responses to the 14 options as to how the children might know they were doing well (Figure 18, p. 229).

Cluster analysis

Cluster analysis (Mardia, Kent et al. 1979; Krzanowski 1988) can be used to determine which individuals are more similar in terms of the variables of interest. It can also be used to cluster variables.

For example, we used it to investigate the extent to which the characteristics of the children as described by the teacher could be used to define clusters of children, and whether these children had relatively similar competencies or not.

Classification and regression trees

Tree-based methods (Hastie, Tibshirani et al., 2001) may be used for classification problems, where the outcome variable is binary (0–1 or “yes” / “no”), or categorical (with more than 2 categories), or regression problems, where the outcome variable is continuous.

The methodology requires weaker assumptions than the equivalent linear or generalised linear models, and in large data sets it can reveal relatively complex forms of structure, including interactions between variables.

We used it mainly in a data-mining sense to explore relationships between age-12 variables and age-10 variables.

Canonical correlation

Canonical correlation (StatSoft manual at <http://www.statsoftinc.com/textbook/stcanan.html> and www2.chass.ncsu.edu/garson/pa765/canonic.htm) allows us to investigate the relationship between *two sets* of variables, such as a set of 5 variables related to children’s perceptions of, and attitudes to, school and learning, and another set, consisting of their scores on the competency measures.

Canonical correlation requires interval level data, and no multicollinearity (i.e., the variables *within* the 2 sets should *not* be very highly correlated, but variables in one set can be strongly correlated with variables in the other set).

Structural equation modelling (SEM) and path Analysis

Linear structural equation modelling (Fox, 1984), of which path analysis is a subset, is an extension and generalisation of the linear model. The method provides a means to model complex inter-relationships between variables. A model can be fitted in which, say, maternal qualification affects the various competencies; the social competencies affect the cognitive competencies; maternal qualification affects the choice of school type (which determines class size) which in turn affects the various competencies, and so on.

SEM has some minimum data requirements:

- variables must be at least interval type (i.e., not categorical or binary);
- variables should have an approximately normal distribution; and
- variables must take on at least 4–5 different values.

SEM allows the use of composite variables. Composites can be constructed using factor analysis, and in some cases, by summing over logical collections of binary variables.

These models can only be fitted to relatively large data sets, or at least those in which there are at least 5 times as many observations as there are parameters estimated by the model.

SEM is largely a confirmatory, rather than exploratory, technique. That is, researchers are more likely to use SEM to determine whether a certain model is valid, rather than using SEM to “find” a suitable model, although SEM analyses often involve a certain exploratory element.

A structural equation model implies estimation of the structure of the covariance matrix. Once the model's parameters have been estimated, the resulting model-implied covariance matrix can be compared to an empirical or data-based covariance matrix. If the 2 matrices are consistent with one another, then the structural equation model can be considered a plausible explanation for relations between the measures.

The SAS procedure CALIS was used to perform SEM analyses. Maximum likelihood parameter methods of parameter estimation were used, and all analyses were performed on the covariance matrix using standardised variables.

Factor analysis and principal components analysis

These dimension-reduction techniques were used mainly as EDA techniques, and when constructing composite variables (see above, Combined measures).

Quartile movement analysis

This is a method used to examine the young people's performance *relative to the rest of the study group* across time: Were there some young people whose competency scores increased (or decreased) more markedly than those of the rest of the group?

For each of the competencies of interest, the median, upper, and lower quartiles were calculated, and the individual scores were recoded to a 1–4 scale, depending on which quartile group they fell into.

Movements between adjacent quartile groups are to be expected, particularly for individuals whose scores were close to the quartile values. Of interest though, were larger changes, in particular between quartile groups 1 (the students with the lowest scores) and 4 (the students with the highest scores).

Partial correlations

In an attempt to explore whether there were long-term trends in achievement or not, partial correlation was used to measure, for example, the correlation between age-8 Mathematics and age-12 Mathematics,

after allowing for the age-10 score, so addressing the question “Is there some variability in the age-12 score that is accounted for by the age -8 score but not by the age-10 score?”

The aim was to explore the extent to which the achievement could be considered to be a Markov process. If achievement could be considered to be a Markov process, then achievement at any age would depend only on achievement at the previous age (writing at age 12 would depend only on writing at age 10, which in turn would depend only on writing at age 8, ...). Otherwise, achievement may depend on achievement at several earlier ages.

We used partial correlation to explore this idea.

What we did

We approached the data with an open mind, and used EDA techniques extensively.

We checked that all the assumptions required for the linear models were valid.

For all the ANOVAs we quote the R^2 values, and give details on mean contrasts (see above).

What we did not do

We did not calculate effect sizes explicitly, as the measures we *do* calculate (r ; R^2 , mean contrasts, and standard errors) are closely related.

We have not fitted any models that require the assumption that the variables are measured on at least an interval scale, where in fact the scale is ordinal at best.

Glossary

Box plot — one of the plots that show the shape of the distribution. The box plot shows the lowest and highest values, the value of the quartiles and of the median. A box is drawn between the quartiles, and “whiskers” extend from the box to the highest and lowest values. A box plot shows the “average” value (median), and whether the distribution is approximately symmetric or skew. See also Notched Box plot.

Categorical variable — a discrete variable that has its possible values defined by categories and the categories typically do not indicate the amount of the variable in question, e.g. gender, eye colour. An **ordered categorical variable** is one in which the categories are indicative of order, e.g. scales such as “very satisfied”, ..., “very dissatisfied”, or responses to a “how often” question that are on a scale from “every day” to “never”.

Chi-square test [of independence] — a test to determine whether 2 [ordered] categorical variables are likely to be independent or not. The null hypothesis is that they are independent, and a small p -value would support the alternate hypothesis that they are not independent (are dependent).

Coefficient of determination, R^2 — the proportion of variability that is accounted for by the modelled relationship between the dependent and independent variables.

Confidence interval — an interval about a sample estimate (like the sample mean), such that there is a known degree of confidence that the true population parameter (the population mean, say) will lie inside that interval. What this means is that, if we were to take hundreds, or thousands, of samples from the same theoretical population, and to calculate a 95 percent confidence interval for the mean of each sample, then we expect that 95 percent of these confidence intervals will actually contain the population mean, but in the remaining 5 percent of the cases the sample will be so extreme (the values measured were unusually high, or unusually low) that the upper limit of the confidence interval will be below the mean (in a low-valued sample) or the lower limit of the confidence interval will be above the mean (in a high-valued sample).

Confidence level — the degree of confidence (usually 95 percent) that the population parameter lies inside a confidence interval.

Continuous variable — a variable that in theory can take on any one of infinitely many values (although in practice it will be measured to a certain level of accuracy and so can take on only a finite—but relatively large—number of possible values) in a certain range, e.g. physical measures such as height and weight.

Correlation coefficient — a measure of the strength of the relationship between 2 variables. A correlation is *positive* if a high value of the one variable tends to be associated with a relatively high value of the other variable (and a low value of the one variable with a low value of the other), and is *negative* if a high value of the one variable tends to be associated with a relatively low value of the other variable. Correlation coefficients take values between -1 and 1 . Correlation coefficients are positive where the correlation is positive, and negative where the correlation is negative. The strength of the correlation is measured by the size of the correlation coefficient, with a value around 0 (say between -0.2 and 0.2) indicating almost no relationship between the variables, a value of between -0.5 and -0.2 or between 0.2 and 0.5 indicating a relatively weak relationship, a value between -0.75 and -0.5 or between 0.5 and 0.75 indicating a moderately strong relationship, and values between -1 and -0.75 or between 0.75 and 1 indicating a strong relationship.

It is possible to test the null hypothesis that there is no correlation, and a statistically significant result indicates that there is a statistically significant correlation. This is not the same as a strong correlation, as for very small sample sizes (like 10), only a very strong correlation will be statistically significant, whereas for a very large sample (several hundred observations) it is possible to have statistically significant correlations that are very weak ($r < 0.2$). This is one reason why it is important to consider the effect size, In this case the coefficient of determination, r^2 , as well as the significance of the test.

There are several different measures of correlation. In this study, the Pearson product-moment correlation coefficient was used. This correlation coefficient measures the strength of a *linear* (straight line) association between the variables.

Cronbach's alpha — a statistic used to measure the reliability of items used to form a scale. Alpha values, like positive correlation coefficients, lie between 0 (approximately no relationship between the items) and 1 (the strongest possible relationship between the items), and values of 0.7 or higher are

considered to be acceptable, while values of 0.8 or higher are considered to indicate good reliability. Alpha values depend on the sample size, as well as the number of items.

Dependent variable(s) — one or more variables whose values are related to the values of another variable(s). Two variables are said to be dependent if the value of the one varies as the value of the other varies. (Note: dependency cannot be taken to be indicative of causality.)

In a linear model sense, a **dependent variable** is the **outcome variable**, and the idea is to be able to predict values of that variable, given the values of the independent or explanatory variable(s).

Discrete variable — a variable that can take on only a few possible values, e.g. gender, year level at school.

Distribution — the “shape” of the variable: Are most of the values low? most high? most in the middle? Are most relatively low with a few rather high ones? Are there equal numbers right across the range of values?

Explanatory variable — in a linear model setting, the variable(s) that are thought to be able to predict the value of the dependent or outcome variable.

Histogram — a bar plot of the distribution of a continuous variable. Because the variable is continuous, there is no space between the bars. This is one of the plots that show the shape of the distribution.

Hypothesis — see Null hypothesis.

Independence — in statistical terms, independence can be inferred where the values of one variable do not appear to depend on the value of a second variable. So variables are either dependent, or they are independent.

In a linear model sense, an **independent or explanatory variable** is not affected by the value of the dependent variable, but is likely to determine the value of the dependent variable to some extent.

Interval scale — on such a scale, it is possible to tell by how much 2 measures differ. For example, a person 182cm is 18cm shorter than a person 200cm in height, and the 18cm has a unique, unambiguous and universally understandable meaning.

Item — one in a group of similar questions attempting to measure something that is impossible to measure directly. For instance, any one of the competencies was formed as a composite scale measure from a number of separate items, such as questions about level of curiosity, or individual mathematical tasks.

Markov process — a process in which each in a sequence of events depends only on its immediate predecessor, and not at all on what happened earlier in the sequence.

Mean — the “average”, or total of the observed values divided by the sample size.

Median — another measure of the “average”: that number such that half the observations are larger than the median, and half are smaller in size. The mean and median are equal if the distribution is symmetric, but not otherwise.

Multicollinearity — the situation in, for instance, multiple regression where 2 (or more) variables are so strongly correlated ($r > 0.7$) that they are almost 2 measures of the same variable. The model cannot be fit with both (or all) variables in the model.

Normal distribution — this is the most useful and fundamental of the statistical distributions. A normal distribution is symmetric, and is completely determined by the value of the mean and SD. The normal distribution is the basis for much of the theory underlying inferential statistics (tests of hypothesis), and so many tests have the requirement that the variable(s) used in the test should be normally distributed.

Notched box plot – A box plot where the box is “notched” or “waisted” and this waist indicates an approximate 95 percent confidence interval for central tendency (“average”) of the distribution. The notch begins and ends at

$$\text{median} \pm \frac{3^{\text{rd}} \text{ quartile} - 1^{\text{st}} \text{ quartile}}{\sqrt{n}}$$

Such a plot can be used to judge which factor level means are likely to be significantly different (those where the notched sections of the bars do *not* overlap). For example, in Figure 3, “mostly low” mean is likely to be significantly lower than all the others; “high” mean is likely to be significantly higher than all the others; “mixed” and “medium” means are not significantly different.

Null hypothesis — a statistical model that is assumed in order for a statistical test to be done. Where the test results indicate that if the null hypothesis were true, then the observed outcome was *very* unlikely (the p -value was very small), the null hypothesis is rejected, and the alternate hypothesis (the opposite of the null hypothesis) is accepted.

Ordinal scale — it is possible to tell which of 2 measures has more of the quantity of interest, but not to tell how much more. For example, someone who responded “very satisfied” is likely to be more satisfied than someone who responded “satisfied”, but it is impossible to say how much more satisfied they were.

Outcome variable — the dependent variable, the outcome of which we are trying to model based on the value(s) of independent or explanatory variable(s).

p -value — the probability, if the null hypothesis is true, of getting a test statistic value more extreme than that observed. If $p < 0.01$, the test result is **significant**, and the null hypothesis is rejected. If $0.01 < p < 0.06$, the test result is “indicative”, in other words it indicates that the null hypothesis may not be true, but further research would be needed to be more certain.

Partial correlation — correlation between 2 variables, when the linear effects of one or more related variables are removed. Used when there are 3 or more variables, all inter-correlated, to determine which pairs of variables are actually correlated, and which only appear to be correlated, because they both are actually correlated with a third variable. For example, mathematics scores at ages 5, 6, 8, 10, and 12 may all be correlated. But the question is whether the scores at earlier ages relate to the score at age 12 directly

(or put a little differently, whether the age-12 score depends on all the earlier scores), in which case there will be significant partial correlations, or whether the score at each age depends only on the score at the immediately previous age, and not directly on any of the earlier scores, in which the partial correlation coefficients will be close to 0 and will not be significant.

Quartile — an extension of the concept of the median. The upper and lower quartiles are values such that a quarter of the observations are less than the lower quartile in value, and a quarter of the observations are greater than the upper quartile in value. It also follows that a quarter of the observations are between the lower quartile and the median, and a quarter of the observations are between the median and the upper quartile. Half of the observations lie between the upper and lower quartiles.

Quantile — an extension of the concept of the median and quartiles. Examples of quantiles are deciles (there are 9 deciles, and 10 percent of the observations fall between any 2 adjacent deciles, as well as between the lowest value and the first decile and between the highest value and the ninth decile) and percentiles (there are 99 percentiles, and 1 percent of the observations fall between any 2 adjacent percentiles).

qq-plot — a quantile–quantile plot. Used to see if 2 data sets come from populations with a common distribution, or if a sample comes from a particular distribution (usually the normal distribution). The quantiles of the one data set are plotted against the quantiles of the other data set. If they have a common distribution, the plots will be along a straight line (the 45° line if the same scale is used on the x and y axes).

Reliability — the extent to which the items contributing to a scale appear to be measuring the same thing. Reliability is important, because reliable scales are more variable, and so there is a better chance that a statistician can develop a model to explain that variability. Scales with low reliability would have values clustered around the mean. Think of 3 people answering 2 questions, and suppose that the responses to the first question were 1, 3, 5. If the scale was reliable, the responses to the second question may be 2, 3, 5 (similar to the responses to the first question, but not necessarily the same), which would give a combined scale (if we just add the responses) of $1 + 2 = 3$, $3 + 3 = 6$, and $5 + 5 = 10$. On the other hand, responses to the second question if the scale was *not* reliable may have been 4, 4, 1, which would give a combined scale of $1 + 4 = 5$, $3 + 4 = 7$, and $5 + 1 = 6$, all of which are pretty close in value.

Regression — regression analysis attempts to fit a line to a scatter of points. Linear regression fits a straight line, but it is also possible to fit curved lines. Simple linear regression has a dependent variable and a single independent variable; multiple regression has (usually) a single dependent variable and 2 or more independent variables. For each independent variable, the slope coefficient measures the amount of change in the dependent variable for a unit change (change of 1) in the independent variable.

Sample size — the number of young people (or parents or teachers, depending on the instrument being discussed) in the study.

Scale — this word can be used to mean a composite new variable formed from the values of a number of items attempting to measure some theoretical construct of interest.

Scatter plot — a simple plot to illustrate the strength of the relationship between 2 variables (represented on the 2 axes). Each observation is represented by a dot, spot, or cross on the graph. If the relationship is linear, then these spots lie on either side of a straight line, that can be fitted using regression, so a scatter plot is a useful way to check assumptions of linearity in relationships.

Significance level — a magic, but arbitrary, number used to determine whether a test of hypothesis is significant or not. One very commonly used level of significance is 5 percent, in which case any test with a p -value < 0.05 is found to be significant. In this study we have usually used a significance level of 0.01.

Skew distribution — one in which most of the observations lie at one end of the range, but there are values at the other extreme of the range (a typical example is income: most people have moderate incomes, but there is always a sizeable number of people with extremely high-incomes).

Standard deviation (SD) — a measure of how variable the variable is. In a symmetric distribution, about a two-thirds of the observations lie within one standard deviation of the mean (if the mean is 20 and the SD is 5, then two-thirds of the observations will be between $15 = 20 - 5$ and $25 = 20 + 5$), and about 95 percent will lie within 2 standard deviations of the mean (in the example, between 10 and 30).

Standard error (SE) — the SD is usually the measure of how variable the *variable* is. However, if 2 samples from the same population were selected, common sense suggests that they would have different sample values: different means and different SDs, for instance. This leads to the idea of the *sampling distribution of the sample mean* (where the sample mean itself is treated like a variable), and the SE is the SD of the sampling distribution of the sample mean. If the $SD = s$, then the corresponding $SE = s / \sqrt{n}$ where n is the sample size. So the SE depends both on the SD and on the sample size (the bigger the sample, the smaller the SE).

Symmetric distribution — any distribution in which there are equal numbers of relatively high and relatively low observations; the distribution is symmetric about the “average”.

Test statistic — a value calculated from the observed values, that will, by statistical theory, enable the researcher to test a null hypothesis.

Variable — a quantity that varies between the individuals measured (e.g. gender, height, maths score, satisfaction with current school).

References

- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, NJ: Lawrence Earlbaum Associates.
- Cox, T. F., Cox & M. A. A. (1994). *Multidimensional Scaling*. London: Chapman & Hall.
- Draper, N. R., & H. Smith. (1998). *Applied Regression Analysis*. New York: Wiley.
- Fox, J. (1984). *Linear Statistical Models and Related Methods: With Applications to Social Research*. New York, Wiley.
- Hastie, T., Tibshirani R., Friedman, J. (2001). *The Elements of Statistical Learning. Data Mining, Inference and Prediction*. New York, Springer.

- Hoaglin, D. C., Mosteller F., Tukey, J. (Eds.) (1983). *Understanding Robust and Exploratory Data Analysis*. New York: Wiley & Sons.
- Jackson, J. E. (1991). *A User's Guide to Principal Components*. New York: John Wiley & Sons.
- Krzanowski, W. J. (1988). *Principles of Multivariate Analysis: A User's Perspective*. Oxford, UK: Clarendon Press.
- Mardia, K. V., Kent J. T., Bibby, J.M. (1979). *Multivariate Analysis*. London: Academic Press.
- Rosnow, R. L. & Rosenthal R. (1996). "Computing contrasts, effect sizes, and counternulls on other people's published data: General procedures for research consumers." *Psychological Methods*, 1, 331–340.
- Tukey, J. (1977). *Exploratory Data Analysis*. Reading: Addison-Wesley.
- Velleman, P. F.(1993). *Learning Data Analysis with Data Desk*. New York: Freeman
- Velleman, P. F., & Hoaglin D. C. (1981). *Applications, Basics and Computing of Exploratory Data Analysis*. Boston: Duxbury.

Appendix 2: Relations between competency scores at age 12

1. Correlations between the competency scores

Table 1 **Competency measures at age 12 (n=490)**

| Competencies at age 12 | Curiosity | Perseverance | Individual Responsibility |
|---------------------------|-------------|--------------|---------------------------|
| Curiosity | 1.00 | 0.52 | 0.36 |
| Perseverance | 0.52 | 1.00 | 0.80 |
| Individual Responsibility | 0.36 | 0.80 | 1.00 |
| Social Skills with Peers | 0.35 | 0.59 | 0.62 |
| Social Skills with Adults | 0.48 | 0.61 | 0.63 |
| Communication | 0.68 | 0.67 | 0.60 |
| Mathematics | 0.37 | 0.39 | 0.24 |
| PAT Reading Comprehension | 0.36 | 0.37 | 0.26 |
| Burt Word Reading | 0.33 | 0.34 | 0.19 |
| Writing | 0.32 | 0.37 | 0.24 |
| Reading Age | 0.42 | 0.47 | 0.31 |
| Logical Problem-Solving | 0.31 | 0.32 | 0.20 |

| Competencies at age 12 | Social Skills with Peers | Social Skills with Adults | Communication |
|---------------------------|--------------------------|---------------------------|---------------|
| Curiosity | 0.35 | 0.48 | 0.68 |
| Perseverance | 0.59 | 0.61 | 0.67 |
| Individual Responsibility | 0.62 | 0.63 | 0.60 |
| Social Skills with Peers | 1.00 | 0.51 | 0.51 |
| Social Skills with Adults | 0.51 | 1.00 | 0.71 |
| Communication | 0.51 | 0.71 | 1.00 |
| Mathematics | 0.16 | 0.22 | 0.43 |
| PAT Reading Comprehension | 0.20 | 0.23 | 0.46 |
| Burt Word Reading | 0.19 | 0.21 | 0.41 |
| Writing | 0.19 | 0.27 | 0.40 |
| Reading Age | 0.25 | 0.32 | 0.55 |
| Logical Problem-Solving | 0.15 | 0.22 | 0.39 |

| Competencies at age 12 | Mathematics | PAT Reading comprehension | Burt Word Reading |
|---------------------------|-------------|---------------------------|-------------------|
| Curiosity | 0.37 | 0.36 | 0.33 |
| Perseverance | 0.39 | 0.37 | 0.34 |
| Individual Responsibility | 0.24 | 0.26 | 0.19 |
| Social Skills with Peers | 0.16 | 0.20 | 0.19 |
| Social Skills with Adults | 0.22 | 0.23 | 0.21 |
| Communication | 0.43 | 0.46 | 0.41 |
| Mathematics | 1.00 | 0.70 | 0.55 |
| PAT Reading Comprehension | 0.70 | 1.00 | 0.64 |
| Burt Word Reading | 0.55 | 0.64 | 1.00 |
| Writing | 0.46 | 0.52 | 0.58 |
| Reading Age | 0.57 | 0.69 | 0.67 |
| Logical Problem-Solving | 0.60 | 0.54 | 0.49 |

| Competencies at age 12 | Writing | Reading Age | Logical Problem-Solving |
|---------------------------|-------------|-------------|-------------------------|
| Curiosity | 0.32 | 0.42 | 0.31 |
| Perseverance | 0.37 | 0.47 | 0.32 |
| Individual Responsibility | 0.24 | 0.31 | 0.20 |
| Social Skills with Peers | 0.19 | 0.25 | 0.15 |
| Social Skills with Adults | 0.27 | 0.32 | 0.22 |
| Communication | 0.40 | 0.55 | 0.39 |
| Mathematics | 0.46 | 0.57 | 0.60 |
| PAT Reading Comprehension | 0.52 | 0.69 | 0.54 |
| Burt Word Reading | 0.58 | 0.67 | 0.49 |
| Writing | 1.00 | 0.50 | 0.38 |
| Reading Age | 0.50 | 1.00 | 0.52 |
| Logical Problem-Solving | 0.38 | 0.52 | 1.00 |

2. Factor analysis – results from ages 10 and 8, and uniqueness of the competencies at each age

Table 1 Loadings for the 3 factors derived in the factor analysis of age-10 competencies

| Competency at age 10 | Factor 1 | Factor 2 | Factor 3 |
|---------------------------|-------------|-------------|-------------|
| Curiosity | 0.09 | 0.26 | 0.71 |
| Perseverance | 0.30 | 0.73 | 0.30 |
| Individual Responsibility | 0.20 | 0.87 | 0.17 |
| Social Skills with Peers | 0.18 | 0.68 | 0.11 |
| Social Skills with Adults | 0.16 | 0.62 | 0.44 |
| Communication | 0.39 | 0.55 | 0.55 |
| Mathematics | 0.78 | 0.15 | 0.13 |
| Fine Motor Skills | 0.20 | 0.18 | 0.04 |
| PAT Reading Comprehension | 0.82 | 0.19 | 0.12 |
| Burt Word Reading | 0.82 | 0.11 | 0.07 |
| Writing | 0.49 | 0.23 | 0.06 |
| Reading Age | 0.74 | 0.24 | 0.12 |
| Logical Problem-Solving | 0.64 | 0.14 | 0.10 |

The cumulative variance these 3 factors accounted for is 57.3 percent, comprising 27 percent from the first factor, 21.1 percent from the second, and 9.2 percent from the third.

Table 2 Loadings for the three factors derived in the factor analysis of age-8 competencies

| Competency at age 8 | Factor 1 | Factor 2 | Factor 3 |
|---------------------------|-------------|-------------|-------------|
| Curiosity | 0.10 | 0.13 | 0.69 |
| Perseverance | 0.31 | 0.68 | 0.40 |
| Individual Responsibility | 0.25 | 0.85 | 0.28 |
| Social Skills with Peers | 0.21 | 0.63 | 0.13 |
| Social Skills with Adults | 0.14 | 0.49 | 0.59 |
| Communication | 0.34 | 0.46 | 0.67 |
| Mathematics | 0.72 | 0.24 | 0.15 |
| Fine Motor Skills | 0.38 | 0.17 | 0.01 |
| PAT Reading Comprehension | 0.78 | 0.17 | 0.14 |
| Burt Word Reading | 0.84 | 0.10 | 0.12 |
| Writing | 0.59 | 0.23 | 0.17 |
| Reading Age | 0.72 | 0.16 | 0.21 |
| Logical Problem-Solving | 0.10 | 0.13 | 0.69 |

The cumulative variance these 3 factors accounted for is 57.5 percent, comprising 27.2 percent from the first factor, 17.4 percent from the second, and 12.9 percent from the third.

Notice that at age 8, Logical Problem-Solving was not sitting clearly with the cognitive group while by age 10 it is.

The table below gives the “uniqueness” of each of the competencies, based on the 3-factor model. This is a measure of how much unique information each competency measure contributes when compared with the other competencies. When they are “less unique” it means the results are similar to the results for other competencies.

Writing and Logical Problem-Solving are the 2 “most unique” competencies at age 12. At the other end of the scale performance in Individual Responsibility and Communication is being reflected in the other competencies to quite a high degree.

Table 3 Uniqueness of the competency measures at age 12

| Competency | Uniqueness age 12 |
|---------------------------|-------------------|
| Curiosity | 0.43 |
| Perseverance | 0.23 |
| Individual Responsibility | 0.12 |
| Social Skills with Peers | 0.53 |
| Social Skills with Adults | 0.39 |
| Communication | 0.14 |
| Mathematics | 0.40 |
| PAT Reading Comprehension | 0.28 |
| Burt Word Reading | 0.39 |
| Writing | 0.59 |
| Reading Age | 0.35 |
| Logical Problem-Solving | 0.57 |

Table 4 Uniqueness of the competency measures at age 10

| Competency | Uniqueness age 10 |
|---------------------------|-------------------|
| Curiosity | 0.43 |
| Perseverance | 0.29 |
| Individual Responsibility | 0.17 |
| Social Skills with Peers | 0.49 |
| Social Skills with Adults | 0.39 |
| Communication | 0.24 |
| Mathematics | 0.36 |
| Fine Motor Skills | 0.93 |
| PAT Reading Comprehension | 0.28 |
| Burt Word Reading | 0.32 |
| Writing | 0.70 |
| Reading Age | 0.38 |
| Logical Problem-Solving | 0.56 |

Table 5 **Uniqueness of the competency measures at age 8**

| Competency | Uniqueness age 8 |
|---------------------------|---------------------|
| Curiosity | 0.49 |
| Perseverance | 0.29 |
| Individual Responsibility | 0.13 |
| Social Skills with Peers | 0.54 |
| Social Skills with Adults | 0.39 |
| Communication | 0.23 |
| Mathematics | 0.40 |
| Fine Motor Skills | 0.82 |
| PAT Reading Comprehension | 0.33 |
| Burt Word Reading | 0.27 |
| Writing | 0.57 |
| Reading Age | 0.41 |
| Logical Problem-Solving | 0.65 |

Table 6 **Uniqueness of the competency measures at age 6**

| Competency | Uniqueness age 6 |
|---------------------------|---------------------|
| Inquisitiveness | 0.36 |
| Perseverance | 0.37 |
| Independence | 0.27 |
| Social Skills with Peers | 0.60 |
| Social Skills with Adults | 0.29 |
| Communication | 0.17 |
| Number Knowledge | 0.38 |
| Fine Motor Skills | 0.89 |
| Word Recognition | 0.40 |
| Invented Spelling | 0.41 |
| Logical Problem-Solving | 0.77 |

Table 7 **Uniqueness of the competency measures at age 5**

| Competency | Uniqueness age 5 |
|------------------------|---------------------|
| Inquisitiveness | 0.56 |
| Perseverance | 0.64 |
| Self Social Emotional | 0.41 |
| Peer Social Emotional | 0.63 |
| Adult Social Emotional | 0.27 |
| Communication | 0.29 |
| Early Number Knowledge | 0.37 |
| Motor Skills | 0.77 |
| Early Literacy | 0.43 |
| Logical Reasoning | 0.67 |

Appendix 3: Transformations of competency scores used in cluster analysis of teachers' perspectives of children's non-curriculum dispositions and habits

| Competency score | P |
|--------------------------------|-----|
| Burt Word Reading | 2.8 |
| Mathematics | 0.7 |
| PAT Reading Comprehension | 1 |
| Writing | 0.2 |
| Communication | 1.7 |
| Curiosity | 1.3 |
| Perseverance | 1.6 |
| Individual Responsibility | 2.4 |
| Social Skills with Peers | 2.2 |
| Social Skills with Teachers | 1.8 |
| Logical Problem-Solving | 2.6 |
| Mean Composite Score | 1.8 |
| Mean Cognitive Composite Score | 1 |
| Mean Social Composite Score | 2.1 |

Appendix 4: Summaries of sizeable associations

| Mathematics | | | | | | | |
|------------------|---|--|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | Largest observed difference | s.e of given difference | Percent variance for model |
| 4 levels | History of school decile group | mostly 1-2 | all 3-8, or mixed | all 9-10 | 39.9 | 5.4 | 21.3 |
| 4 levels | Teacher view of achievement at age 12 | minimal/<average | average to v.good | v.good/excellent | 38.5 | 2.8 | 33.3 |
| 4 levels | Teacher view of achievement at age 10 | minimal/<average | average to v.good | v.good/excellent | 37.9 | 2.9 | 34.9 |
| 6 levels | Mother's education at the birth of the first child | none | anything in between | university | 32.6 | 3.5 | 16.5 |
| 6 levels | Parental aspiration for child at 12 | School Cert. level | far as wants, or uni/tert. | enough to be worthwhile | 30.8 | 10.8 | 9.7 |
| 3 levels | Student learns most things pretty quickly | rarely/never | occasionally | usually | 29.9 | 5.8 | 14.3 |
| 6 levels | Father's education when child was 5 | none | mid or snr.sch.,trade or tert. | university | 29.6 | 3.7 | 16.7 |
| 5 levels | School decile group at age 6 | 1-2 | 5-6 | 9-10 | 29.3 | 4.8 | 15.1 |
| 6 levels | ECE type at near-age 5 | A'oga Amata | kindergarten | FDC,PPres,CRCC&Plyctr | 29.3 | 8.1 | 4.4 |
| 4 levels | Teacher view of achievement at age 6 | minimal/<average | average to v.good | v.good/excellent | 29.1 | 3.8 | 22.2 |
| 5 levels | Mother's education by time child is 12 | none | | degree | 27.5 | 4.2 | 13.1 |
| 5 levels | TV watching at age 8 | 3 hours or more | | none | 27.5 | 8.0 | 4.3 |
| 7 levels | Parent's TV watching at age 12 | >=4 hours daily | amounts in between | none | 27.0 | 7.5 | 7.0 |
| 8 levels | Time per.wk on computer out of school | none or no computer | | 3.5-5 hours | 25.3 | 4.1 | 8.3 |
| 5 levels | TV watching at age 5 | 3 hours or more | | none | 25.0 | 7.8 | 6.4 |
| 4 levels | Parental support for class | none or infrequent | sometimes | v.good or fantastic | 24.7 | 6.4 | 5.7 |
| 3 levels | Student feels close to family at home | occasionally | | usually | 24.3 | 6.7 | 3.2 |
| 5 levels | School decile group at age 10 | 1-2 | 3-4, 7-8 | 9-10 | 23.9 | 3.3 | 12.3 |
| 5 levels | School decile group at age 12 | 1-2 | 3-4, 5-6, 7-8 | 9-10 | 23.6 | 3.6 | 9.2 |
| 6 levels | History upsets or not and how coped | upsets each age, no coping 2 out of 3 | | upsets each age, coped, or varied | 22.9 | 6.4 | 3.2 |
| 5 levels | TV watching at age 6 | 3 hours or more | | none | 22.3 | 7.5 | 6.4 |
| 5 levels | Student's current response to school | bored, routine, or mixed | enjoys | while to settle | 22.3 | 7.9 | 2.2 |
| 4 levels | Family income at age 5 | >\$20K-\$30K | >\$30K-\$60K | >\$60K | 22.0 | 3.7 | 11.8 |
| 3 levels | Student is comfortable at home | occas./rarely/never | | usually | 21.6 | 5.9 | 2.7 |
| 5 levels | School decile group at age 8 | 1-2 | | 9-10 | 21.5 | 3.6 | 9.5 |
| 3 levels | Students keep out of trouble at school | rarely/never | occasionally | usually | 21.2 | 5.4 | 7.5 |
| 4 levels | Student does what likes at home | rarely/never | occasionally | usually | 21.1 | 4.0 | 8.8 |
| 5 levels | Parental handling disagreements at 12 | student "wins" | mixed appr. or parent "wins" | negotiation | 21.0 | 5.7 | 3.5 |
| 5 levels | Student's view of importance of homework | don't know | | it matters | 21.0 | 6.1 | 4.8 |
| 4 levels | Socio-economic mix of ECE | all else | | middle-class | 20.6 | 4.6 | 16.3 |
| 5 levels | History of school ownership | all state | | all private | 20.5 | 8.6 | 3.2 |
| 5 levels | History of class size | class sizes up & down | | always small (up to 25) | 20.4 | 6.8 | 3.9 |
| 4 levels | Student helps out at home | rarely/never | | usually | 19.9 | 7.7 | 2.8 |
| 4 levels | Ethnicity | Pasifika | | Asian | 19.7 | 7.1 | 7.0 |
| 5 levels | TV watching at age 10 | 3 hours or more | | none | 19.7 | 8.5 | 3.3 |
| 3 levels | Student could do better work if he/she tried | usually | occasionally | rarely/never | 19.3 | 3.4 | 8.8 |
| 3 levels | Student feels doing well at school when work hard | disagree | not sure/it depends | agree | 19.2 | 5.9 | 2.6 |
| 3 levels | If computer at home, plays games on it | no computer | | yes comp, yes games | 19.1 | 3.3 | 7.0 |
| 3 levels | Enjoyment of reading | no | qualified yes | yes | 18.6 | 3.1 | 8.1 |
| 4 levels | Student has interesting things to do at home | usually | occasionally | always | 18.3 | 7.0 | 2.6 |
| 4 levels | Student gets bored at home | always | usually | rarely/never | 18.2 | 5.2 | 4.1 |
| 4 levels | Student gets treated fairly at home | rarely/never | | always | 18.2 | 8.4 | 1.6 |
| 4 levels | Family knows student done homework | rarely/never | | usually | 18.1 | 6.9 | 2.3 |
| 3 levels | History of class size | mixed | | always small (up to 25) | 18.0 | 6.4 | 3.0 |

| Mathematics | | | | | | | |
|------------------|---|--|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | Largest observed difference | s.e of given difference | Percent variance for model |
| 9 levels | History of student's involvement in homework | no at 10, no at 12 | | yes at 10, yes at 12 | 18.0 | 8.4 | 4.9 |
| 3 levels | School ownership at age 8 | state | | private fully-reg. | 17.5 | 4.8 | 2.7 |
| 6 levels | Time spent on homework (given it is done) | 0.5-1 hour | | 4.5-5 hours | 17.4 | 3.8 | 6.2 |
| 4 levels | Family asks student about school | rarely/never | | usually | 17.4 | 6.6 | 2.1 |
| 6 levels | History of parental satisfaction | mostly no | | yes at least at age 12 | 17.3 | 6.6 | 6.9 |
| 4 levels | Student unsettled at 12 and how coping | upset, coped poorly | | upset but coped well | 16.8 | 5.2 | 2.2 |
| 3 levels | Student gets a hard time at school | usually | occasionally | rarely/never | 16.5 | 6.1 | 2.5 |
| 3 levels | Student thinks the rules at school are fair | rarely/never | occasionally | usually | 16.1 | 7.8 | 2.4 |
| 4 levels | History of TV watching | 2hrs+ for 1 or 2 of 5,6,&8 | | <2hrs daily each yr. | 15.8 | 4.6 | 7.2 |
| 4 levels | Family income at age 12 | up to \$30K | >\$50K-\$70K | >\$70K | 15.7 | 3.2 | 6.5 |
| 6 levels | Number of parental concerns | 4, 5 or 6 out of the 6 | | some qual.concerns | 15.3 | 4.7 | 2.4 |
| 7 levels | History of teacher relationship with parent | all good or satisfactory | | all v.good/excellent | 15.3 | 4.8 | 4.0 |
| 3 levels | Student feels doing well at school when does very best | disagree | | agree or not sure/it depends | 15.2 | 7.0 | 1.3 |
| 4 levels | Total duration of ECE | <48 months | | 48 months | 15.0 | 3.8 | 7.4 |
| 4 levels | ECE Staff joined children in their play | up to 3rd quartile | | top quartile | 15.0 | 3.9 | 5.9 |
| 4 levels | Number of schools attended | 4 or more | 2 or 3 | 1 | 15.0 | 4.5 | 2.2 |
| 4 levels | Student gets told off at home | always | | rarely/never | 14.9 | 4.9 | 3.8 |
| 4 levels | Teacher view of home support for schoolwork | non/infreq. or sometimes | mostly v.good | fantastic | 14.8 | 3.1 | 5.0 |
| 3 levels | Parent satisfied with child's progress at 10 | no | qualified yes | yes | 14.7 | 4.1 | 2.8 |
| 3 levels | Things explained at home when needed | occas./rarely/never | | usually | 14.7 | 5.7 | 1.4 |
| 3 levels | Homework at 10 | no | | yes | 14.6 | 4.1 | 4.9 |
| 3 levels | Student gets tired of trying at school | usually | occasionally | rarely/never | 14.1 | 3.9 | 2.6 |
| 3 levels | Expectations are fair at home | occas./rarely/never | | usually | 13.9 | 4.2 | 2.3 |
| 4 levels | History of bullying | bully 10, 1 or more 12 | | neither at 10 or 12 | 13.9 | 6.0 | 3.3 |
| 3 levels | Student gets help if needed at home | occas./rarely/never | | usually | 13.8 | 5.3 | 1.5 |
| 3 levels | Student gets listened to at home | occas./rarely/never | | always | 13.7 | 3.8 | 2.6 |
| 3 levels | Parental satisfaction with progress at age 12 | no | qualified yes | yes | 13.3 | 3.6 | 3.0 |
| 3 levels | Homework -teacher view | no or varies | | yes | 13.3 | 4.0 | 3.6 |
| 4 levels | ECE centre was a "print-saturated environment" | up to lowest quartile | quartiles 2&3 | top quartile | 13.3 | 4.8 | 4.9 |
| 3 levels | School ownership at age 10 | state | | private fully-reg. | 13.1 | 4.4 | 2.0 |
| 4 levels | Bullying at age 12 | bully only | | neither | 13.0 | 4.2 | 3.2 |
| 4 levels | ECE staff responsive to children | quartiles 1&2 | 3 | top quartile | 12.9 | 3.7 | 5.7 |
| 3 levels | Student gets bored at school | usually | | occasionally or rarely/never | 12.8 | 3.4 | 2.9 |
| 3 levels | School ownership at age 6 | state | | private fully-reg. | 12.8 | 5.5 | 2.0 |
| 4 levels | History of participation in music | none or just at 12 | at 8 or not 8 but 10 or 10,&12 | each age 8,10, &12 | 12.6 | 2.8 | 5.1 |
| 4 levels | ECE Staff guided children in context of activities | up to 3rd quartile | | top quartile | 12.5 | 4.0 | 4.6 |
| 3 levels | Parental satisfaction with progress at age 8 | no | | yes | 12.4 | 3.9 | 2.2 |
| 3 levels | Enjoyment of working with numbers | no | qualified yes | yes | 12.2 | 3.0 | 3.3 |
| 3 levels | School ownership at age 12 | state | state integrated | private fully-reg. | 11.8 | 3.7 | 2.2 |
| 6 levels | Usage of public library at 12 | none | | fortnightly | 11.8 | 3.9 | 2.3 |
| 4 levels | Teacher view relationship with parents at 8 | none | | very good/excellent | 11.8 | 4.7 | 3.4 |
| 3 levels | Student talks to parent about their reading | no | | sometimes or yes | 11.2 | 2.4 | 4.9 |
| 5 levels | Student's TV watching at age 12 | none or spec.events | 1-2 hours | up to 1 hour daily | 11.1 | 4.5 | 2.6 |
| 3 levels | Student gets a good night's sleep | occas./rarely/never | | usually | 11.0 | 3.7 | 2.3 |
| 3 levels | Student gets bullied at school | usually or occasionally | | rarely/never | 10.9 | 3.0 | 2.7 |
| 3 levels | Parental concerns: home behaviour | yes, concerned | | not concerned | 10.6 | 3.2 | 3.1 |
| 3 levels | Student feels restless at school | usually | | occasionally or rarely/never | 10.6 | 3.6 | 1.9 |
| 3 levels | Student feels doing well at school when doesn't have to try hard | agree | disagree | not sure/it depends | 10.4 | 3.4 | 1.8 |
| 3 levels | Language spoken at home | English+one other | | English | 10.1 | 3.2 | 1.9 |

| Mathematics | | | | | | | |
|--------------------|---|--|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | Largest observed difference | s.e of given difference | Percent variance for model |
| 3 levels | Student's marks at school reflect ability | occasionally or rarely/never | | usually | 10.1 | 4.4 | 3.6 |
| 4 levels | Student's friends come around at home | always | | usually | 9.9 | 2.6 | 3.0 |
| 3 levels | Student feels doing well at school when learns something interesting | agree | disagree | not sure/it depends | 9.9 | 3.5 | 2.1 |
| 4 levels | Teacher view relationship with parents at 12 | difficult/v.diff/or none | | very good/excellent | 9.6 | 3.6 | 2.3 |
| 3 levels | Student feels doing well at school when learn something which makes her/him think | disagree | | agree or not sure/it depends | 9.5 | 4.2 | 1.2 |
| 3 levels | Student feels doing well at school when knows more than other people | agree or disagree | | not sure/it depends | 9.4 | 3.1 | 2.0 |
| 4 levels | Starting age at ECE | 24 mths or more | | up to 23 mths | 9.1 | 3.6 | 3.5 |
| 2 levels | Uses home computer for e-mail | no | | yes | 9.0 | 2.5 | 2.8 |
| 2 levels | Uses home computer for homework/projects | no | | yes | 8.9 | 2.2 | 3.2 |
| 3 levels | Student feels doing well at school when have nothing hard to do | agree | | disagree or not sure/it depends | 8.8 | 3.5 | 3.1 |
| 2 levels | Participation in music at age 8 | no | | yes | 8.6 | 2.1 | 3.3 |
| 2 levels | Student has fixed bed-time on schooldays | yes | | no/not sure | 8.5 | 2.3 | 2.7 |
| 2 levels | Participation in music at age 10 | no | | yes | 8.1 | 2.0 | 3.1 |
| 3 levels | At school teachers treat student fairly | occasionally or rarely/never | | usually | 8.0 | 2.4 | 2.4 |
| 4 levels | Adults students like visit at home | always | | usually | 7.8 | 2.6 | 2.0 |
| 2 levels | Computer at home, uses it for CD ROMs | no | | yes | 7.4 | 3.4 | 1.0 |
| 3 levels | Students feel sad at school | usually | occasionally | rarely/never | 7.3 | 2.9 | 1.7 |
| 3 levels | Parental concerns: help around house | yes, concerned | | not concerned | 6.4 | 2.6 | 1.2 |
| 4 levels | Teacher view relationship with parents at 10 | no relationship | | very good/excellent | 6.3 | 2.6 | 1.6 |

| PAT Reading Comprehension | | | | | | | |
|---------------------------|---|--|--|---|-----------------------------|--------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | Largest observed difference | s.e. of given difference | Percent variance for model |
| 4 levels | Teacher view of achievement at age 10 | minimal/<average | average to v.good | v.good/excellent | 37.5 | 2.5 | 37.7 |
| 4 levels | Teacher view of achievement at age 12 | minimal/<average | average to v.good | v.good/excellent | 37.3 | 2.4 | 38.7 |
| 6 levels | Parental aspiration for child at 12 | School Cert. level | far as wants, worthwhile | university or tertiary | 36.4 | 8.3 | 9.2 |
| 4 levels | History of school decile group | mostly 1-2 | all 3-8, or mixed | all 9-10 | 29.7 | 5.4 | 15.1 |
| 6 levels | ECE type at near-age 5 | A'oga Amata | kindergarten | FDC,PPres,CRCC& Plyctr | 28.4 | 7.5 | 3.9 |
| 6 levels | Mother's education at the birth of the first child | none | anything in between | university | 27.2 | 3.2 | 25.2 |
| 6 levels | Father's education when child was 5 | none | mid or snr.sch.,trade or tert. | university | 26.2 | 3.2 | 18.4 |
| 3 levels | Student learns most things pretty quickly | rarely/never | occasionally | usually | 25.4 | 5.4 | 12.2 |
| 5 levels | Parental handling disagreements at 12 | student "wins" | mixed appr. or parent "wins" or all/any method | negotiation | 25.3 | 5.1 | 6.4 |
| 5 levels | TV watching at age 8 | 3 hours or more | | none | 25.3 | 6.5 | 5.5 |
| 9 levels | History of student's involvement in homework | no at 10, varied at 12 | | yes at 10, yes at 12 | 24.9 | 7.4 | 4.0 |
| 3 levels | Students keep out of trouble at school | rarely/never | occasionally | usually | 24.4 | 4.9 | 12.0 |
| 4 levels | Teacher view of achievement at age 6 | minimal/<average | average to v.good | v.good/excellent | 23.4 | 3.4 | 19.2 |
| 5 levels | School decile group at age 6 | 1-2 | 3-4 | 9-10 | 22.7 | 4.6 | 11.4 |
| 3 levels | Students feel sad at school | usually | occasionally | rarely/never | 22.3 | 9.4 | 1.6 |
| 5 levels | Mother's education by time child is 12 | none | vocational/trade | degree | 22.1 | 3.9 | 12.8 |
| 3 levels | Student feels lonely at school | usually | | occasionally or rarely/never | 21.4 | 7.5 | 1.6 |
| 4 levels | Student has interesting things to do at home | rarely/never | occasionally | always | 21.0 | 6.5 | 2.4 |
| 3 levels | Student is comfortable at home | occas./rarely/never | | always | 20.7 | 5.5 | 2.9 |
| 5 levels | TV watching at age 10 | 3 hours or more | | none | 20.7 | 6.5 | 6.3 |
| 6 levels | History of parental satisfaction | early yes, not at 10&12 | | yes at least at age 12 | 20.6 | 6.6 | 5.0 |
| 4 levels | Family income at age 5 | >\$20K-\$30K | >\$30K-\$60K | >\$60K | 20.4 | 3.5 | 8.7 |
| 3 levels | Student could do better work if he/she tried | usually | occasionally | rarely/never | 20.1 | 3.0 | 9.4 |
| 3 levels | Expectations are fair at home | occas./rarely/never | | always | 19.9 | 4.0 | 5.0 |
| 7 levels | Parent's TV watching at age 12 | >=4 hours daily | amounts in between | none | 19.8 | 6.8 | 6.6 |
| 3 levels | Enjoyment of reading | no | qualified yes | yes | 19.7 | 2.7 | 15.5 |
| 5 levels | History of school ownership | all state | | all private | 19.3 | 7.5 | 4.8 |
| 4 levels | Ethnicity | Pasifika | | Asian | 19.2 | 6.9 | 5.6 |
| 5 levels | School decile group at age 12 | 1-2 | 5-6, 7-8 | 9-10 | 18.8 | 3.3 | 6.9 |
| 5 levels | School decile group at age 8 | 1-2 | 3-4, 5-6 | 9-10 | 18.7 | 3.4 | 7.5 |
| 4 levels | Socio-economic mix of ECE | wide and low | low to middle | middle-class | 18.7 | 4.2 | 14.3 |
| 5 levels | History of class size | class sizes up & down | | always small (up to 25) | 18.5 | 6.0 | 4.5 |
| 3 levels | Student feels lonely at home | always/usually | | occasionally | 17.7 | 5.7 | 1.9 |
| 5 levels | School decile group at age 10 | 1-2 | 3-4, 5-6, 7-8 | 9-10 | 17.4 | 3.2 | 7.3 |
| 4 levels | Student helps out at home | rarely/never | | usually | 17.4 | 7.1 | 2.9 |

| PAT Reading Comprehension | | | | | | | |
|---------------------------|---|--|--|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | Largest observed difference | s.e of given difference | Percent variance for model |
| 5 levels | Student's current response to school | bored/unhappy | routine or mixed | while to settle or enjoys | 17.3 | 6.8 | 2.6 |
| 4 levels | Student does what likes at home | rarely/never | occasionally | usually | 17.1 | 3.5 | 8.1 |
| 5 levels | TV watching at age 6 | 3 hours or more | | <1 hour | 17.1 | 5.9 | 3.9 |
| 4 levels | History of TV watching | 2hrs+ for 1 or 2 of 5,6,&8 | | <2hrs daily each age | 16.7 | 4.3 | 8.0 |
| 3 levels | History of class size | mixed | | always small (up to 25) | 16.7 | 5.5 | 3.4 |
| 3 levels | Student gets help if needed at home | occas./rarely/never | | usually | 16.4 | 4.9 | 2.6 |
| 5 levels | TV watching at age 5 | 3 hours or more | | none | 16.4 | 6.6 | 6.1 |
| 4 levels | History of participation in music | none or just at 12 | just at 8 or (not 8 but 10 or 10,&12), or at 8+one age later | each age 8,10, &12 | 16.1 | 2.5 | 8.6 |
| 7 levels | History of teacher relationship with parent | satisfactory or worse | | all v.good/excellent | 16.1 | 6.8 | 3.9 |
| 3 levels | Parent satisfied with child's progress at 10 | no | qualified yes | yes | 16.0 | 3.7 | 4.0 |
| 3 levels | Student gets a hard time at school | usually | occasionally | rarely/never | 15.8 | 5.5 | 4.4 |
| 4 levels | ECE centre was a "print-saturated environment" | up to lowest quartile | | above lowest quartile | 15.1 | 3.4 | 9.2 |
| 4 levels | Class parental support | none or infrequent | sometimes | v.good or fantastic | 15.0 | 6.7 | 3.0 |
| 6 levels | Time spent on homework (given it is done) | 0.5-1 hour | | 4.5-5 hours | 14.6 | 3.5 | 4.8 |
| 4 levels | History of bullying | both 10, 1 or more 12 | 1 or more 10, neither 12 or neither 12, 1 or more 12 | neither at 10 or 12 | 14.6 | 4.5 | 5.1 |
| 8 levels | Time per wk on computer out of school | none or no computer | | 3.5-5 hours | 14.5 | 3.9 | 3.6 |
| 6 levels | Usage of public library at 12 | none | | fortnightly | 13.7 | 3.1 | 4.5 |
| 3 levels | Student thinks rules at school fair | rarely/never | occasionally | usually | 13.7 | 7.0 | 2.8 |
| 3 levels | Parental satisfaction with progress at age 8 | no | | yes | 13.6 | 3.8 | 2.9 |
| 4 levels | Student gets told off at home | always | | rarely/never | 13.5 | 3.4 | 3.8 |
| 3 levels | School ownership at age 6 | state | | private fully-reg. | 13.4 | 5.1 | 3.0 |
| 4 levels | School type | intermediate or secondary Yr.7-15 | full primary | composite | 13.2 | 4.7 | 2.4 |
| 3 levels | Student talks to parent about their reading | no | | sometimes or yes | 12.9 | 2.1 | 7.4 |
| 4 levels | Parent view, student's comfort puberty changes | no changes observed | | not comfortable | 12.6 | 4.8 | 1.6 |
| 3 levels | Student feels restless at school | usually | | occasionally or rarely/never | 12.5 | 3.6 | 2.4 |
| 3 levels | Homework at 10 | no | | yes | 12.5 | 3.9 | 4.0 |
| 3 levels | Student gets listened to at home | occas./rarely/never | | always | 12.4 | 3.2 | 2.9 |
| 4 levels | Teacher view of home support for schoolwork | none/infreq. or sometimes | | mostly v.good or fantastic | 12.4 | 4.5 | 4.0 |
| 3 levels | Student gets tired of trying at school | usually | occasionally | rarely/never | 12.3 | 3.5 | 2.5 |
| 4 levels | ECE Staff guided children in context of activities | lowest quartile | middle quartiles | top quartile | 12.3 | 3.7 | 4.2 |
| 3 levels | School ownership at age 12 | state | state integrated | private fully-reg. | 12.0 | 3.1 | 3.0 |
| 3 levels | Student gets bullied at school | usually or occasionally | | rarely/never | 11.8 | 2.6 | 4.2 |

| PAT Reading Comprehension | | | | | | | |
|---------------------------|---|--|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | Largest observed difference | s.e of given difference | Percent variance for model |
| 3 levels | Student feels doing well at school when work hard | disagree | not sure/it depends | agree | 11.7 | 5.5 | 1.8 |
| 4 levels | Student gets bored at home | always | | rarely/never | 11.6 | 4.9 | 2.9 |
| 4 levels | ECE Staff asked open-ended questions | up to lowest quartile | | above lowest quartile | 11.4 | 3.0 | 5.3 |
| 4 levels | Bullying at age 12 | bully only | | neither | 11.3 | 3.4 | 4.2 |
| 4 levels | ECE Responsiveness | quartiles 1&2 | quartile 3 | top quartile | 11.2 | 3.7 | 6.0 |
| 3 levels | School ownership at age 10 | state | | private fully-reg. | 11.2 | 3.9 | 2.0 |
| 3 levels | Student gets bored at school | usually | | occasionally or rarely/never | 11.1 | 3.0 | 2.8 |
| 4 levels | Number of schools attended | 4 or more | 2 or 3 | 1 | 11.1 | 3.9 | 1.8 |
| 3 levels | School ownership at age 8 | state | | private fully-reg. | 11.1 | 4.2 | 1.6 |
| 4 levels | Teacher view relationship with parents at 8 | no relationship | | very good/excellent | 10.9 | 4.3 | 2.5 |
| 3 levels | Student feels doing well at school when gets a new idea about how things work | disagree | | agree or not sure/it depends | 10.9 | 4.4 | 1.3 |
| 3 levels | Parental satisfaction with progress at age 12 | no | | yes | 10.8 | 3.1 | 2.9 |
| 3 levels | Student feels doing well at school when knows more than other people | agree or disagree | | not sure/it depends | 10.5 | 2.7 | 3.1 |
| 3 levels | Has computer at home, plays games on it | no computer | | yes comp, yes games | 10.4 | 3.1 | 2.3 |
| 4 levels | Family income at age 12 | up to \$30K | >\$50K-\$70K | >\$70K | 10.3 | 2.9 | 4.7 |
| 4 levels | Starting age at ECE | 24 mths or more | | up to 23 mths | 10.2 | 2.8 | 3.5 |
| 2 levels | Student has good friends at school | occasionally/rarely/never | | usually | 10.1 | 3.7 | 1.5 |
| 2 levels | Participation in music at age 10 | no | | yes | 9.6 | 1.9 | 5.2 |
| 3 levels | Language spoken at home | English+one other | | English | 9.5 | 3.1 | 2.3 |
| 3 levels | Homework at 12 – teacher view | no or varies | | yes | 9.4 | 3.7 | 2.6 |
| 3 levels | Student feels doing well at school when has the highest test marks | disagree | agree | not sure/it depends | 9.3 | 3.7 | 1.9 |
| 3 levels | Student feels doing well at school when doesn't have to try hard | agree | disagree | not sure/it depends | 9.2 | 2.9 | 2.0 |
| 2 levels | Participation in music at age 8 | no | | yes | 9.1 | 1.9 | 4.5 |
| 3 levels | Student feels doing well at school when others get things wrong and s/he does not | agree | | disagree or not sure/it depends | 9.0 | 2.9 | 2.0 |
| 3 levels | Student's marks at school reflect ability | occasionally or rarely/never | | usually | 8.6 | 2.0 | 3.9 |
| 3 levels | Student feels doing well at school when friends help each other | agree | not sure/it depends | disagree | 8.6 | 3.4 | 1.6 |
| 3 levels | Parental concerns: home behaviour | yes, concerned | | not concerned | 8.3 | 2.9 | 3.1 |
| 4 levels | Teacher view relationship with parents at 10 | no relationship | | very good/excellent | 8.3 | 3.4 | 2.9 |
| 2 levels | Teacher helps student do her/his best | occasionally/rarely/never | | usually | 8.1 | 2.5 | 2.2 |
| 4 levels | Bullying at age 10 | both | | neither bully nor victim | 7.8 | 3.6 | 2.2 |
| 4 levels | Student's friends come home | always | | occasionally | 7.6 | 2.5 | 2.5 |

| PAT Reading Comprehension | | | | | | | |
|---------------------------|---|--|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | Largest observed difference | s.e of given difference | Percent variance for model |
| 4 levels | Teacher view relationship with parents at 12 | difficult/v.diff/or none | | very good/excellent | 7.3 | 3.0 | 1.7 |
| 3 levels | Student feels doing well at school when have nothing hard to do | agree | | disagree or not sure/it depends | 7.0 | 2.0 | 2.6 |
| 2 levels | Uses home computer for e-mail | no | | yes | 7.0 | 2.1 | 2.4 |
| 3 levels | Student feels doing well at school when learns something interesting | agree | | disagree or not sure/it depends | 7.0 | 3.3 | 1.4 |
| 2 levels | Uses home computer for homework/projects | no | | yes | 6.9 | 2.0 | 2.6 |
| 2 levels | Student has fixed bed-time on schooldays | yes | | no/not sure | 6.5 | 2.0 | 2.1 |
| 4 levels | Adults students like visit at home | always | | usually | 6.4 | 2.4 | 1.6 |
| 3 levels | Maternal employment at age 12 | full-time | | part-time | 6.3 | 2.1 | 2.0 |
| 2 levels | Uses home computer for graphics | no | | yes | 6.3 | 3.0 | 1.0 |
| 2 levels | Participation in music at age 12 | no | | yes | 6.0 | 1.9 | 2.0 |

| Communication | | | | | | | |
|------------------|---|--|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | Largest observed difference | s.e of given difference | Percent variance for model |
| 4 levels | Teacher view of achievement at age 12 | minimal/<average | average to v.good | v.good/excellent | 34.2 | 2.1 | 40.4 |
| 9 levels | History of student's involvement in homework | varied at 10, no at 12 | yes at either 10 or 12 | yes at 10, yes at 12 | 25.3 | 5.2 | 7.1 |
| 4 levels | Teacher view of achievement at age 10 | minimal/<average | average to v.good | v.good/excellent | 23.0 | 2.4 | 19.4 |
| 3 levels | Homework at 12 – teacher view | no or varies | | yes | 19.9 | 3.0 | 15.1 |
| 3 levels | Student is told when done good work | rarely/never | occasionally | usually | 19.0 | 6.9 | 3.9 |
| 3 levels | Student learns most things pretty quickly | rarely/never | occasionally | usually | 17.8 | 4.8 | 9.8 |
| 4 levels | Teacher view of achievement at age 6 | minimal/<average | average to v.good | v.good/excellent | 17.6 | 2.6 | 16.6 |
| 3 levels | Student thinks the rules at school are fair | rarely/never | occasionally | usually | 17.6 | 6.4 | 2.9 |
| 4 levels | Teacher view of home support for schoolwork | non/infreq. or sometimes | mostly v.good | fantastic | 17.1 | 2.2 | 13.0 |
| 3 levels | Student does interesting things at school | rarely/never | occasionally | usually | 16.8 | 4.7 | 5.5 |
| 3 levels | Student gets help if needed at home | occas./rarely/never | usually | always | 16.4 | 3.9 | 4.0 |
| 3 levels | Parental satisfaction with progress, age 12 | no | qualified yes | yes | 16.2 | 2.7 | 7.4 |
| 3 levels | Student feels sad at school | usually | occasionally | rarely/never | 15.8 | 7.8 | 1.2 |
| 3 levels | At school teachers treat student fairly | rarely/never | occasionally | usually | 15.7 | 5.8 | 3.9 |
| 4 levels | Student has interesting things to do at home | rarely/never | occasionally | always | 15.1 | 6.1 | 1.9 |
| 3 levels | Student gets help he/she needs at school | rarely/never | occasionally | usually | 15.0 | 6.7 | 3.9 |
| 6 levels | Mother's education at the birth of the first child | none | senior-school or trade | university | 14.8 | 2.8 | 5.7 |
| 2 levels | Student has good friends at school | occasionally/rarely/never | | usually | 14.3 | 3.4 | 3.5 |
| 3 levels | Enjoyment of reading | no | qualified yes | yes | 14.1 | 2.4 | 8.3 |
| 6 levels | Parental aspiration for child at 12 | end of secondary | | university or tertiary | 14.0 | 4.5 | 3.7 |
| 3 levels | Student gets bullied at school | usually | occasionally | rarely/never | 13.7 | 6.6 | 2.5 |
| 3 levels | Homework at 10 | no | | yes | 13.6 | 3.3 | 7.1 |
| 5 levels | TV watching at age 10 | 3 hours or more | | none | 13.4 | 5.8 | 3.0 |
| 6 levels | Number of parental concerns | 4, 5 or 6 out of the 6 | | none | 13.2 | 3.8 | 4.0 |
| 3 levels | Student feels lonely at school | usually | | rarely/never | 13.2 | 6.1 | 1.7 |
| 3 levels | Student feels doing well at school when what learns really makes sense | disagree | | agree or not sure/it depends | 12.9 | 3.7 | 2.4 |
| 3 levels | Parent satisfied with child's progress at 10 | no | qualified yes | yes | 12.8 | 3.2 | 4.6 |
| 4 levels | History of bullying | both 10, 1 or more 12 | neither 10, 1 or more 12 | neither at 10 or 12 | 12.8 | 3.7 | 4.4 |
| 3 levels | Student gets tired of trying at school | usually | occasionally | rarely/never | 12.7 | 3.1 | 4.2 |
| 7 levels | History of teacher relationship with parent | diff/v.diff but never none | | all v.good/excellent | 12.5 | 5.1 | 4.1 |
| 2 levels | Teacher helps student do her/his best | occasionally/rarely/never | | usually | 12.1 | 2.2 | 5.8 |
| 3 levels | Student could do better work if he/she tried | usually | occasionally | rarely/never | 12.0 | 2.4 | 5.1 |

| Communication | | | | | | | |
|------------------|---|--|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | Largest observed difference | s.e of given difference | Percent variance for model |
| 5 levels | Student's current response to school | mixed | bored or while to settle | routine or enjoys | 12.0 | 3.3 | 4.4 |
| 3 levels | Things explained at home when needed | occas./rarely/never | | always | 12.0 | 4.1 | 1.7 |
| 3 levels | Student feels restless at school | usually | | occasionally or rarely/never | 11.9 | 3.0 | 3.1 |
| 3 levels | Parent satisfied with child's progress at age 8 | no | | yes | 11.8 | 3.3 | 3.5 |
| 4 levels | Student helps out at home | rarely/never | | usually | 11.8 | 5.7 | 2.1 |
| 4 levels | Student gets bored at home | always | | occasionally | 11.7 | 3.6 | 4.0 |
| 3 levels | Student feels doing well at school when does very best | disagree | not sure/it depends | agree | 11.7 | 4.3 | 1.8 |
| 6 levels | History of parental satisfaction | mostly no | | yes at least at age 12 | 11.2 | 4.7 | 6.8 |
| 5 levels | Parental handling disagreements at 12 | student "wins" | | negotiation | 11.0 | 4.5 | 3.7 |
| 3 levels | Student likes his/her teacher | rarely/never | | usually or occasionally | 10.9 | 3.7 | 2.0 |
| 5 levels | School decile group at age 12 | 1-2 | | 3-4 | 10.8 | 3.2 | 3.8 |
| 4 levels | History of TV watching | 2hrs+ for 1 or 2 of 5, 6, & 8 | | <2hrs daily each yr. | 10.8 | 3.7 | 5.3 |
| 3 levels | Student gets bored at school | usually | | occasionally or rarely/never | 10.6 | 2.4 | 3.8 |
| 3 levels | Attitude to current teacher | does not like | qualified "likes" | likes teacher | 10.6 | 3.0 | 3.1 |
| 3 levels | Student keeps out of trouble at school | rarely/never | occasionally | usually | 10.6 | 3.9 | 5.4 |
| 6 levels | Time spent on homework (given it is done) | 0.5-1 hour | | 3.5-4 hours | 10.5 | 2.8 | 3.8 |
| 3 levels | Expectations are fair at home | occas./rarely/never | | always | 10.5 | 3.3 | 2.4 |
| 3 levels | Student feels doing well at school when gets a new idea about how things work | disagree | | agree or not sure/it depends | 10.5 | 3.7 | 2.2 |
| 4 levels | Family income at age 5 | up to \$20K | | >\$60K | 10.2 | 2.4 | 3.8 |
| 5 levels | Mother's education by time child is 12 | none | | degree | 9.8 | 3.3 | 3.1 |
| 3 levels | Student feels lonely at home | always/usually | occasionally | rarely/never | 9.8 | 4.6 | 1.4 |
| 4 levels | Bullying at age 10 | both | | bully | 9.7 | 4.2 | 2.0 |
| 3 levels | Student gets listened to at home | occas./rarely/never | usually | always | 9.6 | 2.7 | 2.6 |
| 4 levels | History of participation in music | none or just at 12 | | each age 8,10, &12 | 9.5 | 2.6 | 4.5 |
| 4 levels | Student does what likes at home | rarely/never | occasionally | usually | 9.5 | 2.9 | 2.5 |
| 2 levels | Attendance - teacher view | satisfactory or poor | | good | 9.4 | 3.1 | 1.8 |
| 3 levels | Parental concerns: school | yes, concerned | qual. yes concerned | not concerned | 9.3 | 2.9 | 2.3 |
| 3 levels | Student feels doing well at school when s/he solves a problem by working hard | disagree or not sure/it depends | | agree | 9.3 | 3.5 | 1.5 |
| 4 levels | Teacher view relationship with parents at 12 | difficult/v.diff/or none | | very good/excellent | 9.2 | 2.7 | 2.6 |
| 3 levels | Parental concerns: self-confidence | yes, concerned | | not concerned | 8.7 | 2.2 | 3.4 |
| 4 levels | Family income at age 12 | up to \$30K | | >\$70K | 8.6 | 2.3 | 4.0 |
| 4 levels | Child's initial response to school | while to settle | | enthusiasm, matter of fact or unhappy | 8.2 | 2.4 | 4.3 |
| 6 levels | Usage of public library at 12 | none | | fortnightly | 8.2 | 2.8 | 2.9 |
| 6 levels | Father's education when child was 5 | none | | university | 8.1 | 2.7 | 3.5 |
| 2 levels | Uses home computer for e-mail | no | | yes | 8.0 | 1.7 | 4.8 |

| Communication | | | | | | | |
|------------------|---|--|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | Largest observed difference | s.e of given difference | Percent variance for model |
| 3 levels | Student feels doing well at school when learns something which makes her/him think | disagree | | agree or not sure/it depends | 8.0 | 2.9 | 1.6 |
| 3 levels | Student feels doing well at school when knows more than other people | agree | disagree | not sure/it depends | 7.9 | 2.2 | 2.6 |
| 4 levels | Student gets told off at home | always | | rarely/never | 7.7 | 4.1 | 2.0 |
| 5 levels | School decile group at age 10 | 1-2 | | 3-4 | 7.5 | 3.2 | 1.9 |
| 2 levels | Uses home computer for graphics | no | | yes | 7.4 | 2.7 | 1.7 |
| 3 levels | Student talks to parent about their reading | no | | sometimes | 7.3 | 2.1 | 3.1 |
| 3 levels | Student feels doing well at school when work hard | disagree or not sure/it depends | | agree | 7.2 | 3.1 | 1.7 |
| 3 levels | Student's marks at school reflect ability | occasionally or rarely/never | | usually | 7.1 | 1.6 | 3.8 |
| 3 levels | Parental concerns: friendships | yes, concerned | | not concerned | 6.9 | 2.7 | 1.5 |
| 4 levels | Teacher view relationship with parents at 8 | none | | very good/excellent | 6.9 | 3.1 | 3.0 |
| 4 levels | Student gets treated fairly at home | occasionally | | always | 6.9 | 3.3 | 2.1 |
| 4 levels | Class peer support | none to sometimes | | v.good or fantastic | 6.8 | 3.0 | 2.4 |
| 2 levels | Participation in music at age 10 | no | | yes | 6.6 | 1.6 | 3.3 |
| 3 levels | Student gets a hard time at school | usually or occasionally | | rarely/never | 6.6 | 1.8 | 2.9 |
| 3 levels | Student enjoys self at school | occasionally or rarely/never | | usually | 6.6 | 1.9 | 2.8 |
| 5 levels | TV watching at age 8 | 3 hours or more | | < 1 hour | 6.5 | 3.2 | 2.4 |
| 3 levels | Student feels doing well at school when others get things wrong and s/he does not | agree | | disagree or not sure/it depends | 6.4 | 2.3 | 1.6 |
| 3 levels | Parental concerns: home behaviour | yes, concerned | | not concerned | 6.4 | 2.3 | 2.5 |
| 3 levels | Enjoyment of writing | no | qualified yes | yes | 6.3 | 2.2 | 1.6 |
| 2 levels | Participation in music at age 8 | no | | yes | 6.2 | 1.5 | 3.2 |
| 4 levels | Bullying at age 12 | bully only | | neither | 6.2 | 2.8 | 2.6 |

| Individual Responsibility | | | | | | | |
|---------------------------|---|--|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | largest observed difference | s.e of given difference | percent variance for model |
| 9 levels | History of student's involvement in homework | varied at 10, no at 12 | yes at either 10 or 12 | yes at 10, yes at 12 | 40.9 | 5.5 | 9.6 |
| 3 levels | Homework – teacher view | no | varies | yes | 35.0 | 3.2 | 28.3 |
| 4 levels | Teacher view of achievement at age 12 | minimal/<average | average to v.good | v.good/excellent | 25.2 | 2.6 | 17.0 |
| 4 levels | Student helps out at home | rarely/never | | usually | 24.2 | 6.6 | 3.9 |
| 3 levels | Student thinks the rules at school are fair | rarely/never | occasionally | usually | 22.0 | 6.5 | 5.8 |
| 3 levels | Student gets help he/she needs at school | rarely/never | occasionally | usually | 21.4 | 7.4 | 4.4 |
| 4 levels | Teacher view of home support for schoolwork | non/infreq. or sometimes | mostly v.good | fantastic | 20.3 | 3.9 | 13.5 |
| 3 levels | At school teachers treat student fairly | rarely/never | occasionally | usually | 18.4 | 6.1 | 7.5 |
| 4 levels | Teacher view of achievement at age 6 | minimal/<average | average to v.good | v.good/excellent | 18.2 | 3.2 | 11.2 |
| 3 levels | Homework at 10 | no | | yes | 18.1 | 3.5 | 9.6 |
| 3 levels | Students are told when done good work | rarely/never | occasionally | usually | 18.1 | 7.5 | 2.1 |
| 4 levels | Teacher view of achievement at age 10 | minimal/<average | average to v.good | v.good/excellent | 17.7 | 2.8 | 8.2 |
| 3 levels | Student feels lonely at school | usually | | rarely/never | 17.6 | 7.0 | 1.3 |
| 7 levels | Parents TV watching at age 12 | >=4 hours daily | amounts in between | 1–2 hours daily | 17.5 | 3.6 | 3.7 |
| 3 levels | Student gets help if needed at home | occas./rarely/never | usually | always | 17.5 | 4.2 | 3.8 |
| 6 levels | Number of parental concerns | 4, 5, or 6 out of the 6 | some qual.concerns | none | 17.4 | 4.2 | 5.2 |
| 3 levels | Student enjoys self at school | rarely/never | occasionally | usually | 17.3 | 6.2 | 2.9 |
| 3 levels | Parental satisfaction with progress at age 12 | no | qualified yes | yes | 17.1 | 2.8 | 7.9 |
| 3 levels | Parental concerns: school | yes, concerned | qual. yes concerned | not concerned | 16.6 | 3.1 | 5.4 |
| 7 levels | History of teacher relationship with parent | diff/v.diff but never none | | all v.good/excellent | 16.6 | 5.1 | 4.7 |
| 4 levels | Class peer support | none or infrequent | sometimes | v.good or fantastic | 16.5 | 6.5 | 4.7 |
| 4 levels | Family knows student done homework | rarely/never | | always | 16.3 | 5.5 | 3.6 |
| 3 levels | Attitude to current teacher | does not like | qualified "like" | likes teacher | 16.1 | 3.4 | 7.2 |
| 4 levels | Student gets told off at home | always | | rarely/never | 16.1 | 4.1 | 4.0 |
| 6 levels | History of parental satisfaction | mostly no | | yes at least at age 12 | 15.6 | 5.5 | 6.3 |
| 3 levels | Students like their teachers | rarely/never | occasionally | usually | 15.0 | 4.0 | 5.3 |
| 3 levels | Student does interesting things at school | rarely/never | occasionally | usually | 14.9 | 5.0 | 2.8 |
| 3 levels | Students learn what needed for future | rarely/never | occasionally | usually | 14.9 | 5.5 | 2.7 |
| 3 levels | Student gets bored at school | usually | | occasionally or rarely/never | 14.5 | 2.9 | 5.4 |
| 4 levels | History of bullying | both 10, 1 or more 12 | | neither at 10 or 12 | 14.5 | 3.7 | 5.5 |
| 3 levels | Student gets bullied at school | usually or occasionally | | rarely/never | 14.3 | 6.6 | 2.6 |
| 4 levels | Ethnicity | Pasifika | | Māori | 14.2 | 4.7 | 2.0 |
| 6 levels | History upsets or not and how coped | upsets each age, coped or varied | | no upsets | 13.7 | 4.2 | 3.5 |
| 5 levels | Student's current response to school | bored/unhappy | mixed or routine | while to settle, enjoys | 13.7 | 6.4 | 3.1 |

| Individual Responsibility | | | | | | | |
|---------------------------|---|--|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | largest observed difference | s.e of given difference | percent variance for model |
| 8 levels | Time per.wk on computer out of school | none or no computer | | 1 hour | 13.4 | 3.3 | 4.6 |
| 3 levels | Students keep out of trouble at school | occasionally or rarely/never | | usually | 13.4 | 4.8 | 7.6 |
| 5 levels | Parental handling disagreements at 12 | student "wins" | | negotiation | 13.0 | 4.7 | 3.8 |
| 3 levels | Enjoyment of reading | no | qualified yes | yes | 12.9 | 2.7 | 6.3 |
| 2 levels | Attendance - teacher view | satisfactory or poor | | good | 12.8 | 3.5 | 2.7 |
| 3 levels | Student feels restless at school | usually | | occasionally or rarely/never | 12.7 | 3.4 | 2.8 |
| 4 levels | Student has interesting things to do at home | rarely/never | occasionally | always | 12.6 | 6.1 | 1.5 |
| 2 levels | Student has good friends at school | occasionally/rarely/never | | usually | 12.3 | 3.5 | 2.5 |
| 3 levels | Student could do better work if he/she tried | usually | occasionally | rarely/never | 12.1 | 2.8 | 4.0 |
| 4 levels | Bullying at age 10 | both | | neither bully nor victim | 11.9 | 3.1 | 3.5 |
| 3 levels | Parental satisfaction with progress at age 8 | no | | yes | 11.8 | 3.5 | 2.3 |
| 6 levels | Time spent on homework (given it is done) | 0.5-1 hour | | 3.5-4 hours | 11.7 | 3.1 | 3.4 |
| 6 levels | Usage of public library at 12 | none | | 3-weekly | 11.7 | 3.6 | 4.4 |
| 3 levels | Student feels doing well at school when learn something which makes her/him think | disagree | | agree or not sure/it depends | 11.5 | 3.7 | 2.3 |
| 4 levels | Teacher view relationship with parents at 12 | diffcult/v.diff/or none | | very good/excellent | 11.4 | 2.7 | 4.7 |
| 4 levels | Student gets bored at home | always | | occasionally | 11.2 | 4.1 | 2.9 |
| 3 levels | Student gets tired of trying at school | usually | occasionally | rarely/never | 11.1 | 3.2 | 4.1 |
| 2 levels | Teacher helps student do her/his best | occasionally/rarely/never | | usually | 10.9 | 2.3 | 4.5 |
| 3 levels | Student feels doing well at school when s/he solves a problem by working hard | disagree | not sure/it depends | agree | 10.8 | 4.0 | 1.5 |
| 3 levels | Expectations are fair at home | occas./rarely/never | | always | 10.5 | 3.7 | 2.6 |
| 3 levels | Student feels doing well at school when knows more than other people | agree | disagree | not sure/it depends | 10.3 | 2.5 | 3.6 |
| 4 levels | Parent view, student's comfort puberty changes | no changes observed | | not comfortable | 9.9 | 4.4 | 2.0 |
| 3 levels | Students get a hard time at school | usually or occasionally | | rarely/never | 9.6 | 2.0 | 5.0 |
| 4 levels | History of participation in music | none or just at 12 | | each age 8,10, &12 | 9.4 | 2.4 | 3.4 |
| 6 levels | Mother's education at the birth of the first child | none | trade | university | 9.4 | 2.7 | 2.9 |
| 3 levels | Parental concerns: friendships | yes, concerned | | not concerned | 9.0 | 2.8 | 2.1 |
| 3 levels | Student feels doing well at school when gets a new idea about how things work | disagree | | agree or not sure/it depends | 8.8 | 3.2 | 1.5 |
| 3 levels | Teachers listen to what student says | rarely/never | occasionally | usually | 8.1 | 1.9 | 3.8 |
| 3 levels | Parental satisfaction with progress at age 10 | no | qualified yes | yes | 8.0 | 3.5 | 1.5 |
| 3 levels | Enjoyment of writing | no | qualified yes | yes | 7.9 | 2.0 | 2.2 |
| 3 levels | Student talks to parent about their reading | no | | yes | 7.8 | 2.0 | 2.9 |
| 3 levels | Enjoyment of working with numbers | no | qualified yes | yes | 7.3 | 2.4 | 1.9 |

| Individual Responsibility | | | | | | | |
|---------------------------|---|---|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | largest observed difference | s.e of given difference | percent variance for model |
| 3 levels | Parental concerns: self-confidence | yes, concerned | | not concerned | 7.0 | 2.5 | 1.6 |
| 3 levels | Attitude to previous teachers | did not like all, or perhaps did not like all | | liked all teachers | 6.9 | 1.9 | 2.7 |
| 4 levels | Bullying at age 12 | both | | neither | 6.8 | 3.6 | 2.1 |
| 4 levels | Family income at age 12 | >\$30K-\$50K | | >\$70K | 6.6 | 2.8 | 2.5 |
| 3 levels | Student's marks at school reflect ability | occasionally or rarely/never | | usually | 6.5 | 1.8 | 2.6 |
| 4 levels | Family income at age 5 | up to \$20K | | >\$60K | 6.5 | 2.7 | 1.4 |
| 4 levels | Student unsettled at 12 and how coping | upset, coped poorly | | not unsettled | 6.3 | 2.3 | 1.8 |
| 2 levels | Participation in music at age 8 | no | | yes | 6.2 | 1.8 | 2.3 |
| 3 levels | Student learns most things pretty quickly | rarely/never | occasionally | usually | 6.1 | 1.8 | 2.5 |

| Perseverance | | | | | | | |
|---------------------|--|--|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant subgroup difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | largest observed difference | s.e of given difference | percent variance for model |
| 9 levels | History of student's involvement in homework | varies at 10, no at 12 | yes at either 10 or 12 | yes at 10, yes at 12 | 45.9 | 5.3 | 38.0 |
| 3 levels | Homework at 12 – teacher view | no | varies | yes | 40.6 | 3.1 | 33.4 |
| 4 levels | Teacher view of achievement at age 12 | minimal/<average | average to v.good | v.good/excellent | 39.4 | 2.7 | 35.3 |
| 3 levels | Student thinks the rules at school are fair | rarely/never | occasionally | usually | 30.3 | 7.2 | 7.5 |
| 4 levels | Teacher view of achievement at age 10 | minimal/<average | average to v.good | v.good/excellent | 27.3 | 3.0 | 18.2 |
| 3 levels | Student gets help he/she needs at school | rarely/never | occasionally | usually | 26.7 | 8.2 | 5.2 |
| 4 levels | Teacher view of achievement at age 6 | minimal/<average | average to v.good | v.good/excellent | 26.0 | 3.7 | 16.2 |
| 4 levels | Student helps out at home | rarely/never | | always | 25.7 | 7.5 | 3.7 |
| 3 levels | Homework at 10 | no | | yes | 23.9 | 3.8 | 13.9 |
| 4 levels | Teacher view of home support for schoolwork | non/infreq.or sometimes | mostly v.good | fantastic | 23.5 | 4.3 | 15.5 |
| 6 levels | History of parental satisfaction | mostly no | | yes at least at age 12 | 23.1 | 6.0 | 10.4 |
| 5 levels | Student's current response to school | bored/unhappy | mixed | while to settle, enjoys or routine | 22.4 | 4.4 | 5.5 |
| 3 levels | Student feels lonely at school | usually | | occasionally or rarely/never | 22.1 | 8.0 | 1.7 |
| 3 levels | Student feels lonely at school | usually | occasionally | rarely/never | 22.1 | 8.0 | 1.7 |
| 3 levels | Parental satisfaction with progress at age 12 | no | qualified yes | yes | 21.4 | 3.1 | 10.2 |
| 4 levels | History of bullying | both 10, 1 or more 12 | neither 10, 1 or more 12 | neither at 10 or 12 | 21.0 | 4.3 | 8.8 |
| 6 levels | Number of parental concerns | 4, 5, or 6 out of the 6 | some qual.concerns | none | 20.2 | 4.7 | 6.9 |
| 3 levels | Student enjoys self at school | rarely/never | occasionally | usually | 19.8 | 6.9 | 3.1 |
| 3 levels | Parental concerns: school | yes, concerned | qual. yes concerned | not concerned | 18.7 | 3.5 | 5.6 |
| 3 levels | Student gets help if needed at home | occas./rarely/never | usually | always | 18.7 | 4.6 | 4.1 |
| 4 levels | Student gets told off at home | always | | rarely/never | 18.5 | 4.5 | 4.4 |
| 2 levels | Attendance - teacher view | satisfactory or poor | | good | 18.4 | 3.8 | 4.5 |
| 4 levels | Family knows student done homework | rarely/never | | always | 18.4 | 6.1 | 3.8 |
| 3 levels | Enjoyment of reading | no | qualified yes | yes | 18.1 | 3.0 | 9.4 |
| 3 levels | At school teachers treat student fairly | rarely/never | occasionally | usually | 17.9 | 6.8 | 6.1 |
| 3 levels | Students keep out of trouble at school | rarely/never | occasionally | usually | 17.7 | 5.2 | 9.9 |
| 3 levels | Students are told when done good work | rarely/never | occasionally | usually | 17.7 | 8.3 | 3.0 |
| 3 levels | Student gets bored at school | usually | | occasionally or rarely/never | 17.5 | 3.2 | 6.3 |
| 3 levels | Student gets tired of trying at school | usually | occasionally | rarely/never | 17.5 | 3.5 | 7.0 |
| 3 levels | Student could do better work if he/she tried | usually | occasionally | rarely/never | 17.4 | 3.1 | 6.5 |
| 7 levels | Parents TV watching at age 12 | >=4 hours daily | amounts in between | none | 17.4 | 7.2 | 3.6 |
| 3 levels | Student does interesting things at school | rarely/never | occasionally | usually | 17.3 | 5.6 | 4.0 |
| 3 levels | Students like their teachers | rarely/never | occasionally | usually | 17.2 | 4.5 | 4.2 |

| Perseverance | | | | | | | |
|---------------------|---|--|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | largest observed difference | s.e of given difference | percent variance for model |
| 4 levels | Student has interesting things to do at home | rarely/never | occasionally | always | 16.5 | 6.8 | 3.1 |
| 3 levels | Parental satisfaction with progress at age 8 | no | qualified yes | yes | 15.9 | 3.9 | 3.8 |
| 4 levels | Student gets treated fairly at home | rarely/never | | always | 15.7 | 8.3 | 2.9 |
| 4 levels | Bullying at age 10 | both | | neither bully nor victim | 15.4 | 3.4 | 4.7 |
| 3 levels | Expectations are fair at home | occas./rarely/never | | always | 15.4 | 4.1 | 4.1 |
| 6 levels | History upsets or not and how coped | upsets each age, coped or varied | | no upsets | 15.4 | 4.6 | 4.1 |
| 6 levels | Mother's education at the birth of the first child | none | senior-school | university | 15.3 | 3.5 | 5.3 |
| 3 levels | Attitude to current teacher | does not like or qualified "like" | | likes teacher | 15.2 | 3.8 | 5.4 |
| 3 levels | Student feels doing well at school when learn something which makes her/him think | disagree | | agree or not sure/it depends | 15.1 | 3.5 | 3.7 |
| 4 levels | Student gets bored at home | always | | occasionally | 15.1 | 4.6 | 4.4 |
| 4 levels | History of school decile group | mostly 1-2 | all 3-8 | all 9-10 | 14.9 | 5.5 | 4.4 |
| 3 levels | Student feels restless at school | usually | occasionally | rarely/never | 14.6 | 3.8 | 2.9 |
| 2 levels | Student has good friends at school | occasionally/rarely/never | | usually | 14.2 | 3.9 | 2.7 |
| 6 levels | Time spent on homework (given it is done) | 0.5-1 hour | | 4.5-5 hours | 14.1 | 3.6 | 4.1 |
| 7 levels | History of teacher relationship with parent | diff/v. diff but never none | | all v. good/excellent | 14.1 | 5.7 | 4.0 |
| 6 levels | Usage of public library at 12 | none | | 3-weekly | 14.0 | 4.0 | 4.8 |
| 3 levels | Student learns most things pretty quickly | rarely/never | occasionally | usually | 14.0 | 5.9 | 5.2 |
| 2 levels | Teacher helps student do her/his best | occasionally/rarely/never | | usually | 13.7 | 2.5 | 5.7 |
| 2 levels | Teacher helps student do best | occasionally/rarely/never | | usually | 13.7 | 2.5 | 5.7 |
| 3 levels | Students learn what needed for future | rarely/never | occasionally | usually | 13.7 | 5.1 | 2.4 |
| 5 levels | Parental handling disagreements at 12 | student "wins" | | negotiation | 13.7 | 5.2 | 5.3 |
| 4 levels | Family income at age 12 | up to \$30K | >\$30K-\$50K | >\$70K | 13.0 | 3.0 | 5.5 |
| 3 levels | Parent satisfied with child's progress at 10 | no | qualified yes | yes | 12.6 | 3.9 | 3.8 |
| 3 levels | Student feels doing well at school when gets a new idea about how things work | disagree | | agree or not sure/it depends | 12.4 | 3.6 | 2.3 |
| 5 levels | TV watching at age 6 | 3 hours or more | | < 1 hour | 12.4 | 5.3 | 3.5 |
| 4 levels | Family income at age 5 | up to \$20K | | >\$60K | 12.2 | 3.0 | 3.8 |
| 3 levels | Has computer at home, plays games on it | no computer | | yes comp, no games | 12.2 | 4.0 | 2.0 |
| 6 levels | Parental aspiration for child at 12 | end of secondary | | university or tertiary | 12.2 | 5.6 | 2.6 |
| 3 levels | Students get a hard time at school | usually or occasionally | | rarely/never | 11.9 | 2.2 | 5.9 |
| 5 levels | School decile group at age 6 | 1-2 | | 9-10 | 11.9 | 4.7 | 3.8 |
| 3 levels | Enjoyment of working with numbers | no | qualified yes | yes | 11.8 | 2.6 | 3.9 |
| 3 levels | Things explained at home when needed | occas./rarely/never | | always | 11.8 | 5.0 | 1.3 |

| | Perseverance | | | | | | |
|------------------|---|---|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant sub-group difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | largest observed difference | s.e of given difference | percent variance for model |
| 4 levels | Teacher view relationship with parents at 12 | difficult/v.diff//or none | | very good/excellent | 11.7 | 3.1 | 3.8 |
| 3 levels | Student feels doing well at school when knows more than other people | agree | disagree | not sure/it depends | 11.6 | 2.8 | 3.4 |
| 3 levels | Parental concerns: friendships | yes, concerned | | not concerned | 11.6 | 3.1 | 2.8 |
| 3 levels | Student feels doing well at school when s/he solves a problem by working hard | disagree or not sure/it depends | | agree | 11.6 | 4.4 | 1.6 |
| 4 levels | History of participation in music | none or just at 12 | | age 8 + one other age | 11.5 | 3.2 | 4.2 |
| 3 levels | Student gets listened to at home | occas./rarely/never | usually | always | 11.4 | 3.4 | 2.5 |
| 3 levels | Enjoyment of writing | no | qualified yes | yes | 11.3 | 2.7 | 3.4 |
| 6 levels | Father's education when child was 5 | none | trade | tertiary | 11.3 | 4.2 | 5.2 |
| 4 levels | Bullying at age 12 | victim only | | neither bully nor victim | 11.1 | 2.6 | 4.7 |
| 5 levels | Mother's education by time child is 12 | none | | degree | 11.1 | 4.3 | 2.6 |
| 3 levels | Student feels doing well at school when work hard | disagree | not sure/it depends | agree | 10.9 | 3.4 | 2.6 |
| 3 levels | Parent satisf. child's progress at age 6 | no | | yes or qualified yes | 10.9 | 5.4 | 1.5 |
| 4 levels | Class peer support | none to sometimes | | v.good or fantastic | 10.4 | 3.8 | 3.2 |
| 5 levels | TV watching at age 8 | 3 hours or more | | < 1 hour | 10.4 | 4.5 | 2.1 |
| 5 levels | TV watching at age 10 | 3 hours or more | | < 1 hour | 10.1 | 3.7 | 2.6 |
| 3 levels | Student gets bullied at school | usually | occasionally | rarely/never | 9.6 | 2.7 | 3.6 |
| 4 levels | History of TV watching | 2hrs+ for 1 or 2 of 5,6,&8 | | <2hrs daily at 5,6,8 | 9.5 | 4.7 | 3.5 |
| 3 levels | Student talks to parent about their reading | no | | yes | 9.3 | 2.3 | 3.6 |
| 3 levels | Parental concerns: home behaviour | yes, concerned | | not concerned | 9.3 | 3.0 | 2.1 |
| 3 levels | Teachers listen to what student says | rarely/never | occasionally | usually | 9.2 | 2.2 | 3.8 |
| 4 levels | Teacher view relationship with parents at 10 | no relationship | | very good/excellent | 9.2 | 3.5 | 1.5 |
| 4 levels | Socio-economic mix of ECE | wide and low | low to middle | middle-class | 9.1 | 3.2 | 3.3 |
| 3 levels | Parental concerns: Self-confidence | yes, concerned | | not concerned | 9.0 | 2.7 | 2.1 |
| 5 levels | School decile group at age 10 | 1-2 | 5-6 | 9-10 | 8.8 | 3.4 | 2.1 |
| 3 levels | Parental concerns: help around house | yes, concerned | | not concerned | 8.6 | 2.5 | 2.4 |
| 4 levels | Student does what likes at home | rarely/never | | usually | 8.6 | 3.8 | 1.9 |
| 4 levels | Student unsettled at 12 and how coping | upset, coped poorly | | not unsettled | 8.6 | 4.6 | 2.7 |
| 4 levels | Upsets or not and how child coped at 10 | upsets, coping varied | | some upsets, coped well | 8.5 | 3.7 | 1.7 |
| 2 levels | Participation in music at age 8 | no | | yes | 7.7 | 2.0 | 2.9 |
| 3 levels | Attitude to previous teachers | did not like all, or perhaps did not like all | | liked all teachers | 7.5 | 2.1 | 2.5 |
| 3 levels | Student's marks at school reflect ability | occasionally or rarely/never | | usually | 7.3 | 2.0 | 2.5 |
| 2 levels | Participation in music at age 10 | no | | yes | 6.9 | 2.0 | 2.4 |
| 3 levels | School ownership at age 12 | state | | state integrated or private fully-reg. | 6.9 | 3.2 | 1.6 |

| Perseverance | | | | | | | |
|---------------------|--|--|---|---|-----------------------------|-------------------------|----------------------------|
| Number of levels | Factor in order of association by size of largest observed significant subgroup difference | Factor levels with generally low performance | Factor levels with middling performance | Factor levels with generally high performance | largest observed difference | s.e of given difference | percent variance for model |
| 4 levels | Teacher view relationship with parents at 8 | good or satisfactory to difficult | | very good/excellent | 6.7 | 2.2 | 2.1 |
| 3 levels | Student feels doing well at school when others get things wrong and s/he does not | agree | | disagree or not sure/it depends | 6.6 | 2.8 | 1.7 |
| 2 levels | Uses home computer for word processing | no | | yes | 6.0 | 2.1 | 1.8 |