

Sensitive Events in Literacy Development

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Abstract

We have the results of several larger-scale interventions that tell us much about the nature of trajectories of learning, their modification and the barriers to designing more effective schooling. In this chapter I outline these using a developmental framework for considering the nature of literacy learning across school years and how systems create sensitive or even critical periods for effective teaching to occur.

Critical and sensitive periods in development

A major idea in developmental psychology has been the presence of periods in which the growing person is susceptible to particular stimulation: so-called critical and sensitive periods. These were seen as periods in which development was particularly responsive to specific experiences which would set developmental trajectories from that point. The original concept of a critical period proposed a fixed time within which requisite stimulation needed to occur for typical developmental trajectories to be assured. A less fixed version of the concept was one of a period of sensitivity during which receptiveness to the requisite stimulation or the corollary of sensitivity to disruption was optimal, but experiences would still impact on the developing person, albeit with reduced potency, outside of that period. The effects of teratogens on the developing foetus are examples, as are aspects of language development such as phonological development.

Our understanding of these periods has been modified by developmentalists who pointed out that the plasticity of developing systems was greater than what was implied by the concepts (Clarke & Clarke, 1976). Clarke and Clarke famously proposed in their critique of early compensatory programmes that the assumption that they should have

permanent effects regardless of later cognitive and social deprivation or stimulation was, just simply, wrong. Nevertheless, it is apparent that there are periods when experiences are more easily able to affect development and, although this may not fix or determine developmental trajectories, increasingly more intensive and targeted experiences are needed outside of these times. Given the need to modify the more fixed versions of the concepts it became more useful to think of critical events rather than critical periods (Clarke & Clarke, 1976).

The proposal: Literacy development and sensitive periods

The sensitive period (or events) hypothesis is helpful when thinking about the development of school forms of literacy. Given this focus and more contemporary theorising, I would add to the framework the idea of there being critical textual activities and features of guidance associated with them that are particularly effective during definable periods of time. Outside of these times, the intensiveness and nature of the activities needed to impact on development may change.

I propose that there are periods in a child's literacy development during the secondary socialisation that occurs in schools, where experiencing specifiable events (textual activities) is particularly important. The textual activities themselves are not as circumscribed as a single teratogen, like a drug or an environmental pollutant, might be. They are more complex and fluid but, even so, there are some parallels. For example, teratogens do not have single and consistent effects; with teratogens there are interaction effects where individual differences determine just how critical the events are.

The periods

There are four periods during which children appear particularly sensitive to events that will help build robust trajectories of school literacy.

Period one: Getting under way (the transition to primary school)

The period defined by the transition into school, and I include the year prior to school as well as two years into school, is a time during which critical events are necessary to enable children to get under way in school literacy. Developmental transitions are points at which children's learning is particularly vulnerable (Bronfenbrenner, 1979). Most recent models of development over this period support the idea that the rapid learning of what Paris (2005) calls constrained skills (such as alphabet knowledge), and their integration with the more unconstrained skills (such as word knowledge), means that specifiable instructional activities are necessary for co-construction of school literacy to occur.

What are the critical events? The current conceptualisation of literacy instruction as comprising three waves is useful to our thinking about this question. The first wave

comprises that combination of activities that collectively focus on the acquisition of the constrained skills and their integration with ways of making meaning, regulating that meaning and judging that meaning (products of unconstrained skills). The short summary of what these events comprise includes the following (from McNaughton, 2002; Paris, 2005; Pressley et. al., 2001; Snow, Burns & Griffin, 1998): *Instructional balance* involving a mixture of direct skills instruction and more authentic reading and writing; *Instructional density* involving both extensive engagement in versatile (e.g., shared reading and process writing) and more narrowly focused activities (e.g., phonological instruction; morphemic analysis) with goals to integrate constrained and unconstrained skills in text reading and writing; a range of *guidance systems* which are coordinated through close monitoring and adaptable instructional moves which scaffold; encouragement of *self-regulation*; *integration* of reading and writing; *high expectations*; *good classroom management* with a caring and respectful environment and *extensive and modulated practice* in reading and writing real texts.

Without these, children are vulnerable to the educational equivalent of teratogens; the ubiquitous *Matthew effects* (Stanovich, 1986). The descriptive evidence shows, and there is experimental evidence that demonstrates, intensive instruction with the features noted above at the point of entry to school can make up for differential preparedness in school literacy experiences. More than this, the period can operate in systems terms like a *Response to Intervention* (RTI) process, at several levels. Marie Clay (1979), the designer of the early intervention programme Reading Recovery, saw this potential. In the 1970s she set about designing an intervention for children making low progress in literacy after the first year of instruction. At that time in New Zealand, early intervention for low-progress readers in the first year of school did not exist and children were not eligible for any extra support until they had been at school for two years and were assessed as needing special education. Whereupon, they would be taken out of mainstream classrooms and placed in special education classrooms, along with other children who had received similar diagnoses.

There were several problems with this system, including the delay in special help. Clay developed a programme that would filter out children making slow progress relative to their cohort in a school after only a year of instruction. The programme gave them intensive daily one-to-one instruction over the course of about 20 weeks. The argument was that the bulk of children making slow progress were capable of normal progress and needed a burst of very intensive teaching, drawing on well trained and highly knowledgeable specialist teachers. The programme would also act, in turn, as a further screening device (RTI) for severe problems requiring more clinical and specialist roles. In essence, these would be children who did not respond to the best set of teaching conditions, our best “second wave” teaching over this period.

Period two: The “slump” (Years 4–6)

There is a second period which is anticipated in Paris' (2005) model of development. It is the period during which instruction moves from being primarily focused on the acquisition of reading skills and knowledge to a primary focus on the application and extension of being able to read and write across content and topics. It is a period in which there is a need for exposure to specific language and vocabulary, especially for those students for whom the cumulative exposure of school-related language and vocabulary has been limited. The significance of this period has not been realised fully, although there has long been recognition of the plateau in development; the often commented-on slump for which there is New Zealand data (Hattie, 2009).

What are the optimal activities for this period? The details of the stimulation required are being worked out but the general areas are well known. One of these is modulated instruction for comprehension across content areas. Wilkinson and Son (2011) have helped refine our thinking here by indicating that the early single- and multiple-strategy instruction approaches probably need to be better embedded in more dialogic approaches. They outline recent approaches which focus on theories of dialogue and intertextuality. From a dialogic perspective, it is from interaction and negotiation among different voices that meaning and understanding emerge. Particular forms and norms of discourse are needed to promote learning in academic contexts.

A programme of research by Richard Anderson and colleagues illustrates this approach through identifying properties of collaborative reasoning in science topics that contribute to science literacy. The programme has been establishing the role of dialogic reasoning and the development of argument schemas which promote children's reasoning skills in written and oral argumentation (Reznitskaya, Anderson, & Kuo, 2007). Similarly, Resnick and her colleagues have been developing “Accountable Talk” as an approach to conducting academically productive talk across a range of content areas (Michaels, O'Connor, & Resnick, 2008). Classroom talk must be accountable to the learning community and to accurate and appropriate forms of knowledge and ways of arguing. Argumentation is fundamental to the process of scientific inquiry.

A related area draws on recent identification of the intertextual nature of prior literacy knowledge. The activities which might be optimal here are consistent with what we know about effective “culturally responsive pedagogy”, three attributes of which are strong relationships, incorporation of students' resources, and making what is implicit or assumed, explicit and able to be controlled. Each of these may require of teachers a shift in mindset, to value and build on the resources that students bring with them as poly-contextual participants in classrooms (Bishop, O'Sullivan, & Berryman, 2010; McNaughton, 2002). Intertextual theories highlight the social and cultural importance of intertextual connections and the essential nature of students' own diverse resources

as a basis for their literacy. The focus on the way learners build knowledge for reading and writing from their intertextual histories identifies the need for students to work with a wide variety of texts.

This might be especially important for developing writing during this period. To become effective writers, students need extensive and generalisable knowledge of effective texts, as well as how to write them. Students draw on skills, strategies knowledge and experience of previous reading and writing in support of their learning. Therefore, receptive knowledge gleaned when reading texts is applied in the productive context of writing (transfer). Theories of intertextuality can provide a basis for understanding how writers might go about drawing on that prior knowledge to create effective texts.

Period three: Transition to secondary (Years 8–9)

Another developmental transition occurs on going to secondary school. This, too, is a point at which children's learning is particularly vulnerable. In general, children's transition to secondary is associated with a shift from more intrinsic to more extrinsic motivation for academic achievement, and attitudinal shifts away from achievement (Braund, 2009; Galton, 2009). Internationally, the changes are linked to more limited pedagogy, threats to psychological needs for autonomy, positive social relationships, and "belonging". These threats are associated with explicit evaluation, social comparisons, and high stakes exams and discontinuities in patterns of teaching and support over the transition (Galton, Braund, Diack, 2009).

These patterns are captured in a hypothesis which suggest there is a poor "stage environment fit" for the developing adolescent during this period. Evidence for the hypothesis of a poor stage environment fit is mixed, with more agreement around the significance of positive relationships than the needs for autonomy (Hattie, 2009; McKinley, et al., 2009). This may reflect methodological issues in the measurement of autonomy and opportunities of autonomy (Hattie, 2009; McKinley, et al., 2009).

Just how long this vulnerability lasts is unclear. It could be that attitudinal and motivational difficulties compound over time, for example as high stakes assessments for national qualifications loom in the third year of secondary school. In keeping with this, a recent Ministry of Education report (McGee, Ward, Gibbons, & Harlow, 2004) suggested that the transition functions like a process which, over time, may exacerbate shifts in attitude and achievement for some students. But the longitudinal research evidence from the New Zealand Competent Children Competent Learners (CCCL) study showed attitudes were variable across the primary years, more so than achievement, but became stable very soon after the transition to secondary school, although within the resulting relatively stable trajectories there was individual variation (Wylie & Hogden, 2011). So it appears vulnerability might be quite marked and the need for particular activities or events quite compelling over a short period.

What are the critical events needed here? Generally, the question has not been asked with specific reference to literacy. But the more general areas of concern for aspects of motivation and academic achievement are known. Across countries it is found that a school climate which provides emotional support in the forms of warmth and caring from teachers and peers (and more so from one's ethnic group), as well as parental emotional support are consistently associated with more positive outcomes such as higher self-esteem and achievement, and lower depressive symptoms (Benner & Graham, 2009; Jia, et al., 2009). There are consequent detrimental effects on achievement patterns which are exaggerated for "minority" students (Benner & Graham, 2009; Wang & Pomerantz, 2009).

There is some limited New Zealand evidence about how to change these patterns in secondary schools which, therefore, indicate what the compelling events may be. The significance of teacher relationships for both Māori students and Pasifika students' engagement (but to a lesser extent achievement) has consistent support. The former is tested within a limited quasi-experimental design format in the intervention programme, Te Kotahitanga (Bishop, Berryman, Cavanagh, & Teddy, 2009). At the core of the programme is a change in relationships through beliefs and teaching which is designed to promote engagement and school success. Changes in the dimensions of caring (*manaakitanga*), high expectations (*mana motuhake*), secure and well-managed environments (*whakapiringatanga*), interactional and best practice teaching (*waananga and ako*), and evidence-based monitoring (*kotahitanga*) are associated with higher engagement levels of Māori students. The perception of Pasifika students mirrors that of Māori students in commenting on the need to feel respected and appreciated by their secondary teachers (Amituanai-Tolosa, McNaughton, Lai, & Airini, 2009). Evidence from the Te Kotahitanga project (Jia, et al., 2009) showed positive changes in teachers' relationships with Māori students as well as changes in the discursive properties of their instruction in 12 intervention high schools. In these schools, 16 percent more Māori students gained NCEA level 1 (and 15 percent more Pasifika) than in like schools.

The developmental match hypothesis does not explain why the general shifts would be exaggerated for particular groups of students internationally, and in New Zealand specifically for Māori and Pasifika students. Explaining this requires additional theoretical concepts. Moreover, within the limited New Zealand data, there are patterns that are counter to the finding. Pasifika students are more likely to stay at school to higher levels than Māori children. The reasons for this are associated with family beliefs about the status and significance of education

There appears to be an important structural feature of schools that enables specific teaching activities to impact on engagement and achievement. It is present in Te Kotahitanga, and is in The Starpath project (McNaughton, 2002), which reports a case-study intervention using academic counseling for trajectories from Year 9 and school-

wide target setting which boosted NCEA Level 1 completions for Māori and Pasifika students (see also below). The secondary literacy project provides data in support of this feature. Within the overall professional development intervention in the Secondary Literacy project (McNaughton, Wilson, Jesson, & Lai, 2011), the use of a focus classes in which teachers across departments have shared evidence of achievement and learning was related to higher rates of gains compared with other organizational structures for the professional development. Added to this is the finding in Highfield's (2010) study of large variation between departments across secondary schools in pass rates at NCEA level 1 for common students. The conclusion is that a critical set of events lies in how coordinated and evidence-based the teachers' teaching of students might be.

Three New Zealand projects suggest the need for specific instructional events within these structural and relationship features. Each indicates that ensuring challenging texts and task difficulty levels, high teacher expectations conveyed in patterns of questioning and other classroom discourse features, and literacy teaching embedded in content area teaching are needed (Bishop, et al., 2009; McNaughton, et al., 2011; Wilson, McNaughton, & Lai, 2011). It is likely that positive relations and learning are mutually influential. This is hinted at in CCCL studies of trajectories over the secondary years (Wylie & Hogden, 2011). The mutual influence might also mean that optimal stimulation comes in the form of guaranteeing each builds on the other.

The reason for signalling that this period is about the year prior to secondary school is because there is also evidence to suggest that the better coordinated the transition is across schools, including the better systems there are for determining individual needs, the greater the opportunity to deliver the needed stimulation (Levin, 2008).

Period Four: Advanced literacy in content areas (Years 12–13)

The fourth period is becoming more obvious as conditions in teaching practices and assessments create new conditions in the upper secondary school. The new conditions include the National Certificate of Educational Achievement (NCEA) at Level 1 (Year 11), Level 2 (Year 12), and Level 3 (Year 13). The assessment is not a standardized tool. It is essentially criterion referenced, comprising individual standards which, if passed, gain the student a certain number of credits, with either an "achieved", "merit", or "excellence" endorsement. At each level, a certain number of credits in literacy and numeracy are required. Students who gain the right combination and levels of credits, including specified literacy and numeracy credits at Levels 2 and 3, gain a "University Entrance" (UE) qualification. New standards and new alignment of standards to the curriculum have occurred since the first development.

The NCEA has made more apparent the learning needs at Years 12 and 13 and what forms activities should take if trajectories are to be assured. That is, the progression from

Level 1 to Level 2, and then to Level 3 and UE, have functioned somewhat like a Response to Intervention (RTI) process. The national NCEA data show increasingly higher pass rates for all children at Level 1. In general (and despite the period identified above), the needed stimulation in teaching at Year 11 has been increasingly in place. But, despite high pass rates at Level 1, a major differentiation in pass rates by ethnicity and SES occurs, especially at Level 3 and for UE.

Attainment at NCEA level 2 and 3, generally the level at which entrance to university is fully achieved, provides a benchmark for determining whether educational provisions have been successful for Māori and Pasifika students. Passing achievement standards for University Entrance requires high levels of literacy knowledge, not just in English, but arguably across the content areas and especially in science and mathematics in external standards. Pass rates at these levels differs markedly by ethnicity (Strategy and System Performance, Ministry of Education, 2008). In 2007, 18 percent Māori, and 20 percent Pasifika school leavers left with UE level qualifications, while the rate was more than double (44 percent) for European/Pākehā school leavers. In 2007, approximately one in every 10 Māori students left without qualifications, which is almost three times the rate of European/Pākehā. Rates are 10 percent higher for low-decile schools than high-decile schools. Although there are gender differences within these patterns, the gap between boys' and girls' performance is small and has continued to narrow in some areas.

One part of the needed stimulation to achieve in different content areas clearly is related to literacy. The literacy and numeracy requirements for University Entrance are recognized as being substantially more difficult than those required to pass Level 1 and the evidence indicates that they pose particular difficulties for Māori and Pasifika students. The pass rates for Level 1 literacy requirements, especially if considered for cohorts over years and, ultimately, by Year 13, show minimal differences between ethnic groups (Mogol & Johnston, 2011). But if the same cohort analysis is done for the literacy requirements for UE, then a stable marked difference between ethnicities is shown which does not change the longer children stay at school. And it has not changed since 2004, with pass rates for Māori and Pasifika students almost half those of Pākehā and Asian students.

But these data also indicate that literacy activities are not the only activities needed. Recent cohort data show considerably smaller percentages of Māori students stay at school until 17 years (58 percent compared with the average of 75 percent students who started in Year 9) and, associated with this, Māori and Pasifika students have the highest rates of exclusion and expulsion (Strategy and System Performance, Ministry of Education, 2008). There are sensitive activities needed for continued engagement at school. These may very well be a continuation of those needing to be present at Year 9, but the intensive research for the Years 12 and 13 is only just beginning. Madjar, McKinley, Deynzer, and van der Merwe (2010) reported from interviews and students' journals on 44 Māori and Pasifika

students, 37 of whom commenced university study. The needed stimulation included both specific aspects of subject teaching, as well as parental and school systems that supported engagement and perseverance along with informed decision making.

In terms of literacy activities, what makes this period somewhat different from the others is that the nature of the stimulation in literacy activities may look different in different content areas. The existing research supports the notion that different content areas place quite different and quite specific literacy demands upon students. For example, Shanahan and Shanahan (2008) argue that the “disciplinary literacy” skills needed in different content-areas are “more sophisticated but less generalizable” (p. 45) than those needed in the earlier years of schooling.

In terms of engagement, there is an important difference within the groups of children. Several studies show that Pasifika students tend to stay on at school longer and there is considerable parental support for this (Amituanai-Tolosa, et al., 2009; Madjar, et al., 2010; Strategy and System Performance, Ministry of Education, 2008). Together with differences in some achievement patterns, this indicates that the sensitive activities for Pasifika students may need to be different in some respects than those for Māori.

Period Five: The summer breaks

Across the years of schooling there is one other sensitive period, which may turn out to be the most sensitive of all. It is the period that punctuates the school year. During this time, when schools are closed, differential growth occurs in school-related learning, creating a “summer learning effect” (SLE) (Borman, 2000; Cooper, Charlton, Valentine, & Muhlenbruck, 2000; Entwisle, Alexander, & Olson, 1997). Typically, students from poorer communities and minority students achieve less growth than other students over this period, hence contributing to a widening gap in achievement and an accumulating achievement “barrier” that gets larger over time (Alexander, Entwisle, & Olson, 2007). In Heyns’ (1978) classic study, between half and two thirds of the annual achievement gap in sixth grade between white children from high-income homes and the poorest black children accrued during the summer months. The gains over the school year were much closer for all groups. A number of descriptive studies in the United States since Heyns’ study provide an estimate that more than 80 percent of the difference between poor and minority children and others in reading achievement can be attributable to the accumulating effects of the “loss” over summer (Allington & McGill-Franzen, 2009).

The SLE in literacy has been identified in New Zealand schools and their communities despite a relatively short break of six weeks, which is half that of the United States. Three intervention studies in reading comprehension involving numbers of decile 1 schools serving largely Māori students (from indigenous families) and Pasifika students (from Pacific Islands families) in low-SES communities confirmed the extent of the effect

(McNaughton, Lai & Hsiao, in press). When interventions were in place over the school year, estimates from growth curves of gains in reading comprehension relative to expected gains were between 0.32 and 0.43 of a stanine. Over summer, the rate of gain was negative, between -0.14 stanine and -0.25 of a stanine. That is, the students on average dropped up to three months in reading level.

The SLE has been related to students' participation in family social and cultural practices, and access to resources such as appropriate texts that provide differential exposure to school-related literacy activities (Allington et al., 2010; Celano & Neuman, 2008; Cooper et al., 2000). The estimates of what the stimulation needs to be can be quite precise. While not specific to summer, Anderson, Wilson, and Fielding (1988) showed that, after controlling for how well one reads in earlier grades, the best predictor of reading comprehension level in fifth grade, and for growth in reading comprehension from the second to the fifth grade, was time spent reading books at home. They calculated that, over the year, exposure to words from reading ranged from an impressive five million words to fewer than 10,000 (Anderson, et al., 1988). An important but unexplained finding was that there was substantial variation between teachers, suggesting a teacher effect. Children from the class that read the most at home averaged 16.5 minutes per day, whereas children from the class that read the least averaged only 4.1 minutes a day. In the original Heyns' study (1978), the estimate was that each additional hour spent reading on a typical day, or every four books completed over the summer, was worth another vocabulary word (on the standardised achievement test) or about 1–2 months of achievement, irrespective of SES for both Black and white children.

There is experimental evidence for these general explanations of the SLE. The study by Allington, et al. (2010) tested the hypothesis of differential access with 17 high-poverty schools and their primary-grade students. Over three years, starting in grade 1, students attended a specially designed spring book fair before summer and selected to take home up to 12 books from a wide selection (over 500 titles) of multilevel books on a variety of topics—books that matched the science or social studies curricula, books that represented diverse ethnic, language, and cultural experiences, popular series books, and books about TV, movies, sports and other media personalities. The intervention produced significantly higher reading growth in the book fair participants when compared to a control group that received no books, with an effect size of $d = 0.14$. The effect size comparing the most economically disadvantaged students in each group was larger ($d = 0.21$).

Allington, et al. (2010) showed that access to high-interest texts is a barrier. In their study, access was dependent on a school component: the selection and matching of books with children. Also, it is not known what family practices may have been influenced and contributed to use and engagement at home.

More specific teacher, student and family components were added by Kim (2006) in an intervention with 550 fourth-grade children from ten high-poverty schools, about

half of them Black and Latino children. This programme involved teacher preparation and guidance before summer, with an emphasis on child metacognitive development. The students were guided by their teachers while still in school to practise oral reading at home with a family member and to use comprehension strategies during independent silent reading at home. The guidance included an oral fluency component in which children learned to read aloud to a family member who, in repeated reading, would check expressiveness, intonation and word knowledge. Five comprehension strategies were taught to the students to enable them to activate and monitor their reading for meaning (questioning, rereading, predicting, activating background knowledge and summarising), who then practised them to be used during silent reading. The guidance occurred in the last month of school with all children.

All children were given the preparation and guidance. But half of the children were also given extra components aimed to boost their personal control, their awareness, and to activate family practices. Like the Allington, et al. (2010) programme, the Kim (2006) intervention included a component of selecting and matching texts to personal interests. Eight personally matched books were sent home bi-weekly over the two months of the summer together with postcards that had prompts to students to check the use of strategies and to have parents sign off that reading aloud had occurred.

Diary records showed that both groups of students read silently about the same amount over the summer, but the full package did increase student engagement in the oral reading activities with family members. The overall rate of engaging in literacy activities either personally or reading aloud was around once a week for the treatment group and slightly less frequently for the other group. In the Kim (2006) study the achievement levels of the full programme group were compared with the part-programme group. There was a difference favouring the group that participated in the full programme which was sufficient to overcome the SLE drop. Effect sizes for differences between Black and Latino students in the full treatment group compared with the partial treatment were 0.22 and 0.14 respectively.

The descriptive and experimental studies provide evidence for four emerging conclusions about the activities and their properties to boost learning during the summer period. Sheer access to texts outside of school is very important. But, secondly, the texts need to afford high engagement through being well matched with personal interest, and linked to school-related literacy requirements. The third is that engagement is likely to reflect students' own development and practices so, like the general literature, there are individual sources of variation in response to activities. The fourth is that teacher preparation and family practices may support and enhance student engagement.

Our research team is engaged in a series of studies on the SLE to further determine the properties of activities that make them particularly sensitive for New Zealand. We know,

at least from initial findings from this programme, that the properties others have identified are similar to those needed in New Zealand. We know that this is a period during which students are able to be influenced. What has emerged from our findings too, is that there may be some very influential school components in addition to those already identified.

Concluding comments

The idea of periods during which students are particularly sensitive to the requisite stimulation is helpful in considering where to target interventions and where to guarantee that the stimulation is firmly maintained in place. But it also suggests something else. Development in the secondary socialisation context of schools is not best pictured as dependent on a critical period early on in development (McNaughton, 2011). There are several periods of sensitivity and the presence of appropriate stimulation in one period does not guarantee optimal developmental trajectories at another.

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