

WHAT LONGITUDINAL STUDIES SAY ABOUT LITERACY DEVELOPMENT/WHAT LITERACY DEVELOPMENT SAYS ABOUT LONGITUDINAL STUDIES

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Perhaps no other research approach has more potential to answer the complex development questions that should undergird curriculum. Indeed, longitudinal studies have illuminated our thinking about literacy development in ways that have startled theorists and often challenged key assumptions of touted approaches. Amidst a flurry of political polemics and pronouncements about literacy development, longitudinal research oftentimes yields surprises and unmasks presuppositions—especially a review of such research. And, especially, if such research is examined in terms of the assumptions about literacy and society including the sociopolitical nature of what counts as research or, within a research study, what counts as data/evidence or the lens that might be used to illuminate development.

In preparation for the original review (Tierney, 1992), a great deal of time was spent gathering information about longitudinal research: scanning the research for examples of longitudinal research on particular topics of relevance to the language arts and reviewing discussions of research methodologies for some tenets by which longitudinal studies might be conducted and reviewed. At the time, neither a substantial review of longitudinal research dealing with methodological issues nor a thorough review of those longitudinal studies pertaining to reading and writing development existed. Most discussions of research in the social sciences included a mere mention of longitudinal research; and with a few exceptions, reviews of reading and writing research only incidentally mentioned the extent

to which longitudinal studies have been pursued. Perhaps this should have come as no surprise. For longitudinal studies are expensive to pursue and are apt to be viewed as unrewarding if a rapid turnaround in research is an investigator's goal. This may account for the enormous number of cross-sectional studies comparing students at different ages rather than studies of the same students at these ages.

As with the previous review, the current review examines longitudinal studies of readers and writers. Again, most discussions of research in literacy development included a mere mention of longitudinal research. Instead, there continues to be an enormous number of cross-sectional studies comparing students at different ages or studies of short instructional treatments rather than studies of the same students where full consideration is given to development. In addition, most reports of longitudinal studies do not exist in the mainstream research outlets. For the current review, an ERIC search was done using key terms "longitudinal, literacy, and research" from 1992 to 1998 resulting in 225 hits, 30 of which were studies published in journals, and not necessarily research journals. Of these 30 articles, only those that detailed the methods taken to arrive at the conclusions are included in this review. Too, other research was included, including journal articles that did not come up in the ERIC search and research published in books. Not included as "longitudinal studies of literacy development" are studies that occurred over time that describe uses, processes, or co-constructions of literacy but do not chart

development of these uses or social processes according to a stated unit of analysis over time.

A review runs the risk of effecting an illusion of a developmental progression of research and knowledge. In this review, we have fabricated a quilt, of sorts, from the available material—research represented in journals and books. We laid out these “patches” of material in what seemed manageable categories. In this act, each patch was plucked from the history that produced it. Thus, we risk re-presenting a neatly sewn history, one where one study leads to another and knowledge progresses steadily forward. This is not the case. In fact, in this chapter, we find that research is revisiting old haunts—particularly a consistent theme across time: the development of phonemic awareness. We see this as a historical-political phenomenon, and not as a natural progression of research. At the same time, a line of research previously silent is being afforded space in journals—bilingual research and research that attempts to bridge or understand differences in literacies used in homes and in schools. Some of this research has, in our minds, destabilized previously assumed stabilities: the individual and literacy.

The question that guided this review—How does literacy develop?—has, in most the research reviewed, been looked at in terms of stabilities. Some of the recent research, however, suggests that literacy has to be seen as “literacies,” which at every turn is not a set of skills and abilities but situated systems of language and language activities at play in powerful webs of discourse. Thus, an individual may become adept at the use of literacies only to the extent that there is possibility for a multitude of literacy performances. From this perspective, what longitudinal research has to say about literacy development, and what literacy development has to say about longitudinal research should not be seen as a developmental progression that reveals in ever more provocative and sophisticated ways readers’ and writers’ development over time. Perhaps the political climate in which we write this review will best make this point. As we write, a standards movement across the United States has mandated phonics instruction to occur in specific ways; teachers’ practice in some states is scripted; and education professors in California are prohibited from using particular books. Indeed, what counts as research and what counts as literacy depends to a large degree on affordances and constraints the politics around education—and literacy, in particular—support researchers, teachers, and developing readers’ and writers’ literate endeavors. In this particular historical moment, what counts as research and literacy, at legislative levels, is affording particular literacy practices above others. In past and much of present longitudinal research, literacy was not theorized within political contexts. If anything striking has occurred between the time of the original review and this one, it is that literacy can no longer be understood outside the political discourses that constitute the various ways it becomes defined through a number of culturally and politically situated social practices.

Having situated this review (its patches plucked as they are outside their various histories) within the historical moment we have outlined, this chapter examines longitudinal studies of reading and writing growth with two major questions: How do

readers and writers develop? and What are some of the methodological considerations involved in longitudinal studies?

LONGITUDINAL STUDIES DIRECTED AT THE STUDY OF READING AND WRITING IN THE EARLY YEARS

Over the past 40 years, studies of children’s initial encounters with print and beginning school experiences represented the majority of longitudinal studies conducted. Especially in the past 20 years, there appeared several case studies of young children and observational studies of several children that examined reading and writing development across time. The antecedents of such studies seem to be rather a mixed set. Some of them have their roots similar to those pursued by developmental psychologists who were predominant in the period from 1910 to 1930. For example, in the early part of the 20th century a number of maturational psychologists detailed the early development of young children. For instance, based on his observations of several children at various ages and the same children at different times, Gesell (1925, 1928, 1940) detailed what he termed a reading gradient—a scale that represented the book handling and related behaviors that were typical of children at different ages. Likewise, toward proposing development sequences to early writing development and reading, Hildreth (e.g., 1932, 1934) engaged in various observational analyses over time and correlational studies of reading and writing development of students from 3- to 6-years old and elementary age students in conjunction with looking at opportunities to practices and individual differences. Other studies have their roots in more clinically oriented studies based on the case history of the students who had incurred difficulty in learning to read. In this regard, the work of Vernon (1957) in England, Schonell (1956) in Australia and Monroe (1932) in the United States may be most notable. Still others have their roots in case studies that focused on readers’ response to storybooks. Finally, many have roots that stem from a reaction to or movement away from correlational studies that compared skills considered to be related to later reading achievement with each other (e.g., Barrett, 1965; Dykstra, 1966). The 1990s, however, saw a return to correlational studies that predicted phonological awareness and the role of decontextualized language of preschool children in their reading achievement beyond third grade.

A landmark study is Durkin’s (1966) longitudinal research of early readers in which she examined the impact of home experiences on later reading achievement in hopes of attaining answers to several questions: How many children learn to read before they start school? Do they have any traits that distinguish them from other children? What are their family backgrounds? What do their families report about how they learned to read? Do they stay ahead as they move through the grades? Durkin found 49 children out of 5,103 in Oakland, California and 180 children out of 4,465 in New York who could read a list of primary level words at the beginning of first grade. The early

readers were retested at least once a year for several years and the results on these tests were related to various factors in the preschool situation as well as to measures such as IQ, sex, data from personality tests, teacher ratings, and interviews with parents. In addition, the progress of the early readers was compared with that of equally bright students who were not early readers. Furthermore, a number of these early readers were selected for case studies. Several of Durkin's findings served to challenge popular beliefs about early reading experiences. Her studies in "no way corroborate the pessimistic predictions about the future achievement of early readers" (p. 133). After 6 years of schooling, early readers maintained their advantage. Her findings also challenged the belief that IQ, socioeconomic factors, and other traits were effective predictors of success. Neither IQ nor selected personality traits nor other measures suggested a particular advantage for any of these factors. Instead, what proved to be salient were an array of factors related to how parents and siblings encouraged, nurtured, and responded to the reading interests of these children. Durkin stressed that what appeared to be important was "the presence of parents who spend time with their children; who read to them; who answer their questions and their requests for help; and who demonstrate in their own lives that reading is a rich source for relaxation, information and contentment" (p. 136). She also stressed that a great deal of the early readers' interest in print and learning to read was tied to their interest in learning to "print and spell," and their curiosity about what words "say."

In addition to being partially replicated (Tobin & Pikulski, 1988), several lines of research addressed some of the same issues raised by Durkin. In particular, a number of studies examined through parents' diaries, parent-child and teacher-child interactions and other data during young children's storybook reading experiences. Dorothy White's *Books Before Five*, originally published in 1954, represents one of the earliest, best known diary accounts of story reading. White's diary describes a 3-year period (from ages 2 to 5) of her daughter's story reading experience. White's diary chronicles her daughter's response to a caring parent who shares various books with her daughter and notes sensitively the nature of her responses including acquisition of written language, but especially meaning making. As Somerset (1954) points out in the foreword, there are two sets of issues explored implicitly throughout and explicitly on occasion in the diary:

we find on the intellectual side the following lines clearly marked: a gradual understanding of the meaning of drawings and pictorial symbols, growth in comprehending the meaning of words, the growth of memory, the emergence of the distinction between "real" and "pretend," "true" and "untrue." On the aesthetic side, too, we find a great deal of interesting material: the joy in sounds and words, in rhymes and rhythms, and a dawning perception of literary form not only in verse but even in prose stories. And, of course, many phases of a child's emotional life—its joys, its fears, its likes and dislikes, its interests—are to be found illustrated in these pages (p. xvi).

Over the past 20 years, a number of other parents have told the story of their child's development as a reader and writer in

conjunction with story reading. In 1979, Butler described her reflections of her grandchild, Cushla, and the role of story reading on her ongoing cognitive and social development. In 1980, Bissex described the literacy development of her son, Paul, in conjunction with his early reading and writing development. In 1983, Crago and Crago reported the preschool discoveries of their daughter, Anna, as she encountered pictures and texts. In 1989, Wolf offered a case study of her daughter, Lindsey, from 3 years 2 months to 4 years 6 months of age.

Apart from diary studies, a number of longitudinal studies of parent-child interaction together with studies involving repeated readings of storybooks have led to a gradual refinement in understanding of the nature and role of story reading and especially its significance to ongoing literacy development. For example, a study by Ninio and Bruner (1978) with children 8 to 18 months suggests a rich but rather routinized dialogue between parent and child occurs during story reading. As Ninio and Bruner stated, the interactions around books had a "structured interactional sequence that had the texture of dialogue" (p. 6) with the parent's dialogue centering on labeling and the child smiling, pointing, vocalizing, and acquiring the turn-taking rules underlying such dialogues. Investigations by Snow (1983) and Snow and Goldfield (1982) indicate that this type of routinized interaction with parents affords children the security whereby they can link ideas from these experiences. Snow's studies and studies by Teale (1984), Teale and Sulzby (1987), Sulzby (1985), Teale and Martinez (1986b, October), Teale and Sulzby (1986a), Teale and Sulzby (1986b), Teale and Sulzby (1987), Teale, Martinez, and Glass (1988) suggest that routine does not mean mindless repetition. In repeated readings of a storybook children move from elaboration and labeling to a concern with motive and causal issues. Teale (1984) has noted that they shift their focus from character identification to what the characters are doing. Furthermore, the nature of the social interactions between child and parent shift as the child assumes more responsibility for the reading. Describing the changes in the language and social interaction that took place over a 14-month period in a mother-child dyad reading of a counting book, Teale and Sulzby (1987) found important shifts in responsibility as the child gained more and more control over the task. In fact, after 8 months of the mother initiating the reading, the child spontaneously read the material.

In an effort to detail children's use of text cues, a number of studies focused on how children respond to and use print as a source for making meaning across repeated story readings. For example, Cochran-Smith (1984) described in some detail the behaviors of children enrolled in a nursery school over a period of 18 months. According to Cochran-Smith the study demonstrated that the students "were coming to know . . . a great deal about print" (p. 252). The 3- to 5-year olds knew reading and writing were integral and meaningful parts of the everyday world and were effective ways to accomplish many of their own purposes and needs. Furthermore, they knew how to organize and use print, relate print to oral language, relate their own knowledge to decontextualized print of storybooks, achieve and apply understandings, and integrate the use of reading and writing into their lives.

Other studies examined in more detail the shifts that occur in students' use of text cues across time. For example, Sulzby (1985), reported a longitudinal study in which the "emergent reading" attempts of 24 children at the beginning and end of their kindergarten year were compared and examined against similar data acquired from repeated readings with storybooks by 2-, 3-, and 4-year-olds. By using a classification scheme to characterize the reading behaviors of children, Sulzby demonstrated the extensive repertoire of strategies students acquired as a result of storybook reading and the types of changes that occurred across time but seemed relatively stable across books. Sulzby contends, as several of these researchers who have pursued longitudinal studies have stressed, literacy is not learned by rote procedures but occurs in conjunction with negotiations between the child, parent, text, and other features of context.

Adopting a slightly different orientation, Pappas and Brown (1987) explored in detail the extent to which 27 kindergartners were developing an understanding of the register of shared reading including the linguistic awarenesses necessary to understand stories. As they stated,

learning to read is fundamentally an extension of the functional potential of language. During the preschool years young children . . . learn to adjust their linguistic choices to meet the features of particular social contexts—the setting, the participants, and the specific task at hand. To become literate, however, the young child has to come to terms with certain important characteristics of written language—its sustained organization, its characteristic rhythms and structures, and the disembedded quality of written language. Thus, an essential aspect of the extension of the functional potential of language involves young children's coming to understand that the registers of written language are different from those of speech (pp. 160–161).

Rather than focus on children's rote-like word-by-word response to the repeated reading of a story, Pappas and Brown focused on the children's approximations of the author's wordings and extrapolations from the story. Across repeated readings Pappas and Brown found that children made extensive use of extrapolations and approximations and their use seemed integral to their realizations of the potentials of written language (including their constructing an understanding of the social conflicts and plans of characters pertaining to the story). What is noteworthy is the socio-semiotic perspective adopted by Pappas and Brown. Their analyses bring to the fore the social nature of literacy and literacy learning, as well as the extent to which meaning making is constructive. As they concluded,

While young children's reading-like behavior in previous research might have been explained in terms of rote memory, the results reported in this study indicate that this is not the case. The ontogenesis of the registers of written language appears to be just as much a constructive process as we have seen in other areas of children's cognitive/linguistic development (Pappas & Brown, 1987, p. 175).

Along similar lines, Yaden, Smolkin, and Conlon (1989) were interested in the hypothesis that "story reading may provide an opportunity for children not only to explore many aspects of the book itself, but also to acquire new ways of communicating, and

to sharpen, refine, and compare their own view of the world with the perspectives they encounter in books" (p. 207). To this end, they reported studies in which the questions and inquiries of preschoolers (3 to 5 years) regarding print and pictures have been described. On a weekly basis for periods of one and two years, they collected, transcribed, and analyzed the questions and inquiries of nine children. Children's questions were classified as pertaining to graphic forms, word meaning, story text, pictures and book conventions. Their findings suggested that over 1 or 2 years, even the least inquisitive child would ask over 1,000 questions and these represented a full range of question types. While most students asked questions about pictures, some students moved toward asking questions about the story text. At no time did students ask many questions about the conventions of books. While the researchers tended to decline from suggesting trends or developmental patterns (due to the variations that were found across students, the story selections themselves, and the interactional style of parents, and other variables), the researchers concluded that storybook reading offered children a foundation from which they might begin to "master" reading. As they stated,

Perhaps it is safest to say that story books provide a variety of information about the way print communicates meaning and represents the sounds of oral language, just as environmental print may influence children's acquisition of print knowledge. In another way, exposing children to as many sources of written information in the environment as possible before school cannot help but give them the kind of foundation needed for successful mastery of this most complicated human invention (Yaden, Smolkin, & Conlon, 1989, p. 211).

Studies of literacy acquisition have not been restricted to children's responses to story reading. Apart from a number of cross-sectional studies of different children at different ages (e.g., Goodman, 1986; Hiebert, 1978), a few longitudinal studies exist that focus on the link between what is commonly referred to as "print awareness" and reading ability. The key tenet underlying such pursuits is the notion that children acquire an understanding of literacy as a result of their interactions with everyday print. As Goodman (1986) argued, environmental print encounters are at the root of the child developing a model for the features of written language. As she stated, "the development of print awarenesses in environmental contexts is the root of literacy most common to all learners and the most well developed in the preschool years" and serves to facilitate the child's development of "a model . . . which includes rules about the features of written language in situational contexts" (p. 7). One example is a study by Kontos (1988) who examined the relationship between print awareness and reading achievement from the beginning of preschool to the end of first grade for 47 subjects. Print awareness measures included a battery of tests directed at various aspects of print and book awareness (Clay, 1982) along with a researcher constructed measure of the children's knowledge of the communicative functions of print. Other measures included a test of knowledge of sound-symbol correspondence, writing measure, and a prereading phonics inventory. Across six time periods from spring of the preschool year to fall of first grade the intercorrelations between these variables and their relationship to performance on the Metropolitan

Reading Test and California Test of Basic Skill (involving a composite score based on several tests including tests of component skills) were determined. Despite the fact that some of her reading measures were similar to the measures of reading sub-skills used as predictors, print awareness, especially as measured by Clay's battery of tests, did emerge as a significant predictor. Kontos argued that the role of print awareness seemed to be intertwined with the role of other literary knowledge and skills.

The aforementioned research on print awareness has its corollary in studies of early writing development. For example, Bloodgood (1999) examined the role of name writing and its relationship to other literacy development across 67 3-, 4- and 5-year-olds. Using Hildreth's (1936) 7-point scale (no representation, scribble, linear scribble, separate units, mock letters, name generally correct, consistent first name, fluent first and last name), Bloodgood revealed the interface between name writing and other facets of literacy development (e.g., alphabet knowledge, word recognition, and concept of word, etc.) as well as the extent to which letters from students names accounted for the children's "random" choice of characters that they chose to write.

Research on writing development has been another major area for study. In the past 20 years this area of research has received a great deal of attention as researchers began asking questions about the child's conceptions of written language rather than concentrating on how well the letters and words are formed and conventions adopted. In this regard, the work of Ferreiro and Teberosky (1982), which is more cross-sectional than longitudinal, has been most seminal. Based on their analyses of children's writing at various ages, they described the hypotheses that were governing children's writing. Central to their work was the thesis that children operate according to certain assumptions (e.g., writing is a way of representing speech and objects, a principle of minimal quantity in terms of number of letters, a principle of individual variation of letters within words, the syllabic principle) that they construct and upgrade to account for new encounters. To date, a number of researchers have offered a longitudinal perspective on the understandings children acquire as they write. Several past researchers have offered several examples of how young children's writing develops across time. Bissex's (1980) and Baghban's (1984) case studies of their children are devoted primarily to tracing their early writing development. Graves (1982) has offered rich descriptions of writing development across time as students begin writing and conferencing with others. The longitudinal studies of Sulzby and her colleagues (1983b, 1985a; Sulzby, Barnhart, & Heishima, 1988; Sulzby & Teale, 1985) support the findings that have emerged from the aforementioned studies. While highlighting the active and constructive nature of meaning making by the child, they argue that children's writing might be informed more by adult conventions than previous research supported. In a similar vein, Read (1971, 1975), Chomsky (1979), Beers and Henderson (1977), and Zutell (1978) have described in some detail students' spelling development including the linguistic understandings and principles that inform children's spelling adeptness, explorations, and appropriation of conventional spelling.

Taken together, the longitudinal research on early reading and writing to date has confirmed some beliefs at the same time as it has added definition and stimulated a number of issues. The view of the child as an active meaning maker constructing his or her own hypotheses in the context of daily negotiations with print and others is substantiated repeatedly. Left unanswered is how such constructions are achieved. Some of the key factors seem to have been identified, but their interrelationship and the mechanisms students use to construct these hypotheses seem relatively undefined. What seems most promising are those studies that have adopted a more expansive, differentiated view of literacy that is situation-based—namely, studies that have been willing to address the complex configurations of variables that constitute literacy events.

Rowe (1987), in conjunction with exploring the nature of literacy learning across an 8-month period with 3- and 4-year olds enrolled in a daycare situation, pursued detailed analyses in hopes of understanding the saliency of interactions with others and prior experiences in literacy learning. Her analyses prompted her to hypothesize that the links and negotiations children have with their own and other's past experience was central to their ongoing literacy learning. As she stated:

as children formed new communicative goals, they flexibly combined various aspects of their existing knowledge, or linked their existing knowledge to available demonstrations, to construct situation-based hypotheses which were their communicative goals (p. 110).

In accordance with this view, Rowe (1987) suggested that literacy events in the classrooms

provided opportunities for children to observe another at work, to talk with that person in order to expand and develop their ideas, to observe again, and often to incorporate new ideas into their own texts. Sometimes children used the demonstrations of others as starting points for developing their own ideas. . . . At other times, children chose to use available demonstrations conservatively; that is, they chose to stick as close to the demonstration as possible until they felt they understood it fully. . . . It was by observing the demonstrations of others, by exchanging meanings in conversation, and by authoring their own texts that children formed shared meanings about literacy (p. 106).

Rowe's work has a number of parallels with the work by Dyson (e.g., 1983, 1985, 1986, 1988; 1992) who has explored the role of the tensions that occur as various texts (oral, written, drawings) and ideologies (writing workshops) transact. As she stated,

children's major developmental challenge is not simply to create a unified text world but to move among multiple worlds, carrying out multiple roles and coordinating multiple space/time structures. That is, to grow as writers of imaginary worlds and, by inference, other sorts of text worlds as well, children must differentiate, and work to resolve the tensions among, the varied symbolic and social worlds within which they write—worlds with different dimensions of time and space (1988, p. 356).

It is noteworthy that the studies of both Rowe and Dyson extrapolated their principles of literacy learning based on detailed analyses of both individuals and groups across different

literacy situations. These leanings concur with the implications drawn in conjunction with longitudinal pursuits by Galda, Pellegrini, and Cox (1989) and Pellegrini, Galda, Dresden, and Cox (1991) in which a determination of the relationship among play and literacy development were assessed. They hypothesized that the language of reading lessons and linguistic verbs in symbolic play share features involving talking about words and using them to represent meaning. Drawing on Vygotsky, the researchers assumed "that early writing originates in symbolic play and travels a developmental route through drawing to writing." The authors explain that in symbolic play, children divorce meaning from objects; using language to redefine meaning is necessary in writing. A drawing of a car or the written word car at this stage represents the object, not the word car. In a second order symbolization, the written word represents the oral word. Consistent with this theory, they hypothesized that the symbolic transformations at 3½ years-of-age should predict writing status 1 year later because symbolic play provides the basis for using written symbols. The authors predicted, also, that the use of process and process-contrastive linguistic verbs in peer discourse should predict facility with the lexicon of reading events as measured by the Concepts of Print Test (Clay, 1982) because both constructs are concerned with the lexicon of reading events. More exactly, the language or reading lessons and linguistic verbs used in symbolic play share design features to the extent that they both involve talking about words and using words to represent meaning. To explore these hypotheses, 7 boys and 5 girls were observed and audio recorded for 15 minutes during free play periods nine times per year in a university lab school. A variety of data were gathered and assessments used. They found that within Years 1 and 2, the use of linguistic verbs were positively intercorrelated, but Concepts of Print was not significantly correlated with transformations or highest level of writing. Linguistic verbs predicted children's performance on the Concepts of Print Test "to the extent that linguistic process and linguistic process-contrastive verbs were positive and significant predictors. Linguistic idiomatic verbs were not significantly related" (p. 231). Symbolic transformations, however, predicted children's emergent writing status. Accordingly, the authors concluded that "The ability to write words should be related to representational competence in play because both indicate children's ability to use signifiers to convey meaning" (pp. 230-231).

As children navigate these multiple worlds using their own emerging principles, there is some disagreement as to the role of adult conventions. In particular, whereas some researchers verge on the view that literacy learning involves acquiring adult conventions, other researchers contend that literacy should be viewed as emerging. In accordance with this latter position, literacy is viewed as involving respect for what and how literacy is negotiated in different situations rather than how literacy measures up to adult conventions. What seems to distinguish this view is that literacy can be viewed as open to refinement or closed with static conventions. Accordingly, literacy involves refinement, invention, and development in conjunction with pursuing the power to negotiate meanings in different contexts rather than being tied to eventually acquiring a standard set of conventions for so doing. On the one hand, it might be useful

to pursue a view of literacy that somewhat merges the two positions. An amalgamation of such views might suggest that literacy has many of the features of "jazz" music—a mixture of improvisations, inventions, allusions, variations, and standard themes inspired by the combination of players and context. On the other hand, it may be that we simply do not, as yet, understand the extent to which conventions may be embedded in sets of relations available to children; caregivers, and teachers within larger political contexts. While young children may improvise and invent literacy within their communities, once they attend school; improvisation is not rewarded equally across races and classes (see, for instance, Delpit, 1995; Luke, 1995/1996). Understandings of literacy development within situated plays of power involving curriculum, materials, standards movements, and sociocultural processes of race, class, and gender are wide open for exploration.

LONGITUDINAL STUDIES OF LITERACY ACQUISITION DURING THE BEGINNING SCHOOL YEARS

Early longitudinal studies of writing development during the beginning school years represent rather disparate concerns and approaches, and some of these studies further complicate the invention/conventions debate. Hilgers (1987) studied four children repeatedly as they evaluated pieces of writing in hopes of gleaned developmental trends in the standards students used to evaluate their texts and how they applied these criteria. In general, the students' aesthetic response (i.e., whether or not they liked a piece) was the most prevalent criteria used by all four students across this period. While Hilgers suggested there were no clear developmental trends, students, with age, tended to increase in the number of criteria that they employed as well as the time that they spent evaluating essays. In terms of how and when students employed criteria, the trends were not straightforward. Some students applied criteria during planning, others during revision, or both. Furthermore, students tended to use certain skills in their own writing prior to employing that same skill as a basis for evaluating essays. Oftentimes, opportunities to discuss certain skills seemed tied to their use.

Rentel and King (1983) studied written narrative texts elicited from a population of 36 children stratified by sex, socioeconomic class, dialect, and school at intervals of 4 months over the children's first 4 years of schooling. A subsample of the texts of 16 of these children was then used as the basis for an examination of coherence in the students' narratives. Specific to their study, the data revealed that students developed what the researchers deemed to be a coherent text at a very young age and that differences in the coherence of these texts was linked to their use of identity and similarity relationships for purposes of tying together events. Of relevance to the potential of longitudinal studies to inform developmental appreciations, their comments regarding these findings are noteworthy. As Rentel and King stated:

Children marshal their linguistic resources and bend them to the task of writing almost in defiance of the law of adult expectations. From

second grade onward, the sample of children's texts we investigated thwarted our expectations about levels of coherence we could expect within them. Our expectation was that cohesive harmony scores would improve gradually over a period of several years. They did not. Cohesive harmony scores increased significantly from the point at which children could navigate the rudiments of a fictional narrative—for most, at the beginning of second grade. We expected roughly parallel emergence of identity and similarity relations in children's texts. Identity and similarity relations followed a course separate from each other in the sense that identity relations took precedence in children's earliest texts, while similarity relations came to dominate their fourth-grade texts. We expected that reiteration would be an important chain-forming relation in children's first stories, but would gradually diminish as a chain-forming strategy. It did not; instead, reiteration was a basic chain-forming strategy from the outset of writing and grew in its importance as a chain-forming resource over the entire four years of development we studied (p. 31).

Based on a case study of a first grade child, Sipe (1999) contended that shifts in writing development were influenced by a pull of conventional forms, the social nature of writing, topic choice, and by the influence of the teacher. As Sipe observed across a year, shifts in the boy's writing involved (a) using environmental print resources, to linking what he knew to what others knew and requesting less help; (b) focusing on encoding, to focusing on the message; (c) getting lost in revision at letter and word levels, to automaticity in revision at phrase and sentence levels; (d) knowing a meager stock of words, to a large stock of known words, automatization of subroutines, and increased fluency; (e) verbalizing his actions, to not speaking aloud; (f) acquiring case knowledge with sudden breakthroughs, to making analogies and applying knowledge across cases; and, finally, (g) having diffuse spatial organization and serial order, to controlled spatial organization and serial order.

Dyson (1992) suggested that conventions, a social construction, are imposed on writers through such ideological pedagogies as "writing workshops" and process writing. This imposition is embedded in power relationships for which the first grade composer she observed once a week for 4 months and twice a week for 6 months, created "stages of performance." Citing her earlier work, she writes,

Learning to write in school involves figuring out—and gaining entry into—the range of social dialogues enacted through literacy, including the assumed relationships among writers and their audiences (Dyson, 1992, p. 6).

Jameel, an African American boy, used culturally relevant language such as music, repetition, and rhyme in his composing processes. He did not always find his audience helpful and negotiating the multiplicity of roles his audience played was tense. When his teacher asserted a stance that emphasized conventions, it confused his performances. Dyson illustrates how Jameel blended genres, a blending that points to ways literacy genres could open up to allow for cultural performances. Jameel used his strong storytelling style and musical sense of language

as stages to perform. Dyson notes that orality and musicality are part of the dialogic properties of language.

Kamberelis (1992), taking the position that children make transitions to conventional forms, hypothesized that two mixed-level relationships between writing and reading were potential indices of transitional knowledge in emergent literacy. He qualifies "writing" as that which is made up of alphabetic print.¹ A level mixture, Kamberelis explains, is internal disequilibrium experienced when different levels of sophistication of reading and writing are operating. For instance, disequilibrium may be experienced if a child knows more convention strategies in writing than in reading, or vice versa. Hence, "a mixed-level relationship is a relationship comprised of a low-level writing form paired with a higher level reading form or vice versa" (p. 371). He predicted that low-level writing/high-level reading would involve an unsophisticated form of alphabet writing combined with an advanced form of reading and would index transitional knowledge. In this case, random and patterned letter strings would be paired with reading written monologue style. Similarly, high-level writing/low-level reading would also index transitional knowledge. Writing would include invented spellings and conventional orthography but reading would be characterized as an oral monologue style, written, or a mix of the two. Oral and written monologues are re-enactments of printed messages that do not involve decoding the print but, rather, involve enactment of the message using nonprint clues and memory for text. An oral monologue is conversational.

Offering an approach that enabled understanding not only of the sociality of forms but of the social negotiation of power, Wilde et al. (1992) conducted a 2-year study of the writing processes of Tohono O'odham children in Grades 3 and 4. The researchers' overarching purpose was,

not merely to understand the influences on the writing of these particular children but also to suggest how all children learn to write, learn through writing, and learn about writing (p. 3).

To these ends, the researchers observed and interviewed 10 children the first year and 6 of these same children in the second year of their schooling on the Tohono O'odham Reservation. Teachers and parents were also interviewed and researchers recorded observations about the classroom after each session, including details of curriculum and instruction. Data included 278 texts, fieldnotes, 63 videotapes, 46 writing assessment interviews, 32 concept of writing interviews, 9 teacher interviews, and 13 parent interviews. A profile emerged over 2 years: Writing is influenced by (a) societal views about literacy; (b) the nature of the social community inside and outside the classroom; and (c) the ways schools and classrooms are organized.

Kasten's analysis, as part of the Tohono O'odham study, revealed children's development of resourcefulness. Kasten analyzed field notes accompanying 278 texts for the nature and function of oral language used during composition and the use

¹ Kamberelis's hypothesis rests on the notion that Sulzby's classification scheme is "more or less" hierarchical. If variation does occur, the levels on which Kamberelis hypothesis is based could not be held constant, either for individuals or across individuals. The use of the hierarchy is interesting, however, and would be interesting to continue exploring. If the hierarchy were found stable, however, a further difficulty in testing Kamberelis's hypothesis is finding a large enough sample of transitional readers and writers fitting the needed characteristics. That only 13 of 26 students indicated transition does not seem strong evidence of a mixed-level relationship indexing transition to conventional reading or writing.

of classroom resources. She found that children used resources 575 times. The children most often used human resources, to spell a word, for instance, and less often, used inanimate resources. In the second year, students used classroom resources more often in one of the teacher's classes, and less often in another teacher's classroom. The use of resources led directly to changes in text. Kasten concludes:

Classroom management styles, availability and accessibility of resources, and teacher encouragement are all factors in how students solve their writing problems within their community. In this context, control over writing grows, and the confidence to become a writer is established (Kasten, 1992, p. 103).

Wilde analyzed 1,896 invented spellings out of 13,793 words in 215 stories written by the 6 children. She analyzed four spelling features: rounded vowels, unstressed vowels, double consonants, and inflectional suffixes. Over the 2 years, the children improved on these features more than the other eight features she examined. Wilde reports three major findings: First, that children's spellings "progressed beyond what could be called 'emergent' or even 'developing' into something more like 'high level' or 'refined.' Any interpretation of children's invented spellings must always be seen in the larger context... that includes the extent to which knowledge of dictionary spellings has replaced invention." Second, there is logic to invented spelling and omitted letters are not random. And third, a "decrease in the frequency of invented spelling was often also accompanied by an improvement in the quality of those that remained" (p. 146).

Vaughan examined one girl, Anna's, development over the 2 years. In third grade, Anna had conceptions of writing and of herself as a writer; her sense of audience depended on genre (for instance, her audience seemed clear in a letter, less clear in narrative); she used dialogue; she used varied sentence structures; and used punctuation marks mostly appropriately. Too, Anna liked writing narratives but didn't like to revise and what she did revise were surface level revisions. As in Kasten's observations, Vaughan, too, observed the differences in writing communities between Anna's third and fourth grade years and relates Anna's development to the changes in the community. In fourth grade, the class was encouraged to talk about their writing, and Anna became more aware of what her listeners needed from her as a writer, which influenced her revision growth. By the middle of fourth grade, Anna's stories were longer and more complex, syntactically and semantically.

Wilde (1992) presented a case study of a boy, Gordon, in these 2 years. An early "concept of writing" interview revealed Gordon's lack of sophistication about writing: he liked stories if they were interesting and was aware of the impression that spelling and handwriting had on readers. In the third grade, when writing assignments were restrictive, Gordon showed an understanding of his teacher as audience, to such a degree that one assignment was largely copied from an encyclopedia. From the first half to the second half of third grade, Gordon's writing did not change much in terms of use of appropriate spelling and words per story, per sentence, or clause. Gordon's punctuation, however, decreased in appropriateness. Wilde found

this was due to omission of punctuation as Gordon tended to use only periods. Wilde suggested this is "a context induced variable" (p. 186), rather than a developmental regression. In fourth grade, Gordon began to speculate on what makes a story good. Gordon was interactive in third grade and continued to be in the fourth. As story topics were often unassigned in the fourth grade classroom, Gordon wrote on a range of topics. In fourth grade, Gordon's syntactic complexity increased and his spelling and punctuation continued to develop. Gordon began to use hyphens and quotation marks. By the second half of the fourth grade, Gordon's stories were longer as were sentences and clauses; his spellings were generally appropriate, and the words he used most frequently were always spelled correctly, and the percentage of conventional punctuation varied from 25 to 100% as he sometimes omitted periods, often omitted commas, and had partial control of quotation marks.

Taken together, these studies show development of children not only as individuals but across two distinctly different writing contexts. It seems the children developed as writers particularly because the fourth-grade classroom not only involved students in wide varieties of writing, but because socializing over writing was encouraged and made part of the fourth-grade teacher's curriculum.

Several longitudinal studies of reading and writing development describe the stages students pass through as they learn to read and write in school. Clay (1982), for example, pursued a longitudinal study of children during their first year of school in New Zealand. She collected weekly records of reading (including running records of their oral reading of books that they were assigned to read) for a sample of 100 children from six schools, and administered a battery of 17 tests (tests of language skills, auditory and visual perception, a reading readiness battery) within 2 weeks of school entry, midyear, and when each child was 6 years old. In hopes of attaining a comparative perspective on the data, Clay examined the data across three ability groups (high, middle, and low). Her conclusions served two purposes: a description of the strategies of successful readers and a developmental description of the stages they pass through. Good readers, she observed, manipulate a "network of language, spatial, and visual perception cues and sort these implicitly but efficiently, searching for dissonant relations and best-fit solutions. Redundancy in cue sources allows for confirming checks and acts as a stimulus to error correction" (1982, p. 28). In terms of stages, she claimed that children move from a reliance on information from their oral language experience and knowledge of situation to the use of an expanded set of cues that include visual dimensions, word knowledge, and letter-sound associations. As she stated, cues from these sources for a long time are "piece meal, unreliable and unstable" but become efficient as the use of these cueing systems simultaneously become more differentiated. In accordance with these conclusions and other findings, she argued for maintaining a difficulty level of approximately 95% accuracy so that students will be challenged to apply a range of cues rather than rely on a limited repertoire or for which success is dependent on a restricted use of cues, for example, an overreliance on auditory cues.

Emerging from Clay's findings and studies of writing development is the view of children as intuitively sophisticated language

users who access a variety of knowledge about language as they develop as readers and writers. Not surprisingly, a corollary to these findings comes studies of spelling acquisition (e.g., Beers & Henderson, 1977; Zutell, 1978), which suggest that young children approach spelling as extremely intuitive language users who enlist a variety of cuing systems as they learn the English orthographic system. Similarly, Y. Goodman (1976) drawing from various miscue analysis studies of readers over time stresses that "all systems of language must be intact in order for the reader to understand that reading is language and that the purpose of reading is to get at the author's message" (p. 126). She also cautions that development may not be "gradually and continuously in an upward direction for one reader" (p. 126) but is likely to involve a sequence of rises and declines pending the transaction of various elements including personal, emotional, and physical factors and the experiential background of the reader in relationship to the setting, content, plot, characterization, theme, and style of the material.

A number of studies have tended to adopt and be restrained by a priori models of reading development and a focus on decoding. A longitudinal study launched by the Center for the Study of Reading at the University of Illinois in 1985 examined both comprehension and decoding. The primary focus of the Illinois study was on how children develop the ability to comprehend. As Meyer, Waldrop, and Hastings (1989) stated,

How do children develop the ability to comprehend over time? In the process of ferreting out answers to this question, several more focused research questions have emerged. What kinds of home experiences contribute to the development of reading comprehension ability? What is the nature of these activities? What sort of things do children do independently that contribute to the development of reading comprehension ability? How much reading instruction is there in the lower elementary grades? What are the characteristics of this instruction? How do activities in the home and the school jointly influence the development of children's reading comprehension ability (p. 12).

To answer these questions, the research team at Illinois adopted a tentative model of comprehension development that they had been testing. Their model assumed that various home and school factors together with student aptitude and student initiated activity combined to influence reading comprehension development. In all, the model included six general constructs (home background characteristics, students' ability at the time that they entered school, the characteristics of the instructional materials, teacher's management and instructional style, home support for literacy development, and independent reading), which were measured in different ways at different times in accordance with some important a priori decisions. For example, they decided to exclude any measure of independent reading prior to the third grade, and decided to characterize teaching style in terms of micro-level analyses of decoding activities and silent reading activities rather than other features such as shared reading, reading-writing experiences, conferencing, and story talk. The Illinois team did extensive observations of classrooms as well as extensive use of questionnaires and published tests. Perhaps due to the size of their sample, none of their measures of basic abilities were what might be termed open-ended—for example, their measures of reading comprehension included

cloze procedures, multiple-choice items, and so on, but did not include any type of free recall or miscue analysis. Their measures of decoding did not include a measure that addresses the students' use of decoding strategies in context.

The first cohort included 240 students from the three districts selected for study. The schools from which they were drawn represented a suburban school with diverse ethnic mix and two small midwestern towns. While the reading programs in each school differed somewhat, they appeared to be traditional given their alignment with a basal approach and their orientation to the teaching of skills. Using analysis procedures that sought to create a path model with a certain "goodness of fit" (in conjunction with factor analysis techniques to accommodate the use of multiple measures), the research team generated a model of the interrelationship between variables that maximized the variance accounted for at each grade level. As the researchers pointed out, the "model we are presenting is not the only possible model for these interrelationships, but it is the one obtained when we applied the criteria and diagnostic/revision procedures described" (Meyer et al., 1989, p. 41).

Their findings seemed to support and extend some of the findings of other research. Home factors emerged as closely related to end-of-year achievement and, at Grade 2 interacted with teacher behavior. Not surprising, the entry level achievement of students predicted success at the end of each grade level and, beginning in the first grade, interacted with teaching practices to affect achievement—in other words, as they stated, "What teachers do appears to be influenced by the skills the pupils bring with them" (p. 49). Also, the relationship between decoding attainment, reading comprehension, and activities that focus on letters or texts became complex by the end of the second grade. As Meyer, Wardrop, and Hastings pointed out, the decoding and comprehension appeared to be more distinct variables by the end of the second grade. That is, decoding activities tended to be less clearly related with reading comprehension and sometimes appeared to be negatively correlated. Indeed, decoding had a limited and sometimes negative relationship to comprehension by Grade 2. In general, these data point to an issue—the nature of the relationship between decoding and reading development—that has been an important facet of a number of longitudinal studies in reading.

A number of studies have attempted to sort out the precise nature of the interrelationships between component skills and reading, as well as how the development of these skills interface with different instructional experiences. Taken together, these studies, to which we now turn, seem to be suggesting that phonics appears to bear a relationship with reading that changes across time and that does not appear to be causal. By the end of the second grade, the relationship between phonics and reading for meaning is slight. Furthermore, there appears to be no advantage and some disadvantages for emphasizing phonics over reading for meaning. Students who are encouraged to read for meaning have comparable phonic segmentation and superior reading for meaning abilities to students who have received a strict phonics emphasis.

To assess the viability of a model of literacy acquisition that posits decoding as crucial, Juell, Griffith, and Gough (1986) studied changes in the pattern of relationship of scores on

various tests across 80 students during Grades 1 and 2 who were enrolled either in classrooms using a basal approach or in classrooms receiving daily synthetic phonics on top of the basal reading material.

We begin with the simple view of reading . . . that reading is composed of (a) decoding and (b) listening comprehension. This is not to suggest that either of the components, decoding and listening comprehension, is simple in itself but to argue that these two skills are the critical components of reading. That is, we suppose that reading crucially involves decoding, the ability to translate print into linguistic form. But we do not suppose that decoding alone is sufficient for reading. Having derived the linguistic form represented in print, the reader must then comprehend that form. To do this, we suppose that the reader employs the same mechanisms, the same knowledge of morphology, syntax, semantics and pragmatics that are used in the comprehension of spoken language in order to understand decoded print. We recognize that written text has certain distinctive characteristics from speech with differential impact upon the comprehension process . . . But we are inclined to agree with those researchers who emphasize the commonality of the demands of written and spoken language upon the comprehender. Thus, we believe that given perfection in decoding, the quality of reading will depend entirely on the quality of the reader's comprehension; if the listening comprehension is poor, then his reading comprehension will be poor, no matter how good his decoding (p. 244).

In terms of data collection, a battery of tests were given either at the beginning of Grade 1 or periodically during Grades 1 and 2. Some of the measures represented a standard fare of published tests; others seem somewhat limited. For example, ciphering knowledge was based on the students' ability to pronounce nonsense words; exposure to print was assessed in terms of the number of words the students had confronted in their basals. What was apparent in their analyses was some specificity of effects. In particular, phonemic awareness tended to be most clearly related to those tasks which, in a restrictive sense, seem tied to phonemic awareness, such as spelling-sound knowledge. Furthermore, its relationship to reading comprehension, perhaps due to a ceiling effect, became quite diminished by the end of the second grade. Whereas those studies which have tended to focus on phonemic awareness to the exclusion of other variables suggest a strong relationship between phonemic segmentation and reading achievement; those studies which have looked at some of the "other variables" suggest a more tempered and sometimes different viewpoint.

Take, if you will, some of those studies that have attempted to sort out the relationship between decoding and reading in the context of different instructional approaches. For example, Calfee and Piontkowski (1981) pursued a longitudinal study of the acquisition of decoding skills of 50 first graders in 10 classrooms. The design, which included four categories of data diagnostic decoding tests—oral reading, comprehension measures, standardized achievement test, and classroom observations—allowed for an investigation of the patterns of reading acquisition of "component skills" during regular classroom instruction and to examine the relationship of these patterns to the instructional program. In terms of the relationship between component skills and reading acquisition, there appeared to be some transfer from decoding to oral reading and comprehension, but not vice versa. In other words, those students who were

comprehending successfully may or may not have had the same level of decoding skills. In terms of the effects of instruction, the results were somewhat predictable. Student performance on the various tests suggested that students learned what they were taught. In particular, target students in the reading for meaning programs tended to perform better on reading passages than in response to isolated words; target students in the programs emphasizing phonics performed better on decoding tasks rather than reading passages. The findings from this study underline the impact of differences in instructional emphases and illustrate the power of longitudinal studies to inform our understanding of development. As Calfee and Piontkowski (1981) argued in the closing statement of their study:

Understanding how readers become "good" or "poor" readers is not impossible, but it requires longitudinal, multivariate data with appropriate information about teaching styles and programs. Such research will not only clarify our knowledge of the acquisition of reading; it is also likely to yield the practical tools for assessment and instruction (p. 372).

A number of studies adopted the multivariate viewpoint advocated by Calfee and Piontkowski and the possibility that the pattern of relationships between variables would vary with differences in instruction. Perfetti, Beck, Bell, and Hughes (1987) reported the results of a longitudinal study of the relationship between phonemic knowledge and reading for first graders ($N = 82$) in different instructional programs (basal with readiness, basal without readiness, and a direct code teaching method). Various measures were included throughout the year to assess phonemic knowledge, word reading, and curriculum progress. At four points throughout the year phonemic blending and analysis were tested while other tests were less frequent. In general, the results suggested that those students who were given opportunities to read achieved more progress and were as able to perform adequately on the decoding tasks; students who received an emphasis on decoding made less progress and their decoding abilities did not necessarily transfer to reading. Based on partial time-lag correlations, the authors argued that reading gains had a reciprocal relationship with an ability to phonemically analyze (deletion task, e.g., remove the "k" sound from cat), but reading contributed to the ability to delete, which in turn contributed to reading rather than the ability to delete making a contribution by itself. As they stated:

What is clear is that learning to read can begin in a variety of ways, most of which may require only minimal explicit knowledge of speech segments. Thus, the rudimentary ability to manipulate isolated segments may be necessary for significant progress in reading. However, it is reading itself, we suggest, that enables the child to be able to analyze words and to manipulate their speech segments. It is not that the reader performs such manipulations on the orthography. Rather, learning some orthographic principles through reading enables the discoveries, including the alphabetic principle, can happen without direct instruction as well as with it. Although the direct teaching of the code may have some consequences for analytic phonemic knowledge, they are fairly subtle. Children taught by direct code instruction do not seem to learn any more (or less) about deletion than do other children. However, their improvement in decoding may depend less on phonemic analytic abilities than does the improvement of children not taught coding directly (pp. 317-318).

Likewise, in a 15-month longitudinal study that began with children aged 3 years, Maclean, Bryant, and Bradley (1987) found a strong and specific relationship between knowledge of nursery rhymes and the development of phonological skills—particularly the detection of rhyme and alliteration, which remained significant when differences in IQ and social background were “controlled.”

It is interesting to note that studies by Mason (1980) and by Maclean, Bryant, and Bradley (1987) made a similar argument based on their pursuit of the origins of phonological awareness. Mason (1980; Mason & McCormick, 1979; 1981) reported a number of studies in which she examined the reading development of students enrolled in informal preschool and nursery school situations. Based on parent questionnaires describing the children's interests in words, letters, and learning to read and tests directed at letter and word recognition and word learning, Mason (1980) argued that the progress that students appeared to make in knowledge of reading and skill in recognizing and reading words could best be described as involving three levels of development. She stated:

The first level is denoted by children's ability to read at least one printed word, usually their name or a few signs and labels. They can also recite the alphabet, recognize a few letters, and may print letters. At the second level, they read a few short and very common words from books, print, and spell short words and begin to try reading new words by looking at the first consonant. At the third level, they notice and begin to use the more complex letter-sound congruences and letter-pattern configurations. Thus, first level children recognize words by context, second-level children begin to use letter and word-sound cues, and third-level children rely on a sounding-out strategy to identify words (pp. 515-516).

Mason defines third-level children as readers; first and second-level children as prereaders. Vellutino and Scanlon (1987) reached similar findings regarding the interrelationship between phonic segmentation and reading ability. Vellutino and Scanlon (1987) compared the relationship of oral reading scores (acquired at the end of first and second grade) and IQ, various phonemic segmentation measures, vocabulary and syntactic abilities. Word recognition, phonemic segmentation (especially consonant substitution) abilities and use of contextual cues proved to be better predictors of oral reading performance than vocabulary measures and syntactic skills at the end of Grades 1 and 2.

In a slightly different vein, Stanovich, Cunningham and West (1981) have suggested that the interrelationship between automaticity of word recognition varies across time. Stanovich et al. adopted a longitudinal approach in hopes of assessing changes in automaticity of letter and word recognition across skilled and less skilled readers in the first grade; and developing an understanding of its development and role in reading improvement. An automated process was defined as “one that can take place while attention is directed elsewhere.” Across two experiments various measures of response times were obtained at different times of the year (late September, mid-February, and April for experiment one; December and April for experiment two) for two groups of first graders ($n = 24$ for experiment one and $n = 24$ for experiment two). The data from experiment one suggested

that for both skilled and less skilled readers there was little difference in their automaticity between February and late April indicating “a flattening out by the end of first grade” (p. 64). In experiment two, Stanovich et al.'s data confirmed the possibility that the chief difference between skilled and less skilled readers by the end of first grade was speed of recognition rather than automaticity. As they point out, the results are consistent with Ehri and Wilce (1979) who argued that success in reading should be assessed in regard to three criteria: accuracy, automaticity, and speed. And from their results, they argue, one could conceptualize these as stages beginning with accuracy.

Research regarding literacy development and the development of phonemic awareness in the 1990s tended to compare development within different pedagogical contexts. Morris (1993) tested whether beginning consonant knowledge facilitates concept of word in text, which, in turn, facilitates phoneme segmentation, which, in turn, facilitates word recognition. Drawing on observations from his earlier studies, he sought a “clearer developmental formulation of the relationship between concept of word and phoneme awareness” (p. 135). Fifty three suburban Chicago kindergarten children in two teacher's classrooms, with different pedagogical approaches to the teaching of reading, were tested, in 2-month intervals, on five tasks:

1. Alphabet awareness that had limited use in the study because the children had high alphabet recognition prior to entering kindergarten.
2. Beginning consonant sound of dictated words.
3. Finger-point reading sentences under line drawings and finger-point reading at various points, and after examiner modeling, a few sentences while reading with the examiner a five-page storybook.
4. Moving a block while pronouncing separate phonemes in words.
5. Reciting 10 words as the examiner pointed to them along with 10 basal words.

As a group, the children conformed to the predicted sequence of word recognition development. Individually, 20 of the 53 students did not fit the predicted developmental sequence. Growth was not significantly different between instructional settings. Morris wrote:

The theoretical position put forth and tested in the present study offers a different perspective on beginning reading instruction. Although the crucial role of phoneme segmentation in printed word learning is not challenged in this study, the results suggest that a stable concept of word in text can actually facilitate a child's awareness of the sequential sounds within words. If one acknowledges this “facilitator” role of concept of word, then it follows that reading instruction of a certain kind (that which leads beginners to map spoken words to written words in text) need not await the presence of phoneme segmentation skill, but rather can precede it (or at least be taught in conjunction with it) (p. 149).

Chapman (1996), collecting the writing samples of six children in a whole language, first-grade classroom, presented an analysis of the phonemic awareness of one boy who entered school not knowing the alphabet and having few book-reading experiences with adults at home. Offering nine examples of

writing over 9 months of school, Chapman attributed the boy's increasing phonological awareness evident in changes in the boy's texts to the cultural practices of literacy in the classroom that enabled the boy to invent spellings, and in that invention, demonstrate his phonemic awareness.

Treiman (1993) collected data from 43 first-grade children in a mostly white and middle-class whole language classroom. The children were in one teacher's class, 2 different years. Treiman's premise was that "just as learning to read words is an important part of reading comprehension, so learning to spell is an important part of writing" (p. 3). She collected writing samples at the start and end of the school year. Analysis involved: (a) pairing the words with spoken words in the child's diction; (b) omitting words that couldn't be paired with spoken words—that is, when she couldn't figure out what conventional spelling was associated with a child's spelling—those words were omitted from analysis; (c) inferring breaks between words, where children did not have spaces; (d) transcribing words according to how they sounded in isolated speech rather than as they sounded when said because she assumed "children spell words as they sound when said alone rather than as they sound in connected speech" (p. 9); and (e) matching letters in a linguistic phonemic transcription with spoken word spellings.

Her analytic transcription considered spelling, pronunciation, match between spelling and pronunciation, conventional spelling, the name of the child, and the date produced. In answer to her question, "How do children spell each phoneme," she concluded that at least three processes seemed to be involved in spelling a word: analyzing the spoken word into smaller units, remembering the identity and order of the units, and assigning a grapheme to each unit.

MacIntyre and Freppon (1994), drawing on data from two previous studies, one by Dahl and Freppon (1995), charted the pattern of acquisition and use of alphabetic knowledge of six children in skills-based and whole language classrooms during their kindergarten and first grade years. Alphabetic knowledge included knowledge of the graphemic and phonemic nature of written language, grapheme/phoneme correspondence, and use of graphophonics as a tool for reading and writing. The researchers sought a pattern of the acquisition and use of alphabetic knowledge of the six children as they developed as readers and writers in both skills-based and whole language classrooms. The children, all from low-income homes in an urban community, were assessed for literacy knowledge at the beginning of kindergarten and the end of Grade 1. Three children from the two types of instructional classrooms who matched on pre- and post-measures and on levels of achievement (most experienced, less experienced, least experienced) were randomly selected for the study. Each was determined to have no alphabetic knowledge at the beginning of kindergarten, and they each learned to read and write by the end of first grade. MacIntyre and Freppon observed in the two classroom types twice a week from October of kindergarten through the end of the children's first-grade year. They sat near the observed child and recorded what the child and teacher said as well as students' interactions. They also noted materials the child was using. The teachers were interviewed informally about their

beliefs and practices. "The goal of analysis was to identify each observed child's knowledge and use of the alphabetic system across contexts during both years of school" (p. 401). To this end, they coded field notes and transcripts of audio recordings for "talk and action related to each child's use of the system" (p. 401). Their coding categories included: graphemic knowledge, phonemic knowledge, knowledge of sound/symbol correspondences, experimentation with (attention to) sound/symbol correspondences, effective use of sound/symbol correspondences, emergent reading behavior, emergent writing behavior, and level of invented spelling. They found all six children exhibited the same chronological acquisition pattern. The progression was: sound sense (hearing and matching sounds); sound-symbol sense; self-initiated experimentation with the alphabetic system; successful use of the alphabetic system, with assistance; and successful, independent use of the alphabetic system. Differences in the 2-year study were not in how fast or how well children learned the alphabetic system, but in what children did with their knowledge. All three children in the whole language instructional setting read literature and wrote extensively on self-selected topics. The children in the skills-based setting exhibited alphabetic knowledge while working with words in isolation or in sentences in basal readers. The authors documented that the whole language classroom offered more engaged literacy experiences.

In a related study, Dahl, Scharer, Lawson, and Grogan (1999) documented and analyzed the phonics teaching and learning in eight whole language first-grade classrooms from October through May. Their observations complement the aforementioned findings and contrast sharply with the suggestion that whole language teachers offer first graders limited learning opportunity with phonics (e.g., Stahl, Duffy-Hester, & Stahl, 1998). Dahl, Scharer, Lawson, and Grogan (1999) demonstrate that students of varying reading ability within these classes made substantial growth across a variety of reading ability indicators. Furthermore, they tied these observations to the learning opportunities that teachers "flexibly" enlisted. In terms of phonics, strategy development as well as foundational concepts in conjunction with contextualized learning opportunities are more differentiated per customized adjustments for individual students.

Rohl and Pratt (1995) studied the relationship between phonological awareness and verbal working memory in the development of reading and spelling. They note that phonological awareness and verbal working memory have been proposed as causal factors in the acquisition of literacy; yet, phonological memory and phonological awareness may be related, "as both may be dependent on a common latent phonological ability" (pp. 327-328). Phonological awareness was measured by tests of onset and rime, phonemic segmentation, and phoneme deletion. The authors noted that less is known about what is measured by verbal working memory tests. The authors posited that phonological awareness influences automatic word recognition, and verbal working memory could play a part before and during automaticity of word recognition. Seventy six children (46 boys and 37 girls) from three schools in lower-middle class schools in Perth, Australia, were administered a battery

of tests three times in 2 years: the beginning of Grade 1, the end of Grade 1, and the tail end of Grade 2. The battery included three verbal working memory tests, three phonological awareness tests, and six reading and spelling tests. From means, standardizations, and maximum scores of phonological awareness tests, the authors concluded that many pre-reading children were aware of phonological categories of onset and rime and that while children could categorize words based on onset and rime, few could segment whole syllables phonemically. Factor analyses were performed to examine whether measures hypothesized to tap processing in the articulatory loop of verbal working memory loaded on a different factor from those measures designed to tap processing in the articulatory loop. Across the three testing times, a similar pattern was obtained. The authors concluded that the articulatory loop and central executive components of verbal working memory are related but distinct. As Rohl and Pratt stated, "tests which required children to repeat verbal sequences exactly as spoken by the experimenter consistently loaded on a separate factor from those which required children to repeat sequences in reverse order . . . [and] results of hierarchical multiple regression analyses showed that backwards repetition made some contributions to reading and spelling that were independent of simple repetition" (p. 351). Rohl and Pratt further concluded that "whilst the phonological awareness variables made contributions to reading and spelling which were independent of verbal working memory, verbal working memory did not contribute to reading and spelling in Grade 2 independently of end of Grade 1 phonological awareness when onset and rime and simple and compound phonological awareness were all controlled" (p. 351). They concluded also that while phonological awareness may be an independent causal factor in reading and spelling, verbal working memory may be subsumed under phonological awareness tasks. Too, phonemic segmentation contributed to reading and spelling over sound categorization and phoneme deletion contributed above sound categorization and phonemic segmentation.

The sheer number of longitudinal studies of beginning reading that have focused on the acquisition of decoding skills suggest not only certain preoccupations but a political context fostering such concerns. First, research has tended to be preoccupied with decoding to the exclusion of other literacy understandings. There are a host of facets of being literate that have barely been touched on. They include: children's emotional responses to literacy tasks, aesthetic development, view of interpretative authority, genre, cognitive processes such as self-questioning, on-line thinking, the student's use of multiple sources of information, criteria for self-selection, self-assessment, and the role discursive affordances and constraints play in all literacy processes.

HOME AND SCHOOL STUDIES

In the last 20 years, a major field of longitudinal research has opened up—inquiring about language and literacies in children's homes. While much early longitudinal work occurred in homes, the current home studies tend to involve literacies

in low-income homes or in homes of nondominant cultures. This move is important because a great deal of understandings of language and literacy development derive from white, middle-class homes and may assume uses of language that are culturally irrelevant in diverse settings. (e.g., Taylor, 1983; Cairney, 1945; Cairney & Munsie, 1992; Delgado-Gaitin, 1992).

The Home-School Study of Language and Literacy Development is an ongoing study undertaken by several teams of researchers (i.e., Beals, DeTemple, & Dickinson, 1994; Dickinson & Tabors, 1991; Snow, Tabors, Nicholson, & Karland, 1995) with low-income families in the Boston area. "The basic hypothesis of the Home-School Study of Language and Literacy Development is that early development of skill with decontextualized language will be related to reading comprehension abilities when children are in the middle grades of school" (Snow, 1991, p. 5). The home-study project in Boston is too voluminous to review in full. It is premised on the idea that a particular kind of language use—decontextualized language—enables comprehension. Snow (1991) explains that there is a particular kind of discourse that plays in literacy, and it involves "decontextualized" language, which Snow defines as language used to convey information to an audience at a distance, rather than face-to-face, when "contextualized" oral language is used. Snow contends that decontextualized language occurs among all classes and does not necessarily involve discussions around books. Thus, she and other researchers involved in this study recorded the language of 80 children and their families in their homes and at their school settings from the time the children were 3 years, with the intention of collecting data until the children are 10 years old. The researchers predicted that decontextualized language would not be significant in the battery of tests the children received yearly, in their homes and schools, until they were in the fourth grade when their experiences with literacy would more actively involve comprehension. They argue that "school literacy outcomes in Grades 1 and 2 may be quite strongly related to preschool print skills, whereas school literacy outcomes in Grades 4 and higher, when reading comprehension becomes an important factor, may be more strongly related to oral decontextualized language skills" (p. 6). The "Model of Relationships Between Language and Literacy Development" the researchers developed shows no interconnections between print and comprehension in children's early years. As such, "reading" in first grade appears merely a decoding process. Observations of reading in many classrooms, however, would reveal guided reading and book sharing, which include the semantic cueing system in reading. Data are being collected, annually, in more than 80 low-income families' homes as well as in participant children's schools. Home data consist of (a) interviews with mothers; (b) children playing with a toy provided by the researcher; (c) mothers reading two, researcher-provided books, to their children; (d) a report of a past experience that mothers elicit from their children; and (e) mealtime recordings of conversations. School data consist of (a) spontaneous talk between the teacher and child; (b) videotaped group book readings; (c) a report about something that occurred at home, elicited by the teacher; (d) activities of all children in the class are noted every

half-hour; (e) displays of environmental print noted; (f) researchers' curriculum rating; (g) teacher interviews; and (h) teachers' ratings of children's oral language. School recordings are coded. A test battery is administered at the children's homes when they are in kindergarten. Another battery, administered in school, include oral language tasks, a narrative production task, picture description, definitions, comprehension, vocabulary, and spelling tests.

Different researchers involved in the study have presented different results. Dickinson and Tabors (1991), for instance, concentrating on 5-year-olds, found support for the model of decontextualized talk as influential in literacy development; found that homes and schools contribute to early language and literacy skills; and found that vocabulary, story understanding, definitional skill, and print knowledge "seem to be correlating with similar home and preschool predictors" (p. 42). They further conclude that studies examining single settings such as book reading at home may have overemphasized the importance of such settings when other kinds of talk in other settings may also have contributed to literacy support. Beals, DeTemple, and Dickinson (1994), whose data reflect a cohort of 38 children when they were 3-, 4-, and 5-years old, tested the hypothesis that verbal interaction in early childhood would be a precursor of later cognitive and linguistic activity when the children were in kindergarten. Of the variety of data mentioned earlier, this research reports only mealtime talk, home book reading, and school book reading. At age 5, this cohort of children were administered the PPVT to measure receptive vocabulary; a story comprehension task; a narrative production task; and print skills assessments. The researchers found that the proportion of explanatory talk and the number of narratives occurring during mealtime talk when children were age 4 correlated positively with PPVT scores at age 5. The amount and proportion of non-immediate talk (decontextualized talk) at age 3 correlated with the children's Concepts About Print scores. The amount of non-immediate talk in book reading at age 3 correlated with a child's ability to tell a story, and children who provided information without assistance had better story comprehension. From the school book-reading data, the researchers determined that challenging talk at age 4 carries over to story comprehension at age 5; nonimmediate talk at age 4 correlated with PPVT scores; and specific content of talk and not overall amount of talk is what is crucial. Total amount of talk about a book at age 4 is unrelated to vocabulary or story comprehension.

Along somewhat similar lines, a 5-year study by Linda Baker, Robert Serpell, and Susan Sonnenschein, as well as other contributors, explored the interrelationships between socio-cultural contexts in conjunction with looking at preschool home experiences and emergent literacy competencies related to different aspects of reading development, including word recognition, comprehension, and motivation. Participants (initially 43 but eventually 24) were caregivers and children (including equal numbers of males and females of African American and European American descent) drawn from 6 schools in communities associated with varying income levels in the Baltimore area. The children were all born in 1988 and were scheduled to begin kindergarten in 1993-94. A focal point of the research was the overlap between home and

school and how they might interact to support literacy development especially across African American families and European American families varying in income level. The initial data collection included an "ecological inventory" of socialization activities and resources derived from interviews, diaries maintained by caregivers, and observations; ethnohistories developed to detail the parent and teacher beliefs, values, and practices; co-constructive processes through which children appropriate literacy resources based on interviews and videotaped observations; and assessments of a range of developing literacy competencies, including orientation to print, narrative competence, phonological awareness, motivation, and word recognition in the later grades. As they stated:

A general hypothesis guiding our research is that children from different sociocultural groups may have different home experiences because of the characteristics of their niche (such as, parent belief about child development, available material resources, and general activity patterns of the family) that can lead to differences in subsequent reading development.

Their findings suggested that children may receive different degrees of certain types of literacy experiences and that these "niches" appear to be related to income level and the advantages that some children may have over others across all three years of schooling. Where literacy is a source of entertainment versus skill those niches are significantly more highly correlated with the development of literacy competencies (orientation to print, narrative competence in Year 1 and word recognition in Year 3 as well as motivation to read). These niches were most closely related to low-income situations.

The ongoing contribution of meaningful reading experiences versus an isolated skill emphasis also emerges from their analyses of the interrelationship of various measures acquired across Grades 1 through 3. Whereas orthographic knowledge and phonological knowledge were not found to make a significant contribution to word recognition in Grade 3, nursery rhyme knowledge and frequency of activities such as storybook reading, visits to the library and abc book reading did. As the author concluded:

providing children with enjoyable print-related interactions with a variety of genre of books is likely to be of more lasting value than enforced practice on isolated letters and sounds. (Baker, Mackler, Sonnenschein, Serpell, & Fernandez-Fein, 1998, p. 9)

Looking more broadly on home influences, Weinberger (1996) traced the influence of early literacy experiences on later development. She was a teacher in a nursery school in England where she collected data on 24 boys and 18 girls. The children were white and all but one spoke English as a first language. Twenty-seven came from working-class homes, and 15 from middle-class homes. She collected data over 5 years at 2-year intervals. Data consisted of an interview with parents in their homes when the children were 3-years old. She garnered information about family background, literacy resources and activities, access to reading material, book ownership, experience of being read to, parents' approaches to reading and writing with

their children, and details of children acting like readers and writers. When the children were 5, they were given school entry assessments of vocabulary, writing (writing their first name and copying a phrase), letter knowledge (children were presented with letters out of sequence), access to stories at home (parents were asked if they read with their children at home and how often), and their uses of books at school (the teacher recorded her observations of whether children chose books and looked at them voluntarily). At age 7, children and parents were interviewed to update family information from previous contacts. Outcome measures included: (a) the child's level of reading book; (b) assessment of literacy difficulty including their placement on Young's Group Reading Test; (c) a writing score that included story writing and expository writing and the level of independence in these tasks; (d) levels reached on Standardized Assessment Tasks for English; and (e) anecdotal information from their teachers regarding problems. What Weinberger considers significant in her study was not statistically significant. She states that children's favorite books prior to school may not be statistically significant but they are educationally significant. She found that children who read well were those whose literacy was well resourced at home.

Purcell-Gates' (1995) case study of the literacy learning of an urban Appalachian mother and child, over 2 years in a clinical reading context that encapsulated, too, home and community contexts, is rich data for the field of literacy—especially in terms of class and cultural issues. Purcell-Gates is critical of a middle-class world view of literacy, and this criticism is supported by the experiences of Jenny and her son, Donny (a second grader for 2 years during the study), who did not learn to read even though they live in print rich worlds. Purcell-Gates explores the world of illiteracy, from the perspective of the participants in her ethnographic study. One can see Donny's literacy development as part of two worlds: a school that does not seem to see either Donny or his mother, and their home world, which is not mediated by print. Purcell-Gates calls for a consideration of one's assumptions regarding children's literacy experiences prior to schooling and the need to address an expanded consideration of literacy practices when children's situations that are tied to class and culture may not have enabled the learning of implicit rules of literacy practiced in schools.

Biliteracy research has stressed the importance of a home-school bridge including its social, political, and economic character. Moll's (1992) research with teachers who document and make use of literacies or "funds of knowledge" used in Latino homes, posits that curriculum becomes reduced in schools of children from working class families. As teachers document how knowledge is enacted and built in homes of Latinos, they come to see that language use is cultural practice, and cultural practices build social networks among communities. Biliteracy home-school bridges play out very differently in research. Moll takes a "strengths" view of knowledge sources and treats literacy as cultural practice. He also locates the teacher centrally in bridging home and school cultural practices.

Biliteracy research opens up provocative ways of viewing not only biliteracy but literacy, in general. Valdés (1998) writes, "the teaching of English is not neutral . . . the key tenet of the discourse of ESL teaching—that it is possible to just teach

language—is untenable because it is impossible to separate English from its many contexts" (p. 15). Valdés asked, "Why is it that so many non-English-background students fail to learn English well enough to succeed in school?" (p. 4). She documented how two girls recently immigrated from Honduras and Mexico negotiated their ways in United States schools. At ages 12 and 13, neither knew much English when they arrived in California. Teachers' pedagogies fell flat in ESL classes. Critical thinking questions and engagements were usurped by time communicating how to fold paper, for instance, which exhausted teachers and didn't build necessary comprehension skills in the students. The students were used to strict teachers and considered those who seemed nice, weak rather than kind. Class sizes were 35 to 38. Teachers had little mechanisms for figuring out how much English students knew and could not easily evaluate their instruction, either. In the first year, Elisa was quiet and spent a lot of time on her work, whereas Lilian was energetic and out of her seat a lot. The teacher felt Lilian had a learning problem and might need special education. In English class the first year, students were not given advanced organizers to help them know what to listen to and language seemed to be directed at more fluent speakers of English. Little practice in oral English occurred. They pointed at objects and drew and colored shapes for their direct language instruction. By the end of the year, neither girl had progressed much. Elisa, however, was pushed by her mother to use English. Elisa approached the ESL teachers and asked to be let into regular classes, even enlisting the researcher's help. Elisa didn't get into classes on her merits; she had to finish her class materials. The next year, though, when an abundance of immigrant students arrived at the school, Elisa was able to attend a regular math class due to overcrowding in the ESL program. Once admitted to regular math, much language was needed and she had great difficulty writing the longer prose necessary for problems. Lilian learned less English because it tangled too greatly with her identity to accept teachers' definitions of her as her own. She later moved and attended an ESL program all day long, which meant not mixing with many students other than ESL students. Lilian's mother did not know how American schools worked and she, herself, had not known social mobility growing up. Lilian never did escape "the ESL ghetto" (p. 12), did not finish high school, and knows only enough English to work at a fast food restaurant. Elisa, who could not get out of ESL on her own, enlisted, again, the help of the researcher to get into another school. She later enrolled in a college-bound program.

Valdés's research shows how difficult it is to study literacy "development" in classrooms where practices arrest development. Her work points to the increasing visible problem of seeing literacy development as an accomplishment outside of the sociopolitical nature of schools. What home and school literacy research has in common is that it redefines literacy as cultural practice and, by no means, monocultural practice. Nonetheless, monocultural literacy is put forth through curricula and mechanisms of standardized tests. Thus, home and school research does three things: it complicates singular and stable definitions of literacy by providing description of the numerous uses and economies of literacy in specific cultures; it makes visible the middle-class assumptions of literacy; and it leaves researchers,

educators, and policymakers with an unanswered question: If it is schooling that administers certificates of status in the form of standardized literacies, how can these be made available to all cultures?

LONGITUDINAL STUDIES OF READING AND WRITING IN LATER YEARS

The number of longitudinal research studies quickly diminishes as the focus becomes the student moving through the elementary school, high school, or college. As the child's learning moves away from beginning reading and writing, extrapolations about development have tended to depend almost solely on comparisons of sophisticated and less sophisticated learners, experts and novices, good and poor, knowledgeable and less knowledgeable or younger and older students. Such dichotomous comparisons have offered researchers worthwhile descriptions of what students might aspire to, but they have offered only highly speculative insights into how a student might advance his own learning toward the aspirations which were set. Indeed, an interesting ramification of this void are educational practices that naively pursue the eradication of those behaviors associated with novice-like performance or that assume that expert-like behavior can be explicitly taught by carefully mimicking such behavior. What seems missing are those understandings and appreciations of student behaviors that emerge when researchers follow development of the same individual across time and when researchers ask themselves to identify the students' views of literacy.

There do seem to be some exceptions to this trend. First, there are a number of case studies of readers and writers. For example, Bissex (1980) extended the case study of her son through his elementary schooling experience. Numerous case studies have been pursued of professional writers by biographers. Holland (1975) offered case studies of a college student's reading. Petrosky (1976) and Cooper (1985) have pursued case studies of readers' responses to stories. These tend to be more descriptive than biographical so that a longitudinal perspective is less forthcoming.

STUDIES INVOLVING A LONGITUDINAL METHODOLOGY AND PERSPECTIVE

Essentially only a small number of studies exist that adopt what might be viewed as longitudinal methodology and longitudinal perspective. Studies by Wells (1986) and Loban (1967) are among the most notable. Beginning with children at the age of 15 months and continuing with a subsample of these children through the end of elementary school, Wells reported his attempt to address the question: Why were some children, usually lower in socioeconomic status, failing to become literate and failing at school? Wells chronicles their language development by referring to data acquired by interviews, tape-recorded conversations, and assessments by the teacher. A number of recurring themes developed: One theme is the notion that children need to be equal partners in conversation if they are to

succeed. He argued that the types of partnership that parents have with children are lacking from schools. As Wells stated, "schools are not providing an environment that fosters language development. For NO child was the language experience of the classroom richer than that of the home—not even for those believed to be 'linguistically deprived'" (p. 87). He argued that a child's contributions should be taken seriously, that he or she should be viewed as and encouraged to be an active meaning maker.

A second theme was tied to what Wells described as the most striking finding from his longitudinal study—namely, that achievement of children varied little from the time they entered elementary school to the time they ended. Students who were assessed as high at age 5 were high at age 10. Moreover, the explanation for differences entering school seemed governed by the values developed for literacy. Wells argued that it was not the mechanics of literacy that were important, but the purposes for reading and writing that the child had acquired.

A third major theme developed by Wells was that the single most important activity that parents could pursue was reading or telling stories:

We are the meaningmakers—every one of us; children, parents, and teachers. To try to make sense, to construct stories, and to share them with others in speech and in writing is an essential part of being human. For those of us who are more knowledgeable and more mature—parents and teachers—the responsibility is clear; to interact with those in our care in such a way as to foster and enrich their meaning-making (p. 222).

While Wells' longitudinal study has no counterpart in other countries, a longitudinal study conducted by Loban in the 50s and 60s has numerous parallels. Loban (1967) pursued a 13-year longitudinal study of over 200 students during the entire course of their schooling (kindergarten through Grade 12). The study was concerned with the use and control of language, the rates of growth and interrelationships of language abilities. As Loban stated:

From the outset, the basic purpose of the research has been to accumulate a mass of longitudinal data on each aspect of linguistic behavior, gathering the information in situations identical for each subject and using a cross-section of children from a typical American city so that findings could be generalized to any large urban area (Loban, 1967, p. 1).

In particular, Loban delineated patterns of growth in language and details on how proficiency was acquired. Taped oral interviews and a wide range of tests and inventories including lists of books read were used to measure reading achievement, listening ability, written language abilities, as well as ability and fluency in oral language (on an annual basis). Loban found similar findings to Wells in that later success followed from earlier achievements. Just as Wells argued that later success was dependent on the quality of home experience, so Loban argued that a strong oral language base, especially the ability to use language flexibly, seemed to be tied to a student's success as a reader and writer. As Wells also found there appeared to be marked differences in the oral language of students in families of

lower socioeconomic status. Like Wells, Loban lamented what appeared to be the gulf between home and school that seemed to detract from facilitating ongoing language learning.

LONGITUDINAL STUDIES OF DIGITALLY BASED LITERACIES

Longitudinal studies of the emergence of digitally based literacies by individuals and groups have extended the vistas of literacy research. Certainly, we have a growing body of critiques on the impact of these technologies on the nature of text and societal development. But, detailed examinations of literacy development for groups have been restricted to studies such as analyses of engagement of groups on websites, listservs, etc.

In terms of studies of the impact of technology on the literacies of individuals, Tierney has been engaged in a long-term study and follow up of a rather unique set of children who had almost unlimited access to state of the art software (including hypertext in the Apple Classroom of Tomorrow) at a high school in Columbus, Ohio. In particular, a series of papers by Tierney and his colleagues (Tierney, 1996; Tierney, Bond, & Bresler, 1998; Tierney, Kieffer, Whalin, Desai, & Moss, 1990; Tierney, Stowell, & Desai, 1990) report the exploration of the impact of high computer access on selected high school students across 4 years of high school as well as in their experiences after graduation. A major focus of their longitudinal study was an examination of literacy acquisition tied to viewing digital technologies as different medium with semiotic, cognitive, and social dimensions. In particular, they focused on the extent to which computers afforded students alternative ways to represent ideas, access different learning routines, achieve various outcomes, and prompt various collaborations.

The students selected for the case studies represented the first two cohorts of students to complete the high school program offering high computer access and several students who were graduates from various classes. These students represented a cross-section of students in terms of ability and came from primarily working-class homes of a variety of racial origins. The physical arrangement of the high school classrooms was largely self-contained. Most of the classroom periods were taught in one of three or four rooms involving team-teaching situations (e.g., science and math; English and history). Within each classroom, each student had various workspaces that afforded opportunities for individual or group computer use, printers and other media, and access to a range of software available over the 4 years. For example, in their science class or history class, they might pull together projects using PageMaker, HyperCard, and SuperCard, using a mix of scanned images, video, and multi-level stacks of ideas. They also had access to computers at home where they could pursue classwork or projects that they decided to initiate themselves. Researchers' observations and interviews served as the cornerstone for delving into the nature of literacy acquisition.

Emerging as key areas for consideration were major shifts in students' thinking about text, attitudes toward text, and

approach to the representation of ideas. Whereas students in Years 1 and 2 tended to approach their composition from brainstormed lists of ideas that were then used to develop drafts and be refined, in Years 3 and 4 they developed stacks from their vision of the dynamics and visual dimensions of their texts. The students in the high access classroom explored images, sound tracks, and text interconnected in very complex ways (i.e., multifaceted, multilayered ways) using a smorgasbord of image, sound, and print. The researchers were able to demonstrate that the technology increased the likelihood of students' being able to pursue multiple lines of thought and entertain different perspectives. The technology allowed students to embed ideas within other ideas, as well as to explore other forms of multilayering and interconnections between ideas. The students spent a great deal of time considering how ideas laid out—that is, how the issues that they wrestled with could be explored across an array of still pictures, video segments, text segments, and sound clips. The introduction of desktop publishing, scanning capabilities, and hypermedia contributed to some major shifts in how students represented ideas and approached the integration of ideas from various sources. The graphic capabilities of technology afforded the students a means of developing and testing theories at the same time as it became a way to pilot and assess the potential of certain technologies for such purposes. Furthermore, the shifts in approach to representing ideas continued beyond their high school years to their studies at tertiary institutions and in jobs they pursued outside of school. With the technology they were able to do things they might not have otherwise done and were astutely aware of the potential utility of these tools for their own advancement and, in turn, their families'. They also seemed to have a sense of their own expertise, a recognition of various functions technology could serve as well as an appreciation of the skills they needed, including the ability to work with others. The researchers found that students had goals for technology that transcended the classroom (e.g., all of the students viewed the expertise as affording them advantages in the workplace or college, some had begun using their computer expertise to help family members with projects or for their own profit), and the use of the computers assumed a role that might be best described as socially transforming.

The researchers demonstrated that the students became independent and collaborative problem solvers, theorists, communicators, recordkeepers, and learners with the computers. They developed a repertoire of abilities to explore possibilities that were either too cumbersome or difficult to attain without the technology. The researchers predicted that longitudinal studies of societal engagement with these new literacy genres could possibly set the stage for some shifts in how literacy abilities are defined, affecting outcomes of literacy development.

CONCLUDING REMARKS

In the introduction we argued that longitudinal studies were crucial to the advancement of our understanding of how literacy develops. To date, research on reading and writing has

been dominated by extrapolations about development based on a comparison of literacy learners at different ages, ability levels, and so on. We have stressed that such comparisons may be problematic if our goal is to understand how a literacy learner advances from one age to another or from one ability to another, etc. A number of the longitudinal researchers attest to the fact that when they studied the same literacy learners across time that their hunches about development were often challenged and subsequently revised. Some were taken aback with the speed with which literacy developed, the repertoire of literacy learning abilities children had and used at very young ages, the flattening out of certain literacy learnings, the extent to which the relationship between certain variables changed across time, and the extent to which some variables remained closely related to the child's literacy learning across time. At the same time, case studies of diverse cultures that are frequently looked past in schools reveal how slowly literacy develops when uses for literacy assume a middle class family existence.

Repeatedly researchers seem to be sensitive to the child's active construction of meaning-making systems and ongoing negotiation of meanings. Across the various studies the picture of meaning making that emerges is one in which the child is not becoming a meaning maker; the child is already a meaning maker. Some meaning makers, though, do not make meaning of school literacies that are culturally incongruent with their own and they need explicit instruction regarding implicit rules they don't have access to. When classroom culture is engaging, meanings seem to be negotiated by the child using a variety of cues and systems simultaneously, and the child's increasing facility with these cues and systems comes from being involved with experiences that challenge the child in the context of making meaning to use these cues, skills, and systems. Meaning making, once seen as a natural entity of the child, is now seen as dependent on a meaningful context where, when help is needed from a more knowledgeable expert, it is made available.

Despite the fact that longitudinal research seems essential to answer questions regarding how literacy develops, such pursuits are neither straightforward nor problem-free. Indeed, longitudinal research seems plagued by many of the same problems of any research pursuit. Studies are limited by the researchers' view of literacy, selected biases, and awareness (or lack of awareness) of previous research. These can shape the questions that are asked, the variables included for study, the methods used to assess these variables, and the procedures for analysis and interpretation. Across the various studies relatively widespread use was made of instruments that lacked precision or offered a somewhat distorted glimpse of the variable being assessed. In some cases the method used to assess a predictor variable given one name seemed to closely match that used to assess a criterion

variable given another name. Obviously, some of the problems seem unavoidable—particularly, problems devising methods of measuring or describing facets of literacy at an early age or facets that seem amorphous.

Longitudinal research is riddled with problems related to the interpretation of findings. In a number of studies, researchers had a tendency to move from statements about relationships between variables to statements of causality. In a number of cases, a license to make causal inferences seemed to arise whenever multiple regression procedures and the use of path models were enlisted to afford a "best fit." Researchers should be reminded that, regardless of the sophistication of the statistical analyses, these data remain correlational. The limitations surrounding the use of path analysis procedures is not restricted to just ascribing causality. The use of path analysis models oftentimes preclude the consideration of alternative constellations of variables or ways of configuring relationships that are less straightforward. Researchers using path analysis should acknowledge the extent to which their approach adopts an a priori model that is then validated, rather than a more open-ended approach to modeling a configuration of variables. Wells (1986), in the introduction to the *Meaning Makers*, stated:

there can be no true stories. The evidence is never so complete or so ambiguous as to rule out alternative interpretations. The important criteria in judging the worth of a story are: does it fit the facts as I have observed them and does it provide a helpful basis for future action (p. xiii)?

It should be stressed that longitudinal research is not excluded from the various problems associated with generating reasonable interpretations. Just as in any study, there are constraints on the generalizability of findings to other sites, subjects, times, and so on. There may be a danger of assuming that comparisons across age levels, cultures, genders, classes, and abilities will avail themselves. Certainly longitudinal studies do not involve making inferences based on a comparison of the responses of different individuals, but despite the fact that the individuals might be the same, the context, including time, is not. If the individual can perform only as context allows, and if contexts for schooling are ever more restrictive and prescriptive, then research and literacy instruction reduces possibilities for an individual's, and oftentimes, a whole culture's literacy development. What longitudinal literacy research says about literacy development, and what literacy development has to say about research is that they are both delimited by the historical-political discourses that afford and constrain particular literacy practices. One has to question focusing the lens solely on learners, texts, and their immediate social environments, and development may be better understood as contextual affordances for performance.

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