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STUDIES OF READING AND WRITING GROWTH: LONGITUDINAL RESEARCH ON LITERACY DEVELOPMENT

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How does literacy develop? This question is one of the major concerns of educators and, you would expect, one of the major pursuits of literacy research. Understanding how literacy develops is a prerequisite to responding to readers and writers and to planning their educational experiences. Therefore, how do we pursue answers to this question? Here the answer seems rather obvious—initiate studies which examine how students change across time. Ideally, this would involve longitudinal studies of the same individuals at different times rather than different individuals at different times. The present paper represents an attempt to examine 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.

In preparation for this paper, 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 tenets by which longitudinal studies might be conducted and reviewed. Unfortunately, the task was more formidable than expected. 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 enor-

mous number of cross-sectional studies comparing students at different ages rather than studies of the same students at these different ages.

These limitations aside, the current review examines several longitudinal studies of readers and writers. Since a limited number of longitudinal studies have been conducted (or, if they have been conducted, do not exist in the mainstream research outlets) and most of these relate to a few research areas (mostly early reading and writing development) a review of longitudinal studies is more illustrative than explanatory. It is illustrative in terms of:

1. The implications which emerge from such studies, especially the development principles which can be drawn about language learning;
2. The theoretical frameworks which guide their implementation and interpretation; and
3. The methodological considerations which emerge for consideration.

Longitudinal Studies of Reading and Writing in the Early Years

Over the past 30 years, studies of children's initial encounters with print and beginning school experiences represent the majority of longitudinal studies conducted to date. Especially in recent years, there have appeared several case studies of young children and observational studies of several children, which have 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 in developmental psychology,

which dominated the field from 1910 to 1930. For example, in the early part of this century a number of maturational psychologists detailed the early development of young children. For instance, based upon 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 which represented the book handling and related behaviors which were typical of children at different ages. Other studies have their roots in clinical studies based upon case histories of students with difficulty 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 focused on reader's response to storybooks (White, 1954). Finally, many have roots in a reaction to or movement away from correlational studies, which compared skills considered to be related to later reading achievement with each other (e.g., Dykstra, 1966; Barrett, 1965).

A study that has received a great deal of attention is Durkin's (1966) longitudinal studies of early readers in which she examined the impact of home experiences upon later reading achievement in hopes of answering 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 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 challenged 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 six years of schooling, early readers maintained their advantage. Her findings also challenged the belief that IQ and socioeconomic factors of 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 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 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 have addressed some of the same issues raised by Durkin. In particular, a number of studies have examined through parents' diaries, parent-child and teacher-child interactions, and other data young children's storybook reading experiences—its features and relationship to literacy development. 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 three-year period (2–5 years old) 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 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 'pretendy', '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. On all such matters the textbooks of psychology have much to tell us in a generalized manner, but here we can see them happening in the life of one child. (p. xvi)

Over the past 15 years other parents have told the story of their children's development as readers and writers 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 stories. 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 longitudinal studies of parent-child interaction together with studies involving repeated readings of storybooks have led to a gradual refinement in our 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 8–18 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 upon labelling and the child smiling, pointing, vocalizing and acquiring the turn-taking rules underlying such dialogues. Investigations by Snow (1983) and Snow and Goldfield (1982, 1982) indicate that this type of routine interactions with parents affords children the security whereby they can link ideas from these experiences. Snow's studies and, more recently, studies by Teale (1986), Teale and Sulzby (1986 a & b), Sulzby (1985 a & b), and Sulzby

& Teale (1985) 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 their 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 14-months as a mother and child read a counting book, Teale and Sulzby (in press) found important shifts in responsibility as the child gained more and more control over the task. In fact, after eight months of the mother initiating the reading, the child spontaneously read the material.

In an effort to detail children's use of text cues, some studies have focused upon 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 students demonstrated that they "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 work has studied in more detail the shifts that occur in such behaviors (i.e., student's use of 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 story books by 2-, 3-, and 4-year-olds. By using a classification scheme to characterize the reading behaviors of children, Sulzby (1985a) was able to demonstrate the extensive repertoire of strategies students have acquired as a result of story book reading and the types of changes which occur across time but seem relatively stable across books. Tables 11-1 and 11-2 include comparisons made of the kindergarteners at the beginning and end of the year, as well as a comparison with 2-, 3-, and 4-year-olds. 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 kindergarteners were developing an understanding of the register of shared reading including the linguistic awareness 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 a lot about the lexicogrammatical realizations of the language system so that they are able to control a variety of different oral language registers to express their meanings. They learn to adjust their linguistic choices

TABLE 11-1. Classification Scheme for Emergent Reading of Favorite Storybooks in the Kindergarten Year

Reading Attempt Type	Major Categories (and Sub-categories)	
	Beginning of Year	End of Year
A. Attempts Governed by Print	5	10
Reading independently	(1)	(3)
Reading with strategies imbalanced	(1)	(2)
Reading aspectually	(1)	(5)
Refusing to read based on print awareness	(2)	(0)
B. Attempts Governed by Pictures, Stories Formed		
1. Written language-like	6	7
Reading verbatim-like story	(1)	(0)
Reading similar to original story	(3)	(2)
Reading and story-telling mixed	(2)	(5)
2. Oral language-like	5	5
Monologic story-telling	(2)	(3)
Dialogic story-telling	(3)	(2)
C. Attempts Governed by Picture, Stories Not Formed	4	0
Following the action	(2)	(0)
Labelling and commenting	(2)	(0)
D. Refusals (low-level) and/or Dependent Reading	4	2

Note. N = 24

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. (p. 160-161)

Rather than focus upon children's rote-like word-by-word response to the repeated reading of a story, Pappas and Brown (1987) 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 brings to the fore the social nature of literacy and literacy learning, as well as the extent to which meaning-making is inherently 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 cause. 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)

TABLE 11-2. Percentage of Children Reading at Increasing Levels of Sophistication by Age

Categories Reading Attempts	Age				
	Two's ^a (n = 8)	Three's ^a (n = 12)	Four's ^a (n = 12)	Five's November ^b (n = 24)	Five's May ^b (n = 24)
Governed by print	0% ^c	17	25	21	42
Written Language-Like Stories	13	17	33	25	30
Oral Language-Like Stories	25	17	17	21	21
Stories Not Formed	13	17	8	17	0
Refusals (Low-level) and/or Dependent Reading	50	33	17	17	8

^aDate from Study II; counted here is only the first storybook attempt by each child on entry into a longitudinal study (Sulzby, 1983-b)

^bData from Study I; reading attempts are the beginning and end of kindergarten by the same subjects. (Sulzby 1983b)

^cPercentages may not sum to 100 due to rounding.

Along similar lines, Yaden, Smolkin, and Conlon (1989) have been 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 have 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 one or two 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 which 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)

Given the wealth of these data, it seems unfortunate that these data were not considered in a more open-ended fashion that showed what the child's inquisitiveness contributed. 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; Harste, Burke & Woodward, 1984; Hiebert, 1978), a few longitudinal studies were done that focused upon 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 every-day 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 awareness 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). Unfortunately, very few longitudinal studies have examined this claim either directly or in detail. 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 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 1st-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 upon 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 subskills 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.

Research on writing development has been another major area for study. In the past 15 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) has been most seminal. Based upon their analyses of children's writing at various ages, they described hypotheses 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), which 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. Read (1971) and Chomsky (1979) have described in some detail the assumptions which tend to undergird a child's invented spellings. Harste, Burke and Woodward (1984 a & b) and DeFord (1987) 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) and Calkins (1982) have offered rich descriptions of writing development across time as students begin writing and conferencing with others. The longitudinal studies of Sulzby and her colleagues (1983a, 1985a; Sulzby, Barnhart, & Hieshima, in press; Sulzby and Teale, 1985) in general support the findings of 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 other researchers would support.

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 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 which is situation-based—namely, studies that have been willing to address the complex configurations of variables which constitute literacy events.

A number of recent studies seem to be on the verge of moving us toward a more expansive view of the child's reading and writing development. For example, in conjunction with an eight-month study exploring the nature of literacy learning among 3- and 4-year-olds enrolled in a daycare situation, Rowe (1987) 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 others' and their own 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 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. In either case, the construction of intertextual ties appeared to be supported by interaction in which (a) the activities of other authors were familiar and understandable, (b) the participants worked collaboratively to reach shared meanings through conversations, and (c) conversation and demonstration were linked to form interaction demonstrations. 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 (1983, 1985, 1986, 1988) who has explored the role of the tensions which occur as various texts (oral, written, drawings) 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. And it is our own differentiation of these competing worlds that will allow us as adults to understand the seemingly unstable worlds, the shifts of time frames and points of view, that children create. (1988, p. 356)

It is noteworthy that the studies of both Rowe and Dyson extrapolated their principles of literacy learning based upon detailed analyses of both individuals and groups across different literacy situations. These leanings concur with the implications drawn in conjunction with a longitudinal study by Galda, Pellegrini, and Cox (1989) in which a determination of the relationship among play and literacy development. Galda, et al. (1989) suggested that when literacy was defined in more global terms using general measures, including those extrapolated from past studies of literacy development, the interrelationship among play, literacy interaction, and other factors are apt to be diminished and obscured.

The past decade has been a period of enormous growth in our understanding of early literacy learning. The sheer number of studies, including longitudinal studies, focusing upon early literacy development is larger than any other 10-year period. Despite the inroads that have been made, studies of early literacy development appear to retreat to interpretations of findings reflecting one side or other of a debate about the goals of literacy. The debate involves whether children should be viewed as learning a set of stable literacy conventions based upon adult norms or whether literacy learning should be viewed as more

inventive. Whereas there appears to be little disagreement among researchers that children actively construct their own set of rules for literacy during the early years, substantial disagreements appear to exist in some of the assumptions pertaining to the goals or standards by which such rules, hypotheses, or principles are governed. In particular, whereas some researchers verge on the view that literacy learning involves acquiring adult conventions; other researchers contend that literacy should not 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. Perhaps 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.

Longitudinal Studies of Literacy Acquisition During the Beginning School Years

Several longitudinal studies of reading and writing development describe the stages students pass through as they learn to read and write in school. Clay (1966, 1982), for example, pursued a longitudinal study of children during their first year of school in New Zealand. To this end, 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 two weeks of school entry, midyear, and when the 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" (p. 28). In terms of stages, she claimed that children move from a reliance upon information from their oral language experience and knowledge of situation to the use of an expanded set of cues which include visual dimensions, word knowledge and associations of letter and sound. 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 percent

accuracy so that students will be challenged to apply a range of cues rather than rely upon a limited repertoire or for which success is dependent upon a restricted use of cues, say an overreliance upon auditory cues.

Whereas Clay's approach and findings suggest the need for a rather open-ended view of reading development, a number of studies have tended to adopt and be restrained by a priori models of reading development and a focus upon decoding. Perhaps the most elaborate longitudinal study to date was an investigation launched by the Center for the Study of Reading at the University of Illinois in 1985. To date, an interim report (Meyer, Wardrop & Hastings, 1989) detailing preliminary analyses of data from the first cohort of children through kindergarten, first grade, and second grade has been released. The primary focus of the Illinois study is on how children develop the ability to comprehend. As Meyer, et al. (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, which they have been testing. Their model assumes that various home and school factors together with student aptitude and student-initiated activity combine to influence reading comprehension development. In all, the model includes eight general constructs (home background characteristics, student's ability at the time 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 3rd 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. Using this top-down approach, the Illinois team has done 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 are what might be termed open-ended—for example, their measures of reading comprehension include cloze procedures, multiple-choice items, and so on, but do not include any type of free recall or miscue analysis. Their measures of decoding do not include a measure which addresses the students' use of decoding strategies in context. The first cohort includes 240 students from the three districts selected for study. The schools from which they were drawn represent a suburban school with diverse ethnic mix and two small Midwestern towns. While the reading programs in each school differ somewhat, they appear

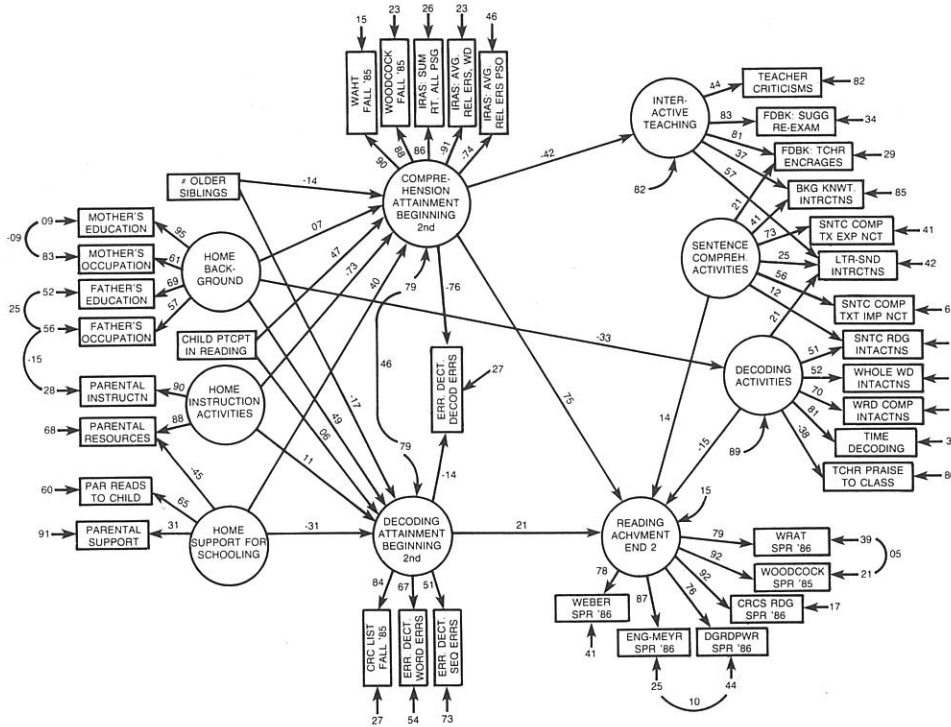


FIGURE 11-1. Final Structural Model for Second Grade Reading.

to be traditional given their alignment with a basal approach and their orientation to the teaching of skills.

Using analysis procedures that seek 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 has generated a model of the interrelationship between variables, which maximizes the variance accounted for at each grade level. Figure 11-1 represents the model generated for the 2nd grade. Tables 11-3 and 11-4 provide intercorrelational matrices of the data. As the researchers point out: the "model they 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, to date, seem 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 1st 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" (Meyer, et al. 1989, p. 49). Also, the relationship between decoding attainment, reading comprehension and activities that focus upon letters or texts became complex by the end of the 2nd grade. As Meyer, et al. (1989) pointed out, the decoding and comprehension appear to be more distinct variables by the end of the 2nd grade. That is, decoding activities tended to be less clearly related to reading comprehension and sometimes

appear to be negatively correlated. Examine, if you will, the intercorrelations between decoding and those reading comprehension indices shaded on Tables 11-3 and 11-4 versus the correlation of reading comprehension with the amount of student participation in reading and more sentence level activities. At grade 1 a similar trend is apparent. Decoding has a limited and sometimes negative relationship to comprehension. In general, these data point to an issue—the nature of the relationship between decoding and reading development—which 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 I will now turn, seem to suggest that phonics appears to bear a relationship with reading that changes across time and does not appear to be causal. By the end of the 2nd 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 synthetic phonics daily 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)

Figure 11-2, while not explicating the various nuances, details the general model that guided the selection of tests and data analysis. 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 upon 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 tends 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 2nd grade. The results of their analyses for the second grade are included on Figure 11-2.

Whereas those studies that have tended to focus upon phonemic awareness to the exclusion of other variables suggest a strong relationship between phonemic segmentation and reading achievement, those studies that 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 1st-graders in 10 classrooms. The design, which included four categories of data-diagnostic decoding tests, oral reading, and 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 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 learn what they are 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)

In recent years, a number of studies have adopted the multivariate viewpoint advocated by Calfee and Piontkowski and the possibility that the pattern of relationships between variables will vary with differences in instruction. Recently, Perfetti, Beck, Bell, and Hughes (1987) reported the results of a longitudinal study of the relationship between phonemic knowledge and reading for 1st 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 suggest that those students who were given opportunities to read progressed more and were as able to perform adequately on decoding tasks; students who received an emphasis upon decoding progressed less and their decoding abilities did not necessarily transfer to reading. Based upon 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

TABLE 11-3. Correlations of First Grade Measures of Student Ability, Classroom Process Variables, and Home Support for Literacy Development

Whole Wd Intrctng	Sntc Rdg Intrctng	Bkg Knwl Intrctng	Sntc Comp Tx Exp Nct	Sntc Comp Tx Impl Nct	Time Ded No Text	Time Ded with Text	Time Rdg in Text	Fdbk Rept Question	Fdbk Tchr Leads	Frequency Seatwork	Tchr Crit to Class	No. Adults in Home	Mother's Education	Father's Education	Mother's Occupat'n	Father's Occupat'n
1.000																
0.636	1.000															
0.302	0.515	1.000														
0.436	0.534	0.274	1.000													
0.447	0.390	0.291	0.473	1.000												
0.356	0.406	0.334	-0.166	0.087	1.000											
0.248	0.434	0.289	0.440	0.243	-0.184	1.000										
0.599	0.628	0.607	0.171	0.390	0.619	0.158	1.000									
0.244	0.138	0.185	0.480	0.077	-0.339	0.202	0.068	1.000								
0.330	0.247	0.003	0.179	0.163	-0.054	0.196	0.111	0.011	1.000							
0.002	-0.319	-0.318	0.041	0.126	-0.675	0.031	-0.333	0.270	0.095	1.000						
0.087	0.183	0.035	0.019	-0.112	0.233	0.261	-0.194	-0.154	0.009	-0.289	1.000					
-0.034	0.035	0.016	0.062	0.023	-0.097	0.058	-0.030	0.020	-0.010	0.018	-0.055	1.000				
-0.144	-0.132	-0.023	-0.138	0.035	-0.118	-0.174	-0.078	-0.119	-0.014	0.234	-0.030	-0.030	1.000			
-0.187	-0.209	-0.078	-0.211	-0.078	-0.111	-0.171	-0.109	-0.171	-0.083	0.189	-0.069	-0.017	0.640	1.000		
-0.127	-0.094	-0.056	-0.080	-0.063	-0.078	-0.155	0.070	-0.042	-0.016	0.135	0.004	-0.077	0.508	0.344	1.000	
-0.165	-0.096	-0.043	-0.161	-0.012	-0.024	-0.122	-0.066	-0.196	-0.009	0.028	0.029	0.021	0.531	0.664	0.390	1.000

TABLE 11-4. Correlations of Second Grade Measures of Student Ability, Classroom Process Variables, and Home Support for Literacy Development

	WRAT Fall '85	Woodcock Fall '85	IRAS: Avg Ret Ers, WD	IRAS: Avg Ret Ers, PSC	IRAS: Sum Rt all PSC	Err Dect Word Ers	Err Dect Decode Ers	Circ List Fall '85	Wat Spr '86	Woodcock Spr '86	Cres Rdg Spr '86	Dg Rd Pwr Spr '86	Eng-Meyer Spr '86	Weber Spr '86	Mother's Education	Father's Education	Mother's Occupat'n	Father's Occupat'n	
WRAT Fall '85	1.000																		
Woodcock Fall '85	0.825	1.000																	
IRAS: Avg Ret Ers, WD	-0.855	-0.774	1.000																
IRAS: Avg Ret Ers, PSC	-0.696	-0.588	0.710	1.000															
IRAS: Sum Rt all PSC	0.769	0.804	-0.795	-0.623	1.000														
Err Dect Word Ers	0.398	0.289	-0.335	-0.369	0.277	1.000													
Err Dect Decode Ers	-0.781	-0.683	0.828	0.774	-0.706	-0.477	1.000												
Circ List Fall '85	0.376	0.353	-0.412	-0.303	0.339	0.339	-0.392	1.000											
Err Dect Sntc Ers	0.435	0.439	-0.308	-0.376	0.396	0.590	-0.488	0.416	1.000										
Wat Spr '86	0.811	0.711	-0.592	-0.598	0.642	0.304	-0.616	0.277	0.351	1.000									
Woodcock Spr '86	0.729	0.756	-0.697	-0.598	0.687	0.370	-0.676	0.368	0.497	0.759	1.000								
Cres Rdg Spr '86	0.725	0.701	-0.738	-0.616	0.709	0.403	-0.717	0.370	0.554	0.712	0.803	1.000							
Dg Rd Pwr Spr '86	0.534	0.634	-0.519	-0.426	0.557	0.291	-0.479	0.372	0.467	0.555	0.787	0.795	1.000						
Eng-Meyer Spr '86	0.623	0.657	-0.530	-0.542	0.643	0.355	-0.620	0.330	0.544	0.640	0.787	0.795	0.744	1.000					
Weber Spr '86	0.589	0.543	-0.614	-0.528	0.513	0.391	-0.620	0.312	0.442	0.587	0.696	0.714	0.535	0.687	1.000				
Mother's Education	0.136	0.213	-0.182	-0.145	0.188	0.180	-0.201	0.208	0.340	0.168	0.272	0.258	0.358	0.280	0.289	1.000			
Father's Education	0.065	0.074	-0.098	-0.071	0.050	0.141	-0.096	0.091	0.150	0.120	0.209	0.161	0.231	0.177	0.132	0.187	1.000		
Mother's Occupat'n	0.172	0.220	-0.197	-0.202	0.220	0.117	-0.177	0.157	0.230	0.205	0.226	0.196	0.255	0.232	0.257	0.232	0.201	1.000	
Father's Occupat'n	-0.094	-0.121	0.165	0.075	-0.113	-0.010	0.103	-0.142	-0.025	-0.124	-0.099	-0.107	-0.089	-0.089	-0.031	-0.041	-0.028	0.055	1.000
# Older Siblings	-0.059	-0.035	0.058	0.062	-0.022	-0.062	0.059	0.006	0.054	0.008	-0.008	0.010	0.017	0.017	-0.017	0.245	-0.090	0.268	0.148
Par Reads to Child	0.147	0.131	-0.140	-0.133	0.126	0.024	-0.131	0.110	0.054	0.148	0.183	0.208	0.191	0.175	0.151	-0.010	0.040	-0.158	-0.149
Child Prept in Reading	-0.007	0.075	0.031	-0.025	-0.023	-0.008	0.011	0.054	0.046	0.057	0.066	0.027	0.036	0.005	0.095	0.179	0.191	0.075	0.057
Parental Resources	0.068	0.036	-0.111	-0.019	0.101	0.010	-0.062	0.100	0.059	0.114	0.114	0.087	0.037	0.031	0.095	0.005	0.007	0.075	0.057
Parental Support	-0.147	-0.154	0.169	0.080	-0.229	0.016	-0.062	-0.033	-0.078	-0.160	-0.138	-0.180	-0.177	-0.189	-0.092	-0.005	0.007	-0.158	-0.096
Parental Instruct	-0.120	-0.186	0.176	0.129	-0.180	0.222	0.129	-0.065	-0.094	-0.125	-0.125	-0.140	-0.177	-0.166	-0.092	-0.147	-0.158	-0.158	-0.096
Ltr-Snd Instruct	-0.068	-0.165	0.093	0.084	-0.115	0.045	0.054	0.009	0.112	0.129	0.096	0.125	0.024	0.067	0.205	-0.083	-0.148	-0.174	-0.089
Whole Wd Instructs	-0.120	0.077	-0.086	-0.120	0.041	0.102	-0.150	0.078	-0.064	-0.116	-0.101	-0.106	-0.107	-0.099	0.205	-0.058	-0.147	-0.174	-0.089
Sntc Rdg Instructs	-0.161	-0.199	0.158	0.067	-0.201	0.046	0.078	0.029	-0.064	0.074	0.101	0.050	-0.049	-0.007	0.205	-0.083	-0.148	-0.129	-0.089
Bkg Kowl Instructs	0.155	0.076	-0.165	-0.104	0.139	0.059	-0.165	0.096	0.041	0.074	0.101	0.050	-0.049	-0.007	0.205	-0.083	-0.148	-0.129	-0.089
Sntc Comp Tx Exp Nct	-0.001	0.014	-0.048	-0.101	0.030	0.041	-0.096	0.090	0.012	0.034	0.106	0.091	0.061	0.103	0.035	-0.235	-0.136	-0.134	-0.165
Sntc Comp Tx Imp Nct	0.007	-0.009	0.015	-0.036	0.008	0.091	-0.016	0.090	0.090	0.015	0.041	0.023	0.001	0.046	0.035	-0.235	-0.136	-0.134	-0.165
Time Decoding	0.111	0.021	-0.073	-0.022	0.033	0.048	-0.069	0.044	0.000	0.036	-0.046	0.032	-0.210	-0.111	0.015	-0.069	-0.073	-0.147	-0.114
Fdbk: Tchr Encrages	-0.233	-0.286	0.243	0.212	-0.280	-0.004	0.202	-0.102	-0.195	-0.180	-0.241	-0.248	-0.215	-0.224	-0.146	-0.127	-0.215	-0.059	-0.082
Fdbk: Sngg Re-exam	-0.249	-0.306	0.305	0.209	-0.300	-0.011	0.261	-0.062	-0.140	-0.189	-0.258	-0.310	-0.254	-0.307	-0.227	-0.195	-0.194	-0.022	-0.032
Tchr Praise to Class	0.156	0.167	-0.153	-0.043	0.158	0.054	-0.120	0.072	0.116	0.137	0.106	0.147	0.146	0.126	0.014	0.254	0.205	0.178	0.219
Teacher Criticisms	0.154	0.144	0.159	0.167	-0.113	-0.092	0.154	-0.069	-0.221	-0.124	-0.128	-0.175	-0.060	-0.110	-0.135	-0.079	-0.055	0.033	0.004

TABLE 11-4. Correlations of Second Grade Measures of Student Ability, Classroom Process Variables, and Home Support for Literacy Development

	# Older Siblings	Par Reads to Child	Child Prct in Reading	Parental Resources	Parental Support	Parental Instructn	Ltr-Snd Instructn	Whole Wd Instructn	Sntc Rdg Instructn	Bkg Kwvl Instructn	Wrd Comp Instructn	Sntc Comp Tx Exp Nct	Sntc Comp Tx Imp Nct	Time Decoding	Fdbk: Tchr Enc'rages	Fdbk: Sugg Re-exam	Tchr Praise to Class	Teacher Criticisms
# Older Siblings	1.000																	
Par Reads to Child	0.021	1.000																
Child Prct in Reading	-0.060	0.054	1.000															
Parental Resources	-0.090	0.114	0.451	1.000														
Parental Support	-0.002	0.201	0.092	0.195	1.000													
Parental Instructn	-0.102	0.404	0.359	0.431	0.203	1.000												
Ltr-Snd Instructn	0.059	-0.105	-0.034	0.002	0.040	0.079	1.000											
Whole Wd Instructn	0.083	-0.200	-0.049	-0.006	-0.085	-0.023	0.321	1.000										
Sntc Rdg Instructn	-0.047	-0.071	0.034	0.072	0.078	-0.030	0.316	0.021	1.000									
Bkg Kwvl Instructn	0.123	-0.074	-0.028	-0.042	-0.147	0.039	0.394	0.238	0.066	1.000								
Wrd Comp Instructn	-0.023	-0.165	0.027	0.035	0.093	-0.086	0.331	0.367	0.407	0.128	1.000							
Sntc Comp Tx Exp Nct	-0.017	-0.060	0.012	-0.014	0.001	0.024	0.303	0.084	0.242	0.356	0.163	1.000						
Sntc Comp Tx Imp Nct	0.060	-0.146	0.007	0.047	0.022	-0.064	0.253	0.380	0.202	0.357	0.354	0.448	1.000					
Time Decoding	-0.033	-0.151	-0.073	-0.027	0.062	-0.064	0.517	0.576	0.417	0.145	0.621	0.179	0.239	1.000				
Fdbk: Tchr Enc'rages	0.062	-0.049	-0.103	-0.039	-0.067	0.048	0.609	0.235	0.269	0.430	0.229	0.221	0.223	0.285	1.000			
Fdbk: Sugg Re-exam	0.095	-0.067	-0.070	0.051	0.035	0.133	0.559	0.290	0.260	0.358	0.226	0.020	0.204	0.311	0.659	1.000		
Tchr Praise to Class	-0.063	0.176	-0.021	-0.031	-0.026	0.067	-0.395	-0.101	-0.270	-0.212	-0.301	-0.211	-0.033	-0.269	-0.116	-0.152	1.000	
Teacher Criticisms	0.032	-0.031	-0.073	-0.126	-0.087	0.009	0.461	0.115	-0.007	0.166	0.233	0.018	-0.155	0.124	0.348	0.243	-0.382	1.000

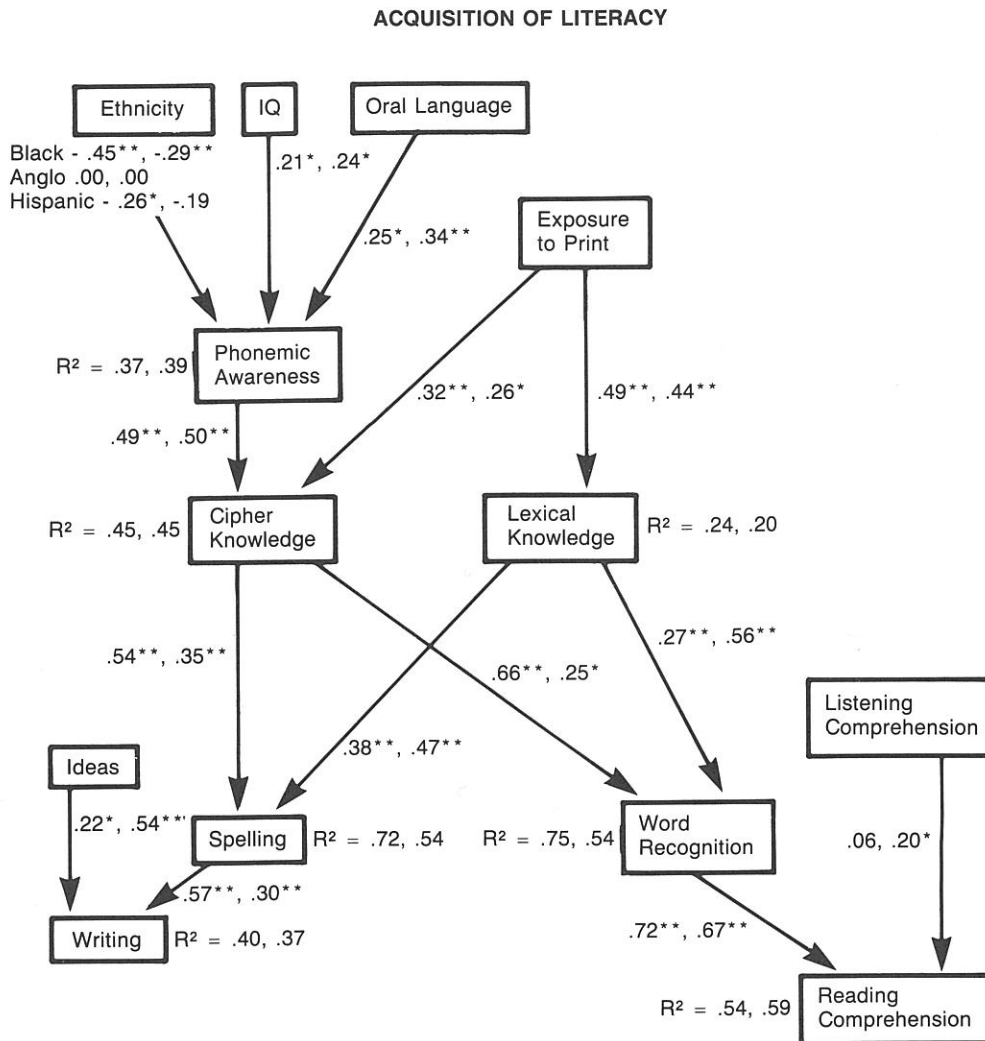


FIGURE 11-2. Path analysis of proposed model of literacy acquisition. (Path coefficients for the straight arrows are standardized regression coefficients. The first listed number represents first grade, and the second number represents second grade. * $p < .05$. ** $p < .01$.)

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. (p. 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.

Studies by Mason (1980) and by Maclean, et al. (1987) make a similar argument based upon their pursuit of the origins of

phonological awareness. Mason (1980; Mason & McCormick, 1979; 1981) has reported a number of studies in which she has examined the reading development of students enrolled in informal preschool and nursery school situations. Based upon 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) has argued that the progress that students appear to make in knowledge of reading and skill in recognizing and reading words can best be described as involving three levels. As she stated:

The changes made in knowledge of reading and skill in recognizing letters and words, spelling and writing were best described in terms of three levels of development. 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. Mason defines third-level children as readers; first and second-level children as prereaders. (pp. 515-516)

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 1st and 2nd 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. (1981) adopted a longitudinal approach in hopes of assessing changes in automaticity of letter and word recognition across skilled and less skilled readers in the 1st 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, April for experiment one; December, April for experiment two) for two groups of first graders ($n = 24$ for both experiment one and 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 1st 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 1st 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.

The sheer number of longitudinal studies of beginning reading that have focused upon the acquisition of decoding skills suggest certain preoccupations. 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 which have barely been touched upon. They include: child's 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. A second preoccupation of these studies has been the tendency to isolate reading from the other language arts. For example, to date, there exists a dearth of longitudinal studies that examine the interface between early writing development and reading development despite the belief

originally espoused by Chomsky (1979) that children will learn to read by writing. As she stated:

Children who have been writing for months are in a very favorable position when they undertake learning to read. They have at their command considerable phonetic information about English, practice in phonemic segmentation, and experience with alphabetic representation. These are some of the technical skills that they need to get started. They have, in addition, an expectation of going ahead on their own. They are prepared to make sense, and their purpose is to derive a message from the print, not just to pronounce the words. (pp. 51-52)

Certainly, several descriptive studies suggest that there is a strong interface between reading and writing during these years, but careful study using longitudinal procedures are lacking.

A related problem is that very few longitudinal studies of writing exist and those that do tend not to examine writing and reading together. In fact, studies of writing development during the beginning school years have been dominated by cross-sectional comparisons of students varying in age or ability rather than studies that have looked at the same children at different ages. Perhaps the only exceptions to that are the studies by Loban reported in the next section and the work by Rentel and King (1983) and Hilgers (1986) which represent rather disparate concerns and approaches.

In Hilger's study (1987), four children were studied repeatedly as they evaluated pieces of writing in hopes of gleaning 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 was 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. Often, opportunities to discuss certain skills seemed tied to their use.

In the Rentel and King study (1983), written narrative texts were elicited from 36 children stratified by sex, socioeconomic class, dialect, and school at intervals of four months over the children's first four 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 text was tied 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.

Our initial expectations of coherence in children's texts probably were not unlike those of most adults. Nor is it likely that our views differed significantly from those held by teachers. Adult expectations are in part probably the product of generalizing from the problems that children seem most concerned about at the outset of learning to write: spelling, orientations, editing, and topic. (p. 31)

Taken together, the longitudinal studies of literacy development during the beginning school years are quite sobering. One should be sobered by the problems associated with these sets of longitudinal studies—especially the shortcomings arising due to problems with scope. Since longitudinal studies have the potential to include an enormous number of variables, most researchers have chosen to restrict themselves by adopting *a priori* models of literacy development that limit the number of variables. Without discounting the worth of these separate studies, as a set they suggest a predilection with phonics to the exclusion of other variables. Reconsider the studies of literacy development during the years prior to formal schooling. Unlike studies dealing with early literacy development, the studies addressing the school years have adopted a rather narrow view of literacy and a restricted and rather static view of its sociosemiotic character or situation-based variation.

A related problem pertaining to measurement—most of the longitudinal studies of literacy during the early school years have developed or selected tests with certain assumptions. The question arises: Are these assumptions considered tenable? Are these assumptions predisposed to a certain view of literacy development? Rather than being open-ended without preset notions, the goals of most of the aforementioned research has been largely to prove a model rather than develop one. Furthermore, such recurring tendencies make syntheses across studies difficult lest recurring results may be more a sign of repeated error than reemerging truth.

Take, if you will, the findings pertaining to phonics. It is appearing to conclude that while one or two studies may point to the important role played by phonics in early literacy development, the studies as a set suggest that over time phonics offers little advantage and some disadvantages. In particular, by the end of 2nd grade, students receiving a reading-for-meaning emphasis appeared to be better comprehenders yet did not appear to lack phonic segmentation abilities. As stated earlier, phonics appears to bear a relationship with reading which changes across time and which does not appear to be causal. But can

such synthesis be assumed? Are such studies comparable or collapsible? Would different sets of measures of different kinds of analyses or different points of view yield different results, sets of results, and syntheses?

Longitudinal Studies Directed at the Study of Reading and Writing in Later Years

The number of longitudinal research studies quickly diminishes as the focus of such studies becomes the student moving through the elementary school, high school, or college. As the focus of the child's learning moves away from beginning reading and writing, so extrapolations about development have tended to depend almost solely upon 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 students might advance their own learning toward the aspirations which are 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. Johnson (1985) pursued a case study of an adult who had minimal reading abilities. 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.

In recent years there appears to have been an increase in what might be termed program evaluations and the use of longitudinal methodology to follow up on the lasting impact of a program. Central to such pursuits is an examination of trends across time. For example, researchers will trace the progress of students who were returned to the regular classroom after being involved in programs such as Reading Recovery—a program for "at risk" students. At the heart of these program evaluations is a concern for enduring effects including whether or not the program has worked. In addition, any other advantages or disadvantages can be noted. There are two reasons why such studies were excluded from the present view. First, the number of such studies would require a review beyond the scope of this paper. Second, with very few exceptions, program evaluations focus almost solely on a program's effectiveness and not upon the nature of change across time.

Essentially only a few 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 until 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 are developed by Wells. One theme he develops throughout the book is the notion that children need to be equal partners in conversation if they are to succeed. He argues 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 argues that a child's contributions should be taken seriously, that they should be viewed as and encouraged to be active meaning makers. A second theme is tied to what Wells describes as the most striking finding from the whole longitudinal study—their finding that achievement of children varied little from the time they entered elementary school to the time they ended (p. 147) 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 argues that it is not the mechanics of literacy that were important, but the purposes for reading and writing that the child had acquired. In turn, a third major theme developed by Wells was that the single most important activity that parents can pursue is reading or telling stories. Storying, he argued, is "sustained meaning-building organization of written language." p. 151. In accordance with this view, he reiterates a concern for the gulf between schools and home, which he uses as a basis for drawing the implication with which he effectively closes his story of these children:

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 exact counterpart in other countries, a longitudinal study conducted by Loban in the 1950s and 1960s has numerous parallels. In the 1950s and 1960s 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. (p. 1)

In particular, Loban delineates patterns of growth in language and details 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, similar to Wells, found that later success followed from earlier achievements. Just as Wells argued that later success was dependent upon 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, which appeared to detract from facilitating ongoing language learning.

Finally, a study by Fitzgerald, Spiegel and Webb (1985) represents a worthwhile attempt to examine one of the numerous findings arising from the cross-sectional research on reader's understanding—in particular, they focus upon the nature of the readers' understanding of stories. To this end, at the beginning of both the 4th and 6th grades, they had 30 subjects respond to two stories that were presented in scrambled form. Knowledge of structural features was determined mainly by structural complexity in story productions and the degree to which scrambled stories were restructured into canonical versions. Knowledge of story content was examined in the story productions by determining the amount and nature of conflict, conflict resolution and by analyses of actions occurring in the stories. Their data yielded no important differences in terms of changes in the students knowledge of the content of stories (knowledge of conflict, response, and resolution did not seem to change from a rather restricted range—especially use of internal conflict), but did suggest that students had increased in their knowledge and use of complex story structures. They made greater use of embedded episodes, used the various story categories more often and appeared to use their knowledge of story structure to aid in recall.

Concluding Remarks

In the introduction of this paper I 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 upon a comparison of literacy learners at different ages, ability levels, and so on. I have stressed that such comparisons may be problematic if your goal is to understand how a literacy learner advances from one age to another or from one ability to another and so on. A number of the longitudinal researchers cited here attest to the fact that when they studied the same literacy learners across time 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.

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. Furthermore, meanings seemed 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 meaning making experiences that challenge the child in the context of making meaning to use these cues, skills and systems.

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. Such 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 which 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 often precludes 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, which is then validated, rather than a more open-ended approach to modelling 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 in longitudinal studies of assuming that comparisons across age levels and abilities will avail themselves. Certainly longitudinal studies do not involve making inferences based upon 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.

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