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ABSTRACT

A longitudinal study examined the contributions of early language ability, home characteristics, and emerging knowledge about literacy to children's later decoding and comprehension ability. The study followed 127 children from the beginning of kindergarten to the end of grade 3 (when 83 were left). Subjects attended schools in a small, rural, midwestern town or a low-income area of a small midwestern city. In one of two sets of regression analyses, baseline measures collected at the beginning of kindergarten were used as predictors of reading ability at the next five time periods: end of kindergarten, beginning of first grade, and at the ends of first, second, and third grade. In the second set of analyses, the same baseline measures and measures of reading ability at the end of each time period, predicted reading ability for each subsequent time period. Results indicated that: (1) individual differences in decoding ability have little effect on children's reading comprehension, and vice versa; (2) early language understanding predicts reading comprehension; (3) emerging knowledge about reading predicts subsequent decoding ability; (4) children's early interest in and involvement in literacy predicts gains in reading; and (5) home problems had a negative prediction on reading. Findings suggest support for integrating cognitive processing models, developmental models, and social constructivist models. (Thirteen tables and three figures of data are included; 50 references, a parent questionnaire, and a summary of information from the parent questionnaire are attached.) (Author/RS)

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Abstract

Children from two communities participated in a longitudinal study that examines the contributions of early language ability, home characteristics, and emerging knowledge about literacy to children's later decoding and comprehension ability. In one of two sets of regression analyses, baseline measures collected at the beginning of kindergarten were used as predictors of reading ability at the next five time periods: end of kindergarten, beginning of first grade, end of first grade, end of second grade, and end of third grade. In the second set of analyses, the same baseline measures, in addition to measures of reading ability at the end of each time period, predicted reading ability for each subsequent time period. These two sets of analyses were run to separate the potential pervasive influence of early baseline measures from year-to-year gains in reading. Results show that (a) individual differences in decoding ability have little effect on children's reading comprehension, and vice versa; (b) early language understanding predicts reading comprehension; (c) emerging knowledge about reading predicts subsequent decoding ability; (d) children's early interest in and involvement in literacy predict gains in reading; and (e) home problems that were identified at the beginning of kindergarten have a negative prediction on reading. These results are discussed in relation to existing models of reading development.

TOWARD AN INTEGRATED MODEL OF EARLY READING DEVELOPMENT

In what ways do young children use their early knowledge about language and emerging literacy concepts to learn to read? To what extent does early language and literacy knowledge explain later reading success and failure, as compared to knowledge gained during schooling? Might early differences in knowledge about language and literacy processes and procedures help to explain the inordinate difficulties some children have learning to read? These questions, which have been asked for years, are still being addressed, for the process of learning to read continues to be debated. We believe that by comparing contrasting models in the light of reading development data, we can answer some of these questions.

Currently, there are contrasting perspectives for explaining individual differences in early reading development, with each explaining limited aspects of the overall process of learning to read. Proponents of each perspective are particularly vocal regarding either the beginning steps or the ontogenesis of the overall reading process. Corollary instructional procedures are presented with equal zest. The danger of these ongoing debates lies in perpetuating the assumption that one perspective should gain credibility at the expense of another.

Longitudinal studies of beginning reading may be the best way to connect divergent models of the reading process with instructional practice. Longitudinal studies divulge children's actual development and their shifts in different aspects of reading competency. Reading in its broader context can thereby be analyzed and judged with respect to individual differences, family support, and school instruction. In choosing to conduct a longitudinal study, we hoped to support some aspects of all models, thus allowing realignment of components of the various perspectives.

In the following section, we describe three different perspectives about the reading process that represent developmental models, cognitive processing models, and social constructivist models. For each model, we present examples and explanations of what reading is, what readers must know, and how knowledge is acquired. Following the descriptions, we discuss how proponents of each model gather evidence to support their model and how these procedures may lead to limitations for explaining aspects of reading proficiency. We then present our longitudinal study of reading development and show how it provides support for integrating the three perspectives.

Developmental Models

Developmental models are based on the premise that beginning readers process information differently from mature readers. Proponents of this model, including Biemiller (1970), Chall (1983), Ehri (1985), Fries (1963), Gough, Juel, and Roper/Schneider (1983), Mason (1980), and Webber (1970), explain the progression of stages or phases inherent in the development of word-reading ability as a necessary prerequisite to proficient reading. Although proponents of developmental models differ in the number of stages or levels of development they identify, and in their explanations about the shift to each higher functioning stage level, they share a notion of discrete changes in knowledge and the primacy of letters and letter sounds in the development of word reading that leads to an instructional emphasis on phonological awareness. In fact, according to recent reviews of the developmental perspective (Adams, 1990; Ehri, 1991; Juel, 1991), an awareness of the alphabetic nature of our written language, particularly its symbol-sound correspondence, is at the heart of developing ability. Ehri (1991) suggests that the sequence of development for unlocking the pronunciation of printed words be described as *logographic*, *alphabetic*, and *orthographic* (from Firth, 1985).

At the *logographic* stage, children attend to overall visual characteristics of words but not the letters per se. They learn words in context, such as environmental print words, and they learn some personally important words, such as their names. Drawing on work by Downing (1979) and by Gough and Hillinger (1980), Juel (1991) argues that to function at this stage, children must gain critical insights into communicative functions of print and learn to connect and apply features they already know about communication and language to the writing system. Although children may quickly recognize that oral and written language have similar functions of communicating with others and communicating (recording information) for oneself, it may not be obvious to them that print is encoded speech, how speech is broken into words, or how words are encoded as letters and ... is. At the *alphabetic* stage, children begin to encode speech in terms of grapheme-phoneme relations, enabling them to identify, remember, and spell words using letter and letter-sound information. They realize (a) how to pair spoken with written words, (b) how to recognize some words based on letters, and (c) how letters (graphemes) in words represent specific sounds (phonemes) in words.

At the *orthographic* stage, children realize that spelling patterns recur across words. They become able automatically to recode words with similar letter sequences for both spelling and reading, and they can apply knowledge about letter-sound and letter-cluster patterns to figure out how to read and spell new words.

Many of these insights are based on knowledge about language that is acquired in the preschool years. Activities such as labeling of objects, categorizing and defining words, and telling and hearing stories are thought to be sufficient to induce a number of children to reach the alphabetic stage, realizing that words contain phonemes that can be matched to letters. Beyond this time, typically through instruction in first grade, nearly all children move through the alphabetic and orthographic stages and so are able to use spelling-to-sound correspondences to remember and recognize new words. Thus, proponents of developmental models recommend that kindergarten teachers acquaint children with letters and letter sounds, and that first-grade teachers teach the recognition of phonemes in words and the coding of letters and letter groups as sound patterns, both for spelling words and for blending sounds into words.

However, there are limitations to developmental models. These models have not resolved questions about appropriate contexts for learning words or about the nature of support from adults, probably because the models are derived primarily from research on children's attempts to read and spell isolated words. Moreover, these models either do not consider comprehension or assume that it is readily accessible by children when they are being taught to read. This narrow view discourages the study of development from a more holistic perspective, such as in relation to language and listening comprehension development, or in coordination with home and school contexts for literacy learning.

Cognitive Processing Models

Cognitive processing models of word recognition draw on evidence of processes used by proficient readers to delineate the skills needed by beginning readers. However, the models differ in a number of ways that are beyond the scope of this brief review. Some feature an interactive processing system (Rumelhart & McClelland, 1981), whereby letters and words, letters and phonemes, and phonemes and words are linked, that is, processed interactively. A major concern in these models is the nature of the process and whether it is a single or dual process. All words may be recognized the same way or different processes may be used for recognizing common words, regular-patterned words, and uncommon words. Also important are questions regarding the representation of meaning and the use of text context in word recognition (Perfetti, 1992), connections between reading and spelling (Ehri, 1991), and processing impairments (Rack, Snowling, & Olson, 1992; Seidenberg, 1992; Stanovich, 1990).

Questions about the nature of word-recognition processing do not change the assumption of an instructional focus on analysis of words into letters and sounds for beginning readers. Individual

differences in reading are still explained principally by differences in decoding ability, because research on adults' reading abilities has shown that excellent reading comprehension skills, such as context prediction, inferential reasoning, and vocabulary knowledge, are seldom, if ever, found when word-analysis skills are deficient (Stanovich, 1990). The importance of word-analysis skills is based on cognitive models of the reading process "virtually all of which embody some type of hierarchical structure whereby the meanings activated by the successful recognition of words (the process of lexical access) are the building blocks for subsequent comprehension processes" (Stanovich, 1990, p. 419).

Letter and letter-sound instruction is an enabling subskill in early reading, making it possible for the beginning reader to discover and exploit the alphabetic principle. As reading skill develops, word recognition "via direct visual access occurs more autonomously, and other knowledge sources tend to interact only with the outputs of completed word recognition, not with the word-recognition process itself" (Stanovich, 1986, p. 377).

Whereas cognitivists focus on individual processing competencies of comprehension and word recognition to explain abilities to recognize words and to comprehend texts, they are not particularly interested in developmental issues. They seldom consider the effects of young children's language understanding on beginning or later reading, relying instead on adult competency to model learning. Moreover, they do not consider the effects of environmental, social, and contextual features. These features are needed "only to help discover the nature of the underlying psychological realities; they are not theoretically essential to characterizing those structures and capacities themselves" (Williams, 1989, p. 109).

Although cognitivists include listening comprehension and more general language knowledge in their models, they do not use connections between aspects of language and reading acquisition to explain differences among beginning readers. This is because they assume language competency to be adequate for learning to read. So, similar to developmentalists, cognitivists assume that the acquisition of the alphabetic principle is central to learning to read. Therefore, they assume that phonological awareness rather than more general language competencies initiate reading and that not learning how to use phonetic information explains reading failure.

Social Constructivist Models

A third set of models of reading can be articulated from Vygotsky's theory of social cognitive development (Vygotsky, 1934/1986, 1978). Vygotsky based his theory on the notion that cognitive development occurs through use of language in a social community (Wertsch, 1985). This is explained in Vygotsky's general genetic law of cultural development:

> Any function in the child's cultural development appears twice, or on two planes. First it appears on the social plane, and then on the psychological plane. First it appears between people as an interpsychological category, and then within the child as an intrapsychological category. This is equally true with regard to voluntary attention, logical memory, the formation of concepts, and the development of volition. (Vygotsky, cited by Wertsch, 1985, p. 11)

One offshoot of this general law, as well as the explanation of how children can learn about reading before gaining the necessary cognitive resources to carry out the activity, is found in the notion of the *zone of proximal development* (ZPD). The ZPD is defined as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). Children can participate in reading activities through sustained

social interactions with knowledgeable others. Support, or scaffolding, that is provided enables children to be involved in reading tasks that are too difficult to accomplish alone.

> Another important corollary of this general law is that a learning activity is good only when it proceeds ahead of development, when it awakens and rouses to life those functions that are in the process of maturing or in the zone of proximal development. It is in this way that instruction plays an extremely important role in development. (Vygotsky, cited by Wertsch & Stone, 1985, p. 165)

Thus, involvement in reading that stretches but does not overwhelm the child's understanding provokes knowledge about its process and leads eventually to a higher conceptual plane and to new consciousness about the process.

A third aspect of the theory is that

> in the process of development, children begin to use the same forms of behavior in relation to themselves that others initially used in relation to them. . . . The validity of this law is nowhere more obvious than in the use of the sign. A sign is always originally a means used for social purposes, a means of influencing others, and only later becomes a means of influencing oneself. (Vygotsky, cited by Wertsch & Stone, 1985, p. 165)

By applying Vygotsky's (1934, 1986) explanation of concept development to reading development, we can say that written words function at first as referents, that is, as indicators of objects designated by the word. Later, words take on deeper meanings or expressions and are represented categorically. As a result, children's understanding may at first be relatively simple and context-bound, describing a sign-object relationship even when adults are employing more complex relationships. Although, as they read with children, adults introduce interrelated linguistic categories, the children may at first only realize the simplistic connection between word and object, or referential agreement (Soderbergh, 1977). In the process of internalizing reading constructs, however, the children gradually form more complex understandings.

Evidence to support the application of a social constructivist model to literacy learning is based on research showing the benefits of adult-supported learning (Cook-Gumperz, 1986; Lave & Wenger, 1991; Rogoff, 1990). A great deal of early literacy activity occurs in highly familiar situations, that is, in literacy-related activities that are routinized, contextualized, and shared. Storybook reading, alphabet book and block activities, language games, and shared writing activities are a few prominent examples. According to Bruner (1985), the adult and child are then fully engaged, there are fairly easily recognized intentions, and the adult can easily adjust his or her hypotheses about what the child understands and provide effective scaffolding for the child. This has been documented in a number of parent-child and teacher-class book reading and story retelling interactions. (For a review, see Kerr & Mason, in press.)

The force on reading development of the social context at home and in the early school years has also been studied by Heath (1983) and Wells (1985), but processing variables of import have yet to be fully articulated. A confluence of home and school background factors that share contextual and interactional characteristics is likely to include parent-child talk about literacy and language, availability of appropriate literacy materials, social status of the family, book reading to children, and child involvement and interest in literacy.

The social constructivist models are still emerging from interdisciplinary work in cognitive and literacy development, sociology, and anthropology, and descriptive studies of emergent literacy development. Although they are concerned with social-interactional factors related to learning,

they have not explained how individual differences in learning to read and individual processing of written text and acquisition of word reading are related to interactive learning processes and settings. Thus, these models cannot explain how learning to read is affected by the nature of literacy learning within home and school language contexts, nor which social constructs surrounding the learning tasks would predict later reading.

Comparison of Reading Models with a Longitudinal Study

We carried out a four-year longitudinal study of children's reading development to determine (a) how beginning-of-kindergarten measures of language understanding, early reading knowledge, and home background characteristics explain reading development from the end of kindergarten to third grade; (b) how grade-to-grade tests predict and explain reading development; and (c) how high- and low-achieving readers develop over time.

We began the study in the first month of children's kindergarten year so as to capture their entering-school interests and abilities. We engaged them individually with lengthy and varied tasks to measure their literacy and language competencies in order to have robust measures for predicting emerging decoding and reading comprehension abilities. We asked parents to fill out a lengthy questionnaire so that we could include effects of family support and children's early literacy involvement in our prediction model. We expected these analyses to provide a more complete explanation of reading development than has been evident from the three models.

Method

Subjects

The children in this study came from classrooms in two communities. Four classrooms with a half-day kindergarten program were in a district serving all children of a small, rural midwestern town. Two classrooms with a whole-day kindergarten program were in a magnet school situated in a low-income area of a small midwestern city. Most of the children from the town school were from low- or middle-income families, whereas about half of the city children were from low- or middle-income families and half were from higher income, professional families. One-hundred-eleven of the children were white. One town child and 14 city children were African-American. One city child was Asian, and there were no Hispanic children in either the town or city sample. Data were collected on 127 children at the beginning and end of kindergarten. At the end of first grade, there were 109 children in the sample, by the end of second grade, there were 98 children, and at the end of third grade, there were 83 children. An approximately equal proportion of city and town children remained in the sample. Comparisons on entering measures of children who were dropped from the study with those who remained for the four years indicated that children who moved away were not dissimilar in entering abilities from those who remained, but that about 5 of the lowest scoring children who remained in the schools but were dropped from the study had been placed in special education classes or had repeated a grade.

The two kindergarten teachers in the town school provided whole-class reading instruction based on daily use of Alpha-time, a commercial letter-identification program, followed by reading readiness booklets, preprimers, and primers from the Houghton Mifflin reading program. Whole-class instruction was continued in the next three grades, with children taught from the Houghton Mifflin program.

Instruction in the city school was characterized in kindergarten by a focus on individual and peer-shared reading using Modern Curriculum Press materials. Listening to storybooks was also important in kindergarten. In later grades, the instruction included art, music, and foreign language enrichment. One kindergarten teacher focused on predictable books that children learned to read and share with peers,

language experience stories, and storybook listening experiences. The other kindergarten teacher engaged children in storybook listening and discussion activities, with writing, art, and music extending the program. The Houghton Mifflin basal reading program was used in first through third grades, with children typically taught in small groups, grouped by ability. A Chapter 1 program augmented regular instruction for low-performing students.

Procedures and Preliminary Analysis

In the fall of the kindergarten year, parents filled out a questionnaire on home literacy and family background, and each child was administered tests of language and early reading. Subsequent reading tests were administered to the children at the end of kindergarten, the beginning and end of first grade, and the end of second and third grade. (See the Appendix for information about the questionnaire and Table 1 for details about the assessment measures.)

[Insert Table 1 about here.]

Parent questionnaire. Each parent was given a 59-item questionnaire (Mason, Bhavnagri, & Meyer, 1983) to fill out and return to the school or to send directly to the researchers. Through persistence, responses were eventually obtained from 96% of the families. Thirty-seven of the questions focused on home literacy to obtain estimates of the nature of parental support for literacy and of children's interest and involvement in reading and writing. Estimations of family social class were obtained from 5 questions about fathers' and mothers' education and occupations. Estimations about home climate were obtained from 17 questions about the child's strengths and problems, preschool and after school care, and size and makeup of family.

Assessment measures. To assess early reading, each child was individually administered the Wide Range Achievement Test (WRAT) (Jastak, Bijou, & Jastak, 1978) and an Early Reading Test (ERT), modified from an unpublished test by Mason and McCormick (1979). The WRAT evaluates letter-name knowledge as well as the ability to read words in isolation. The ERT consists of measures of letter identification, environmental print reading, spelling, common word reading, pseudoword reading, and story reading.

The children were administered an unpublished language understanding survey, which contains measures of word classification, analogy definition, sentence memory, listening comprehension, and language communication designed to gauge diverse language abilities. Items from IQ tests of analogy, classification, and word definition were modified to assess word-analysis abilities. Children had to produce analogies and simple syllogisms and categorize and define familiar words. A sentence repetition task, also drawn from an IQ test item, and a listening comprehension test (CIRCUS--Listen to the Story, Level A) (Educational Testing Service, 1976) assessed memory and interpretation of sentential and text units by requiring children to remember sentences or short texts and repeat the sentences or choose a picture that answers a text question. A picture-story construction and two picture-interpretation tasks (Mason & Meyer, 1983) assessed text understanding and communication abilities. In the picture-story construction task, children told a story from correctly ordered four-picture sets. In one of the picture-interpretation tasks, children answered questions about pictured events and then judged their certainty about their answer. In the other picture task, they explained what didn't belong in each of four pictures, why it didn't belong, and how it could have gotten there. These last two tasks were omitted from the analysis because of concern about reliability of scoring.

The ERT was administered four times. The beginning of kindergarten (Time 1) test contained tasks of spelling, high-frequency words, pseudowords, environmental print words, and storybook reading. Spelling was assessed with 6 three- and four-letter words, and phonological awareness was measured with 12 three-letter pseudowords. Responses were scored at the letter level, because only a few children

could read or spell whole words, and so letter-level scoring was a stronger estimate of children's awareness of phonemes. Environmental print recognition consisted of 10 familiar signs and labels the children were asked to read first in and then out of context. Twelve high-frequency words were presented on cards one at a time for children to read and were scored at the word level in order to estimate their ability to recognize common words. A letter-identification task was administered at Time 1 with the normed WRAT letter test. A story reading task was administered but could not be reliably scored and so was not analyzed.

The ERT administered at the end of kindergarten (Time 2) contained a 10-letter-naming task to replace the WRAT. In addition to the Time 1 measures, children attempted to read two simple stories that were scored in terms of the number of words correctly identified on each page. Each story contained 7 different words, 13 words altogether on 6 pages with 2 or 3 words on each pictured page. Also, to assess their processing strategies, children were asked to locate the last word they nad just read and tell how they knew it, find another word on the same page and tell how they knew it, and find the print error on an earlier page (one page contained "Stop, step, stop" instead of "Stop, stop, stop").

In the fall of first grade (Time 3), the word, spelling, and story reading tests of the ERT were expanded to include harder items, and the two easiest tasks, letter identification and environmental print reading, were dropped. Spelling now included two harder words, *BAIT* and *COAT*. Added to the 12 high-frequency words were 8 longer words (e.g., *came, found, these, number*), and the pseudoword test also contained 8 more items (e.g., *nibe, nabe, voy, vait*). The two stories were augmented with one new story about a Brownie (48 words), which was presented on one page with a picture. The text began, "I am a little Red-Cap Brownie." As the children read the story aloud, they were told any words they misread or did not know. The stories were scored for the number of words the children read correctly, their answers to story questions, and their responses to questions about the location of words and about how they could identify the words. To assess listening comprehension, an examiner read a story to all the children in the classroom, and they were asked to retell it later that day as part of their test. It was scored for the number of propositions accurately recalled and accuracy in answering two comprehension questions.

In the spring of first grade (Time 4), the ERT was again revised. The spelling task was dropped, the pseudoword test was replaced with a set of 20 low-frequency words (e.g., *lye, mace, pome, cleat, nongame, bluefish*,), and more difficult, multisyllable high-frequency words were added (*e.g., anything, without*). Children's word-reading accuracy and their reading times were recorded for both lists. To measure listening comprehension, children listened to a short story during the testing session and retold it twice, once to the examiner and then again to a teddy bear. Their recalls were transcribed and later scored for the total number of story idea units recalled on the two retellings, not including the units that they repeated. They were also asked questions about the story. To measure reading comprehension and word reading in context, children read aloud the Time 3 story and a new, harder story that contained 70 words. They answered 6 story questions that were read to them by the examiner, and their reading times, the number of oral reading errors, and story comprehension scores were recorded for both stories.

In the spring of second grade (Time 5), children were individually administered the WRAT-R1, Level 1 and an unpublished word-reading test constructed by the first author. They answered questions on Form PA-8 of Degrees of Reading Power (DRP) (College Board, 1979), and Form D of the CIRCUS listening test in their classrooms. The WRAT was identical to the one given at the beginning of kindergarten, but because everyone obtained a perfect score on letter knowledge, word reading was now the defining variable. The word-reading test contained 10 pseudowords (e.g., *dack, biztov, ponkonore*) and 3 irregular words (*said, wagon, furniture*) for children to read and then explain how they figured out the pronunciation. The CIRCUS listening comprehension test was similar in format to the Level A kindergarten test, with children selecting from pictured choices the item that answered orally presented

questions. The DRP, a cloze test with 8 expository passages and 56 items, required children to read and mark the words that correctly filled in the blanks in each paragraph.

In the spring of third grade (Time 6), children were given the group-administered test of reading comprehension from the Illinois Goal Assessment Program (Pearson & Valencia, 1987). The test contained two long passages, one narrative and one exposition. Children selected one or more responses from among five choices. In this test, up to three responses for each question could be correct, so children were faced with an unfamiliar way of answering reading comprehension questions. (For a fuller explanation, see Greer, 1990).

Preliminary Analyses

Composite variables were created from the parent questionnaire, the language tests, and the tests given at the six testing periods. The composite variables were created with the aid of factor analysis using the principal components factor analysis program in SYSTAT, Version 4.1. Measures with skewed distributions were transformed with log normal or arcsine transformations (Time 1 reading, reading scores and times in Time 4, reading score in Time 6). Composite variables were formed from the parent questionnaire and from the tests given at each time period using factor analysis, creating factors that had eigen values greater than 1.00. This approach, which generated four parent questionnaire variables, a Language Understanding variable, an Early Reading variable for Time 1 and 2, Decoding and Comprehension variables for Times 3, 4, and 5, and a comprehension variable in Time 6, is described next.

Factor analysis of the parent questionnaire involved several iterations, but using guidelines of parsimony and factor interpretation, a four-factor solution was chosen, yielding four clearly defined home characteristics. Factor 1, Story Activities with Children, describes attention to books and story telling by the family. Factor 2, Home Problems, indicates characteristics that include extensive day care and after school care, no father at home, and substantial work outside the home by the mother. Factor 3, Social Class, is delineated by the amount of parents' education and prestige of parents' occupations (from Treiman, 1977). Factor 4, Children's Literacy Interest, is marked by the child reading to self and others, the parent reading to the child from a very early age and helping the child read and write, the child seldom watching television, and the parent holding a positive view about the child. Factor score coefficients for each factor were saved and used in subsequent analyses to predict reading at each time period.

[Insert Table 2 about here.]

Factor analysis for the seven language measures indicated that all tasks were positively loaded on the first factor and accounted for 45% of the variance (see Table 3). Analogy, classification, sentence repetition, listening comprehension, and picture judgment had the strongest weightings, and so best represent the Language Understanding composite variable.

[Insert Table 3 about here.]

Factor analyses of reading tests given to children at each time period produced either one or two variables at each time period (Table 4). At Time 1, all variables loaded as one Early Reading factor and explained 66% of the total variance. Highest loadings were for word and pseudoword reading and spelling; lowest was WRAT letter knowledge. End-of-kindergarten factor analysis showed a similar one-factor solution that explained 65% of the total variance. At the beginning of first grade, the ERT now included comprehension items, and a two-factor solution yielded a Decoding factor that explained 50.5% of the variance and a Comprehension factor that accounted for 12.9% of the variance. At the end of first grade, Decoding and Comprehension factors were obtained, explaining 42.5% and 21.7% of the

variance, respectively. At the end of second grade, word-reading variables that described Decoding continued to account for more of the total variance (43.7%) than did Comprehension, which accounted for 33.7% of the variance. At the end of third grade, only one comprehension instrument was administered, so decoding ability was not evaluated. A factor analysis determined that the narrative and expository sections of this instrument contributed equally, so the sum of these two measures served as the dependent variable. Correlations among these factored variables are displayed in Table 5.

[Insert Tables 4 and 5 about here.]

Early Reading, Language, and Home Influences on Reading Development

Our first question was whether reading at the end of kindergarten and in later grades could be predicted by early home influences, entering school language understanding, and entering school reading knowledge. We relied on simultaneous multiple regression analyses at each time period using the four parent questionnaire factors (Story Activities, Home Problems, Social Class, and Children's Literacy Interest), the Language Understanding factor, the Early Reading factor, Gender, and Age to predict each successive set of reading measures. Results are summarized in Figure 1, where standard *B* coefficients of the independent variables are displayed on the arrow to indicate significant predictions ($p<.10$) of each subsequent dependent variable.

[Insert Figure 1 about here.]

Seven analyses were carried out to produce Figure 1. These analysis are presented next, beginning with home background influences on early reading and language, and continuing with end- of-kindergarten, beginning- and end-of-first-grade, and end-of-second and third-grade reading.

The analysis in Table 6 shows that all four home factors predict Early Reading, accounting for 44% of the variance, and that three of the four home factors predict Language Understanding, accounting for 26% of the variance. In both analyses, greater amounts and regularity of home reading activity, higher social class, and greater interest and involvement by children in literacy activities at home make a positive contribution to children's Early Reading and Language Understanding. Home Problems have a negative influence on Early Reading. Neither Age nor Gender of the child figure in the equations.

[Insert Table 6 about here.]

Reading at the end of kindergarten features abilities to hear and recognize letters and sounds in words and to read words in and out of context. As shown in Table 7, it is predicted primarily by children's entering kindergarten reading knowledge and less so by their language understanding. The R^2 for this analysis, .60, shows that children's knowledge about reading and their language competencies at the beginning of kindergarten are highly significant predictors of end-of-year ability. These test variables, then, replace the home variables. Home variables operate only indirectly, through the Time 1 Early Reading and Language Understanding tests.

[Insert Table 7 about here.]

At the beginning of first grade, the factor analysis indicated that reading could be separated into decoding and comprehension and so two regression analyses were run, continuing with the same beginning-of-kindergarten predictors. Decoding (R^2 = .55) is predicted by Early Reading and Children's Literacy Interest but not by Language Understanding. Language Understanding is the only significant predictor of comprehension, though not much variance is accounted for here (R^2 = .15), probably because our measure of comprehension was weak. Nevertheless, the analysis indicates that comprehension is beginning to separate from decoding, which is evident because early reading ability

predicts only decoding, whereas language understanding only predicts comprehension. These analyses are presented in Table 8.

[Insert Table 8 about here.]

Decoding at the end of first grade continues to be influenced by Early Reading and not by Language Understanding, although only 29% of the variance is accounted for (Table 9). Possibly, differing instruction in the schools explains some of the unaccounted for variance. Additional predictors of decoding are gender (girls are the better decoders) and a problematical home environment, which has a direct negative influence. Comprehension at the end of first grade is strongly predicted by one variable, Language Understanding (R^2 = .39). We infer that our measure of comprehension performance is more reliable now so that a greater amount of the variance, 39%, is predicted.

[Insert Table 9 about here.]

At the end of second grade, there is a significant effect of Early Reading and no influence of other variables on decoding (Table 10). However, only 16% of the variance is accounted for, probably because later developing decoding skills are not represented in the early reading predictors. Comprehension at the end of second grade, by contrast, is strongly predicted by Language Understanding, and there is an additional disadvantage accruing to children from problematical homes. The R^2 of .55 provides substantial explanation of the variance in comprehension scores.

[Insert Table 10 about here.]

Third-grade data, represented by one comprehension test (Table 11), reveal that Language Understanding continues to be a strong positive predictor along with Children's Literacy Interest, and that older children and children from problematical homes are negative predictors. There is an R^2 of .49 for the model. Thus, nearly half of the variance at the end of third grade is predicted by children's language competencies at the beginning of kindergarten.

[Insert Table 11 about here.]

To summarize, these analyses reveal that all of the home questionnaire variables predict Time 1 Early Reading and all but one, Home Problems, predict Language Understanding. Two of the home questionnaire variables, Children's Literacy Interest and Home Problems, also directly predict later reading measures. Early Reading and Language Understanding, which themselves are moderately correlated at .60, have initially strong but waning predictions of Decoding, waxing predictions of Comprehension into second grade, and a leveling off in predictions of Comprehension in third grade. Decoding is predicted principally by Early Reading, and Comprehension is predicted principally by Language Understanding. Gender has an effect only on Decoding at the end of first grade, and Age has an effect on second- and third-grade comprehension scores. The Home Problems factor has a similar late but negative influence on Comprehension.

Grade-to-Grade Prediction of Reading

Our second question was whether the course of reading development would still be predicted by earlier test- and parent-questionnaire variables when later-appearing tests were allowed to enter the predictive equations. Because recently administered decoding and comprehension tests usually enter as the only significant predictors, we expected that our measures of home background and our Time 1 early reading and language measures were unlikely to be influenced after children were instructed in reading in first grade.

To obtain the final models for each time period, all variables that preceded each end-of-grade outcome factors were allowed to enter as predictors. Models were then reduced through forward and backward stepwise analyses to obtain the variables that made significant contributions. The reduced models for decoding are presented in Table 12 and the models for comprehension are in Table 13. These are also summarized in Figures 2 and 3.

[Insert Table 12 and Figure 2 about here.]

Table 12 and Figure 2 reveal that decoding proficiency at the end of each grade is predicted principally by the immediately preceding decoding test, and in some analyses, also by Early Reading, Language Understanding, Children's Literacy Interest, Home Problems, and Gender (girls were better decoders). Early Reading and Language Understanding did not continue to be significant predictors once children had been taught to read. However, children with Home Problems at the beginning of kindergarten continued to be less effective decoders.

Quite a different picture of comprehension emerges. It is not a narrowly defined construct, as shown in Table 13 and Figure 3. Language Understanding is the only predictor in the first-grade analyses, in second grade it explains the greatest portion of variance, and only in third grade is it replaced by the preceding year's reading comprehension test. Moreover, until third grade, Language Understanding is a better predictor of comprehension than is the immediately preceding comprehension test, and even third-grade reading is correlated .49 with Language Understanding, .54 with Early Reading, and .42 with Children's Literacy Interest.

To summarize, analyses shown in Table 12 and summarized in Figure 2 indicate that grade-to-grade prediction of decoding can be based principally on the immediate, prior decoding test, although the predictions are improved by information about gender and early home literacy influences. Grade-to-grade predictions of comprehension are based principally on children's early language competencies, and in third grade by the previous comprehension test and children's literacy interest at the beginning of kindergarten. Thus, our early reading measure is a potent predictor of decoding in kindergarten and at the beginning of first grade, but when children are taught to read in first grade, that early measure is no longer viable. Instruction has a differential effect on children's growing decoding competency, and so more current measures are required. Language Understanding, however, continues to predict reading comprehension until third grade. Perhaps this is because early comprehension skills are more amorphous than decoding skills or are difficult to measure, and so are better explained by the more general early language understanding competencies. Another possibility is that schools were not particularly effective at teaching comprehension and so the early measures had a longer lasting influence on comprehension performance.

[Insert Table 13 and Figure 3 about here.]

Case Analyses

Before interpreting these results, we present detailed information about two boys, one of whom did very well on the third-grade test and one who did very poorly. Both boys attended the city school and had a complete set of data. E had one of the lowest and J had one of the highest scores on the third-grade test. Their folders revealed different backgrounds and that they entered kindergarten with quite different early reading and language competencies. Examples of their responses to the tasks offer a way to see and understand the statistical analyses.

E had a third-grade reading comprehension score of 19.83 ($\bar{X}$ = 23.4, see Table 4 for other test statistics, and the Appendix for details about the parent questionnaire data). He was the next-to-youngest child in a family of 10 children, and his mother and father had ninth-grade educations. His

mother worked as a cook, and his father worked as an assembly line operator. Parents reported on the questionnaire at the beginning of kindergarten that they provided E with all-day babysitting in his first two years, and all-day school in his third and fourth years. A parent or an older sibling cared for E after school during kindergarten. The parents indicated that E was afraid of dogs and was overactive. On the positive dimension, they checked that he was calm, outgoing, friendly, cheerful, well-liked, and bright. They read to E once a week (but 43% of the children in the overall sample were read to daily), beginning at age 3 (but 86% began reading to their child by age 2), but there was no regular time for reading (46% had a regular time). They said they had 5 or 6 children's books at home ($\bar{X}$ = 85), no magazines, and no games to help him learn, and that he did not yet read, but that he tried to read to them occasionally and that they helped him read occasionally. These responses place him on the low end of the scale on the parent questionnaire factors of Story Activity, Social Class, and Children's Literacy Interest, and at the high end on Home Problems.

When tested at the beginning of kindergarten, E could write his first name, identify some letters, and recognize half of the environmental print in context but used color names for the words out of context. He seemed to have no idea about how to read or spell words, because he arranged all 10 magnetic letters in a line when asked to spell three-letter words, and he made wild guesses about words he was asked to read. Still, he may have begun to connect sounds and initial letters of words because he seemed to match words with the similar initial sounds. To spell *pat*, he used ꟼ Ǝ Ↄ Ǝ ⋊ A T S I. To read *go*, he said, "Orange, no green," for *fam* he said "*fat*," but for *pag* he said "*hat*." On the language understanding test, he had a below-average combined score of 36 on classification, analogy, definition, and sentence repetition ($\bar{X}$ = 46), and a score of 15 on listening comprehension ($\bar{X}$ = 17). He had difficulty categorizing and defining words in clear and specific ways. He received partial credit for saying that *penny* and *nickel* are alike because "you can buy something." A *diamond* is "shiny; you could keep it." A *castle* "is what you go in." *Snap* means "snap your fingers." *Moth*: "it flies, stings." Analogies were more difficult: In winter it is cold, in summer it is "*here*." Dogs have fur, ducks have "*ears*." K is a letter, 7 is a "8." Although he could tell complete stories from four-picture sequences (e.g., "There go a ice cream truck and a lady givin' a little girl ice cream and then she walking with the ice cream and she done and throwed the cup away in the garbage can."), his nonstandard syntax may have increased the difficulty of the sentence-repetition task, where he made mistakes with even the shorter sentences. For example, he dropped "blue" from the third sentence, "Tom found 3 blue eggs in his birdhouse."

At the end of kindergarten, the reading test revealed that he was beginning to figure out sounds in words (spelling *pat* as *PT*, *tape* as *TAP*, *sack* as *CK*), and he recognized two words, *stop* and *M&M's*, out of context. He could not read any words or pseudowords, and he picture-read the two little stories. We noted that he did not look at the print. At the beginning of first grade, to spell words, he correctly picked out first and last consonants then added a random set of letters in front of or behind them. He read one word, *go*, from the list of 12, and he picked out the same word from a story. For the first page of another story that read, "stop car," he said, "When the red light said stop, I want you to stop." In a new story that had repetitive phrases and only seven different words, when he was told words he didn't know, he was able to remember the told words to read 41 of the 47 words correctly. At the end of first grade, he could read all but two words from this 47 word story but he missed 17 words from the harder 70-word story. He could now read 11 of 12 three-letter high-frequency words, but could not read any of the 8 longer words and he read only 2 of the 12 uncommon words (e.g., saying *three/tree* for *tee*, *ran* for *rad*, *doe* for *bud*, *jote* for *jot*), although his word reading rate was nearly average (90 seconds; $\bar{X}$ = 88.6). At the end of second grade, he read 33 words out of context on the WRAT, but this was a below-average score of 58 ($\bar{X}$ = 63.2). He decoded 6 of the 8 pseudowords ($\bar{X}$ = 6.7), and he was able to explain how he read them (e.g., for *moke*, he said, "It's just like smoke, you took the *s* away and it's *moke*; for *thid*, he said, "I said /th/, /i/, /d/, *thid*"). His second-grade reading comprehension score of 21, however, was below average ($\bar{X}$ = 28), but his listening comprehension score of 31 was average.

In interviews conducted during March of his kindergarten year, he described how he was learning to read as, "My mom helps me read and I help her read . . . . My teacher helps me. She tells me how to read." In May, he said he didn't have any books at home and didn't like the books at school but he read them, and that the teacher helped him with the words he didn't know. When asked at the end of kindergarten to describe what next year's class should do to be good readers, E wrote the first nine letters of the alphabet and drew pictures of a child and of a class of children, which he dictated to indicate, "A boy listening," and "They all of them listening." At the end of first grade, his written advice was, "Work Quietly," "I will be a go [good] lesinr [listener]," and "Class rules." At the end of second grade, he wrote, "Pacntes" [practice], "Read," and "Pacntes readng." He told us in first grade that his mom helped him learn to read, "She asks me what to spell words," and his teacher helped him to "do work." He said he was learning in school to "write things." In the second-grade interview, he ranked himself, unrealistically, as second best in his class, "'cause I can read real good." He said that family members helped him to read, that parents and a sister read to him once a week, and that he went to the library every two weeks.

J obtained a high score of 26.37 on the third-grade reading comprehension test. His mother completed college and his father completed graduate school. Both were in business, with the mother working 30-35 hours a week and the father working 50 hours a week. He had one sibling, a younger brother. Parents noted that he had had three physical problems since birth (ear infections, eyes crossed, and asthma), but they checked 15 of the 18 positive characteristics. They placed him in half-day and whole-day school for his third and fourth year, and before that, he had had babysitters. They read to him daily, and regularly every evening, beginning before age 1. When he began kindergarten, they said he had 80 books at home, and they bought reading materials very often to help him learn to read. They reported that he tried to read to them daily, and family members helped him daily. He read alone occasionally, and read to other children weekly. He also tried to print letters, words, or stories daily, and parents helped him print weekly. Thus, he was at the high end on the parent questionnaire factors of Story Activity, Social Class, and Children's Literacy Interest, and in the middle on Home Problems.

The ERT at the beginning of kindergarten confirmed his involvement in reading. J could read 6 out of 10 environmental print words in context and 5 of them out of context, 11 of 12 pseudowords, 4 of 12 high-frequency words, and he spelled *pat* and placed correctly 16 out of 22 letters of the 6 words. He knew all the letter names and read 6 words on the WRAT. On the language understanding test, he had a high score of 62 on classification, analogy, definition, and sentence repetition, and an average score of 17 on listening comprehension. He repeated 6 of the 10 sentences exactly, and made only 1 error on the seventh and eighth sentences, but could not repeat the last two longer sentences. He correctly defined many words and received partial credit for the following: A *castle* is "something you can live in." *Polite* means "you're nice." A *hero* is "someone who done something real good." He missed some classification and analogy items: a cat is an animal, a flower is a "*rose*." A bed has a bedspread, a table has "*legs*." A house and store are alike because "*both can't move*."

At the end of kindergarten, he spelled 2 words correctly and placed 20 of 22 letters correctly. He read 11 of 12 high-frequency words (calling *did* "bib"), all 12 pseudowords, and all 26 words in the 2 stories. At the beginning of first grade, he correctly placed 23 of 30 letters in spelling (only making vowel errors), read 15 of 20 high-frequency words (e.g., calling *ran* "rain," *may* "my," and *same* "some"), but read only 3 of the 12 pseudowords he had read in May and 2 of the new pseudowords. All three stories were read without error. At the end of first grade, he read the 20 high-frequency words with only one error in 13 seconds, and got 15 of 20 uncommon words correct in 37 seconds. Both stories were read with only one error (J commented, "Why don't you give this to somebody in Sunshine [low reading group]?"). Most comprehension test questions were answered correctly, with a total score of 13. At the end of second grade, he obtained a 38 on listening comprehension, 45 on the reading test, read 66 words on the WRAT, and read 7 of the 8 pseudowords.

In an interview at the end of kindergarten, he said he had favorite books at home and that "Sometimes I can read them but I need a little help." He said he was learning to read because the teacher "lets me bring books home from the classroom and I practice them. She makes us read books and only if we need help she'll help us, only if we ask for help . . . She tells us the word. At the end of first grade he reported that at home "Sometimes I read books to myself, but mostly it's at school." When asked to describe what next year's class should do to learn to read, at the end of kindergarten J. drew pictures and wrote, "REDEN" [reading], "liSiNiEN," and "WrKiN." At the end of second grade he wrote, "I think they should have a special time for reading," "I think they should have a reading group," and "Make a chart to encourage you to read." At the end of second grade, he ranked himself in second place, explaining, "I'm in the highest reading group." He reported that his mom reads to him about three times a week, but that he seldom goes to the library.

E and J entered school with markedly different early reading skills and language understandings. Our tests show that they differed in word reading and spelling knowledge (which indicated differences in phonological awareness), letter knowledge, an ability to use print and picture cues to read pictured words and stories, word and concept-structuring meanings, and syntactic usage. They were nearly similar only on the listening comprehension task. Thus, J's early reading and language competencies propelled him forward rapidly. At the beginning of first grade, he nearly topped out on several of our measures and was a fluent reader by the end of first grade. When given the second and third grade tests, he could combine his sound decoding skills with his firm language foundation to read. E was also learning, but his early reading skills appeared to be at least a year behind J's. At the end of first grade, E could read common, high-frequency words, but he could not identify low-frequency words, even those that had only three letters, until he was in second grade. With later developing decoding skills and a weaker language foundation, which can be traced to very different home literacy experiences, E was reading more slowly and less accurately, understanding less of what he read, and making more comprehension errors on reading tests. The reading instruction he received in school was not an accelerated program, and although he was making progress, he was not able to catch up with most of his classmates.

Integrating and Relating the Evidence to Models of Reading

The first set of statistical analyses focus on effects on children's later reading of their entering kindergarten reading and language competencies and their home background. The second set of analyses indicate grade-to-grade influences on reading development. The case studies show that children's competencies can be understood more thoroughly by studying parents' answers to the questionnaire and children's interview responses. These provide converging evidence that children's language and literacy activities before beginning kindergarten have an enormous influence on later reading. The case studies show that even well-meaning parents may not be able to help much after their children enter school, at least in school contexts where children may not be recognized as needing added instruction and their classmates begin with far greater skills and quickly become independent, confident readers. So, unlike J whose family had slackened their support after kindergarten, E was still receiving help from family members in second grade. Although E said he was second-best in his class because he could read "real good," and indeed he was making progress, he may not have realized how to help himself. His advice about how next year's class could become better readers (read and practice reading) was certainly vague. By contrast, J seemed sure of his reading competencies. He gave a plausible reason, being a member of the top reading group, for a second-best position, and he provided quite sophisticated advice for becoming better readers (e.g., have a special time for reading and use charts to encourage reading). A solid language and literacy foundation upon entering school was confirmed in the statistical analyses. The first set showed that both language and early reading are well-explained by home characteristics and then that language understanding predicts comprehension measures and early reading predicts decoding, even into second grade. The second set of analyses indicate that while decoding is affected by school instruction, based on the strong grade-to-grade predictions,

comprehension is still strongly influenced by children's entering school home characteristics and language competencies.

The developmental and cognitive process models imply that grade-to-grade changes in reading can be explained entirely or principally by tracing the development of decoding ability first and of reading comprehension skill later. Clearly, this is not sufficient. Our analyses show that reading development should not be based only on letter-, sound-, and word-reading test differences. A striking advantage in early reading, and in later comprehension, accrues to children who begin school with strong language understandings and a substantial involvement at home in literacy. Thus, children's language understandings, which probably draw on home culture and communication experiences, join with their home literacy experiences to play central roles in reading development.

Comparing E's background with that of J's documents a number of differences. E is from a large family, his parents have limited education and low-prestige jobs, and his mother works 40 hours a week. Story reading is not a regular family activity, and E only occasionally talks to his parents about TV or tries to read or is helped to read and write. So parent-child communications might be limited. J is from a small family, his parents have advanced schooling and high-prestige jobs, and his mother works 30 hours a week. There is a regular, daily time for reading, books are very often purchased, J tries to read daily, and he is helped daily to read and weekly to write. There seem to be many parent-child literacy events in this home. The children are similar in that they both live in two-parent homes, both sets of parents hold jobs, and they had provided similar amounts of pre-kindergarten schooling and baby-sitting experiences for their children. However, their home literacy experiences are quite dissimilar. E's parents began reading to him two years later than J's parents began reading to their child, reading occurred irregularly rather than daily, and there were few reading materials available at home. Drawing on parents' estimates of home reading frequency and when they began reading to their child, it appears that E may have received altogether fewer than 200 reading sessions at home before entering school, whereas J might have received over 1,800 reading sessions. It is not surprising then that J's parents reported far more interest and involvement in reading and writing by J than did E's parents. J had been launched into several years of reading before entering kindergarten. The ERT scores are confirmatory: In kindergarten, E was struggling with letter recognition, but J was beginning to read. The language understanding test scores, which show differences particularly with respect to word meanings and their classification and with respect to written language syntactic structures, may also reflect the different opportunities at home for reading and listening to stories.

Why might early reading be so important to decoding, which was measured in this study with word-reading accuracy, spelling, and letter-recognition measures? The obvious answer arises from both the developmental word-reading model and the cognitive processing model, based on the importance of phonological awareness. The less obvious answer comes from the social constructivist model. Children who are further along in development when they enter school will be viewed as more competent, and perhaps given more opportunities to participate in reading and writing activities. They will learn more readily from the beginning reading instruction and move more quickly to higher levels of literacy and to independent reading and writing. Children who are behind their classmates at the beginning of kindergarten are easily identified because they will be able to do fewer letter-naming tasks independently, they will have more difficulty attending to the right information, learning and remembering printed words will take more time and effort, and they will be less likely to develop effective learning strategies. These children, then, will be more vulnerable to failure because they are more dependent on high quality teaching and they may be less likely to be supported at home. Moreover, they may have unrealistic understandings of their progress and about how to learn to read. Eventually, they will lose confidence about reading and lose interest in trying to read and write.

Why might language understanding be so important to later comprehension? If we assume that the tasks are not simply measures of intellectual potential, then one explanation is that language understanding provides a necessary basis for thinking, learning, and reasoning about print. As Vygotsky

(1983) argued, the "psychic functions" required for learning the basic school subjects are not mature at the beginning of schooling. "Written speech is a separate linguistic function, differing from oral speech in both structure and mode of functioning. Even its minimal development requires a high level of abstraction" (p. 264). Sensory aspects of speech must be replaced by "images of words." That is, "it is the abstract quality of written language that is the main stumbling block, not the underdevelopment of small muscles or any other mechanical obstacles" (p. 264). The abstract qualities of written language are represented in classification tasks and in a willingness to view language as system or structure. Bruner, Goodnow, and Austin, in their 1956 study on thinking, similarly argue that all cognitive activity is dependent upon "a prior placing of events in terms of category membership" (p. 231). It requires placing and organizing objects and events, and so "category learning is one of the principal means by which a growing member of a society is socialized, for the categories that one is taught and comes to use habitually reflect the demands of the culture in which they arise" (pp. 231-232).

When young children are members of families that seldom use written-language structures, the children will have few opportunities for learning about literacy categories and the abstract nature of written language. Unless compensated for by the teachers, children could become discouraged about becoming literate and unsure about their own competencies. When children are members of families that frequently use written-language structures, parents are providing scaffolding for understanding and using written-language constructs, and their children have multiple opportunities to learn about literacy. It is in this way that the third model of development helps to explain the importance of language understanding on early reading and later comprehension.

The importance of language in literacy learning has been pointed out by Dickinson and Snow (1987), Donaldson (1978), Mason (1992), Mason and Allen (1986), Snow (in press), Watson and Olson (1987), and Wells (1981). Donaldson, who utilizes Piaget's notion of decentering, expresses the importance of language understanding in this way:

> The normal child comes to school with well-established skills as a thinker. But his thinking is directed outward on to the real, meaningful, shifting, distracting world. What is going to be required for success in our educational system is that he should learn to turn language and thought in upon themselves. . . . His conceptual system must expand in the direction of increasing ability to represent itself. He must become capable of manipulating symbols. (p. 90)

How do parents foster literacy development for young children in this country? Typically, they engage children in literacy activities within the context of book and language talk. They give children innumerable opportunities to move beyond referential and associative language use toward categorical and reflective language use through story book reading and discussion, shared reading, and advice about what printed words say and mean as they try to read (also see Adams, 1990, for discussion of this point). In so doing, children begin to use language at higher levels and to make connections between words and letter sounds and between letters and their arrangements in words. They begin to see how to make analogies and to organize words into categories, they portray story events in their language but hear the story language as well, and they remember events in stories by connecting them to their own experiences. In so doing, they develop both decoding and comprehension constructs out of home literacy experiences.

When children's home experiences are not well matched with the school literacy curriculum, they may begin school with a severe handicap. They may have grave difficulty catching up, even when their first teachers use books and provide good support for their reading attempts as did the kindergarten teachers in this study. The children may see themselves progressing in learning to read, but they may have too much to learn without an accelerated program. They may have acquired a sufficient battery of linguistic concepts for listening to and remembering simple stories, but they may have difficulty abstracting and comprehending more complex written language constructs. Their parents may be trying to assist them

at home but if they are struggling at school, their teachers may be overestimating their ability to catch up and at the same time underestimating their reading potential.

A social constructivist model of literacy offers an extension of our views about learning to read in a social context. Cognitive and developmental word recognition models have shown us how to characterize the essential elements, letters and sounds, in the initial steps of learning to read. However, the social constructivist model suggests the importance of shared reading, writing, and talking about books and print. Early literacy experiences help children make sense of letters, sounds, and printed words, and lead them to ways of categorizing and remembering print and to more sophisticated reading and writing constructs. Written language and print concepts are acquired under the guidance of adults, using meaningful materials, particularly stories, from a very early age. What we propose is that these kinds of experiences launch children toward connecting oral and written language even before beginning kindergarten. A strong language foundation, coupled with an emerging awareness of printed words and the phoneme system, is an unbeatable combination for abstracting language and literacy concepts to read, write, listen, and communicate.

References

Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: The MIT Press.

Biemiller, A. (1970). The development of the use of graphic and contextual information as children learn to read. *Reading Research Quarterly, 6*, 75-96.

Bruner, J. (1985). Vygotsky: A historical and conceptual perspective. In J. Wertsch (Ed.), *Culture, communication, and cognition: Vygotskian perspectives* (Chap. 1). New York: Cambridge University Press.

Bruner, J., Goodnow, J., & Austin, G. (1956). *A study of thinking*. New York: Wiley.

Chall, J. (1983). *Stages of reading development*. New York: McGraw Hill.

College Board. (1979). *Degrees of reading power*. New York.

Cook-Gumperz, J. (1986). *The social construction of literacy*. New York: Cambridge University Press.

Dickinson, D., & Snow, C. (1987). Interrelationships among prereading and oral language skills in kindergartners from two social classes. *Early Childhood Research Quarterly, 2*, 1-25.

Donaldson, M. (1978). *Children's minds*. New York: Norton.

Downing, J. (1979). *Reading and reasoning*. New York: Springer-Verlag.

Educational Testing Service. (1976). *CIRCUS--Listen to the story, Level A*. Menlo Park, CA: Addison-Wesley.

Ehri, L. (1985). *Learning to read and spell*. Invited address at the annual meeting of the American Educational Research Association, Chicago.

Ehri, L. (1991). Development of the ability to read words. In R. Barr, M. Kamil, P. Mosenthal, & P. D. Pearson (Eds.), *Handbook of reading research* (Vol. 2, pp. 383-417). New York: Longman.

Firth, I. (1985). Beneath the surface of developmental dyslexia. In K. Patterson, J. Marshall, & M. Coltheart (Eds.), *Surface dyslexia* (pp. 301-330). London: Erlbaum.

Fries, C. (1963). *Linguistics and reading*. New York: Holt, Rinehart & Winston.

Gough, P., & Hillinger, M. L. (1980). Learning to read: An unusual act. *Bulletin of the Orton Society, 30*, 179-196.

Gough, P., Juel, C., & Roper/Schneider, D. (1983). A two-stage model of initial reading acquisition. In J. Niles & L. Harris (Eds.), *Searches for meaning in reading/language processing and instruction* (pp. 207-211). Rochester, NY: National Reading Conference.

Greer, E. A. (1990). *Examining the validity of a new large-scale reading assessment instrument from two perspectives*. Unpublished doctoral dissertation, University of Illinois, Urbana-Champaign.

Heath, S. B. (1983). *Ways with words: Language, life and work in communities and classrooms*. New York: Cambridge University Press.

Jastak, J., Bijou, S., & Jastak, S. (1978). *Wide range achievement test.* Wilmington, DE: Jastak Associates.

Juel, C. (1991). Beginning reading. In R. Barr, M. Kamil, P. Mosenthal, & P. D. Pearson (Eds.), *Handbook of reading research* (Vol. 2, pp. 759-788). New York: Longman.

Kerr, B. M., & Mason, J. M. (in press). Awakening literacy through interactive story reading. In J. Osborn & F. Lehr (Eds.), *Reading, language, and literacy: Instruction for the 21st century.* Hillsdale, NJ: Erlbaum.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* New York: Cambridge University Press.

Mason, J. (1980). When do children begin to read?: An exploration of four-year-old children's letter and word reading competencies. *Reading Research Quarterly, 15,* 203-227.

Mason, J. (1992). Reading stories to preliterate children: A proposed connection to reading. In P. Gough, L. Ehri, & R. Treiman (Eds.), *Reading acquisition* (pp. 215-242). Hillsdale, NJ: Erlbaum.

Mason J., & Allen, J. (1986). A review of emergent literacy with implications for research and practice in reading. In E. Rothkopf (Ed.), *Review of research in education* (Vol. 13, pp. 205-238). Washington, DC: American Educational Research Association.

Mason, J., Bhavnagri, N., & Meyer, L. (1983). *Kindergarten general questionnaire.* Unpublished manuscript. Champaign, IL: Center for the Study of Reading.

Mason, J., & McCormick, C. (1979). *Testing the development of reading and linguistic awareness* (Tech. Rep. No. 126). Urbana-Champaign: University of Illinois, Center for the Study of Reading.

Mason, J., & Meyer, L. (1983). *Early written language assessment.* Unpublished manuscript. Champaign, IL: Center for the Study of Reading.

Perfetti, C. (1992). The representation problem in reading acquisition. In P. Gough, L. Ehri, & R. Treiman (Eds.), *Reading acquisition* (pp. 145-174). Hillsdale, NJ: Erlbaum.

Rack, J., Snowling, M., & Olson, R. (1992). The nonword reading deficit in developmental dyslexia: A review. *Reading Research Quarterly, 27,* 28-53.

Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context.* New York: Oxford University Press.

Rumelhart, D., & McClelland, J. (Eds.). (1981). *Parallel distributed processing: Explorations in the microstructure of cognition* (Vol. 1). Cambridge, MA: MIT Press.

Seidenberg, M. (1992). Dyslexia in a computational model of word recognition. In P. Gough, L. Ehri, & R. Treiman (Eds.), *Reading acquisition* (pp. 243-274). Hillsdale, NJ: Erlbaum.

Snow, C. E. (in press). The development of definitional skill. *Journal of Child Language, 17.*

Soderbergh, R. (1977). *Reading in early childhood: A linguistic study of a preschool child's gradual acquisition of reading ability.* Washington, DC: Georgetown University Press.

Stanovich, K. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly, 21*, 360-407.

Stanovich, K. E. (1990). Word recognition: Changing perspectives. In R. Barr, M. Kamil, P. Mosenthal, & P. D. Pearson (Eds.), *Handbook of reading research* (Vol. 2, pp. 418-452). New York: Longman.

Treiman, D. J. (1977). *Occupational prestige in comparative perspective.* New York: Academic Press.

Vygotsky, L. (1978). *Mind in society.* Cambridge, MA: Harvard University Press.

Vygotsky, L. (1934, 1986). *Thought and language.* Cambridge, MA: MIT Press. (Original work published in 1934)

Vygotsky, L. (1983). School instruction and mental development. In M. Donaldson (Ed.), *Early childhood development and education: Readings in psychology.* New York: Guilford Press.

Watson, R., & Olson, D. R. (1987). From meaning to definition: A literate bias on the structure of word meaning. In R. Horowitz & S. J. Samuels (Eds.), *Comprehending oral and written language* (pp. 329-353). San Diego: Academic Press.

Webber, R. (1970). A linguistic analysis of first-grade reading errors. *Reading Research Quarterly, 5*, 427-451.

Wells, G. (1981). Some antecedents of early educational attainment. *British Journal of Sociology of Education, 2*, 181-200.

Wells, G. (1985). Preschool literacy-related activities and success in school. In D. Olson, N. Torrance, & A. Hildyard (Eds.), *The nature and consequences of literacy* (pp. 229-255). New York: Cambridge University Press.

Wertsch, J. (Ed.) (1985). *Culture, communication, and cognition: Vygotskian perspectives.* New York: Cambridge University Press.

Wertsch, J., & Stone, C. (1985). The concept of internalization in Vygotsky's account of the genesis of higher mental functions. In J. Wertsch (Ed.), *Culture, communication, and cognition: Vygotskian perspectives* (Chap. 7). New York: Cambridge University Press.

Williams, M. (1989). Vygotsky's social theory of mind. *Harvard Educational Review, 59*, 108-126.

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Table 1

Description of Assessment Instruments

Language understanding: Classification. There were 8 items in which the child was asked to tell how two different objects were alike (e.g.,. How are a penny and a nickel alike?) Each item was scored as correct (2 points), partially correct (1 point), or incorrect.

Language understanding: Analogies. Twelve questions assessed flexible knowledge about word concepts such as "In winter it is cold, in summer it is _____" ; "A couch is furniture, a shirt is _____"; and "A person has eyes, a house has _____." The examiner read each item aloud, and the child completed the sentence orally. Each item was scored as correct or incorrect.

Language understanding: Sentence repetition. The examiner read aloud a series of 10 progressively more difficult items, and the student attempted to repeat them verbatim. Omissions, transpositions, additions, and substitutions were errors, and each error reduced the number of points available for a sentence. Easier items had maximum scores of 1 or 2 points, whereas harder items could generate up to 3 or 4 points. The second item was: "The bad dog ran after the cat." The sixth item was: "Peter would like to have new boots and a cowboy suit." The last item was: "Next Monday our class will visit the zoo. Bring your lunch and be sure to be on time."

Language understanding: Picture-story construction. Four four-picture sequences were presented, and the child was asked to tell a story from the pictures. Children's story-related responses were written down verbatim to score the number of words, the number of T units, and the complexity of syntax. One picture sequence shows a child flagging an ice cream truck, a woman in uniform giving the child an ice cream cone, the child walking and eating it, and the child throwing away something.

Language understanding: Vocabulary definition, from WPPSI. In an assessment of word knowledge, children were read 22 relatively common words, and for each they were asked, "Tell me what these words mean. What does *knife* mean?" (other items included *castle, hero, join, diamond*). Their responses were scored as correct (2 points), partially correct (1 point), or wrong, and the scores summed.

Language understanding: CIRCUS--Listen to the Story, Form A. This 26-item test evaluates listening comprehension by selecting the picture that answers a question read aloud or portrays a situation described by the examiner. For example, Item 22 reads: "At the end of the circus, the children clapped and the seals did too. Which [picture] shows this?" (Picture 1 shows children clapping, Picture 2 shows seals clapping, Picture 3 shows children and seals clapping).

Language understanding: Picture-story interpretation. After practicing ways to answer definite and indefinite questions about a picture, two other pictures were shown and five questions were asked about each. Two questions could be answered from the picture information, and three were speculative. One picture showed two large monkeys and two small monkeys looking at a hanging rope. Children were asked: "Do all the monkeys have tails?" (yes); "Is one monkey going to climb the rope?" (maybe or can't tell); "Are all the monkeys big monkeys?" (no); "Is it a cold day in this picture?" (maybe or can't tell); "Is one monkey a daddy monkey?" (maybe or can't tell). After answering each question, the children were asked why they said that. Responses to all questions were scored as correct/plausible or incorrect/implausible based on the reasoning, and summed. This task turned out to be unreliably scored and was deleted from all analyses.

Language understanding: Picture-story reasoning. Children were told they would see "some silly pictures and they're silly because something doesn't belong." Shown four pictures, they were asked to tell what doesn't belong, why it doesn't belong, and how it might have gotten there. One picture shows a full-sized car in a kitchen and a second shows two children in bathing suits standing next to blooming tulips and building a snowman. Correct (2 points), partially correct or plausible responses (1 point), and

incorrect responses to each question were summed. This task turned out to be unreliably scored and was deleted from all analyses.

ERT: Letter identification. Ten upper case letters were shown to the child; one point was given for each correctly named letter. Items were: T P A E S K D C I U.

ERT: Environmental print in and out of context. Ten items were shown first in and then out of a pictured context. Items were the words *stop, M&M's, kool-aid, crayons, baby powder, exit, Coca Cola, Nestle's Quick, Jello, telephone*. Picture responses were unscored; word responses were scored 2-1-0 on the closeness of the response to the actual word(s).

ERT: Spelling. Upper case plastic letters were presented in an unordered array for children to use to make words. Items for Times 1 and 2 were *pat, tip, tape, kite, sack, sick*. Scores were collected for the number of letters placed in their approximately correct positions and the number of words correct. Letter scores were used in Times 1 and 2 as a measure of phonological awareness. Items were added and word scores were used for Time 3 measurement. A level of spelling development was also assessed on a score of 1 to 4 for Times 1 and 2.

ERT: High-frequency (common) word reading. Words were presented on cards (one word to a card) or in Times 3 and 4 on a list. Times 1 and 2 words were *go, ran, but, ten, say, use, at, did, not, had, may, ate*. Children attempted to read each word. Scores were the number of words correctly read and the level of word reading development. Items were added for Times 3 and 4 and the number of words correct was scored.

ERT: Pseudoword reading. Twelve consonant-vowel-consonant regular patterns presented in Times 1 and 2 were *fam, pag, caf, ras, maz, san, lac, tak, jav, gat, naj, kap*. Additional one-syllable patterns were given in Time 3; one and two syllable words were used in Time 4. Scores were the number of consonants and words correctly rendered in Times 1 and 2 and the level of word-reading development. The number of words correct was used in Times 3 and 4, and time in seconds to read each column of 10 words was also measured in Time 4.

ERT: Story reading. Two stories at each time (totaling 26 words in Times 1 and 2; 73 words in Time 3; and 118 words in Time 4) were given for children to read. Scores were the number of words correctly read and the number of story questions answered correctly. In Time 4, time in seconds to read each story was also measured. Questions in Times 2 and 3, which addressed children's metacognitive knowledge about how to read the stories, were scored as correct (or appropriate) or wrong (or inappropriate). The six questions in Time 2 were: "Show me where it says that [examiner asks child to find the last phrase read by the child]; How do you know?" "What does it say here [examiner points to a word or phrase]? How do you know it says that?" "Where does it say ___ [examiner asks about one word from the last page]? How do you know it says that?" In Time 3, the first four questions were asked after each story. In Time 4, comprehension questions were asked after each story.

ERT: Story listening. One story in Times 3 and 4 was read to children. In Time 3, the story, "A New Girl at School," was read to the whole class at the beginning of the week that children were tested; in Time 4, the story, "Peter," was read by the examiner during the testing. In Time 3, children were shown the cover of the storybook and were asked: "What do you remember about this story?" "What else?" "Anything else?" In Time 4, the examiner requested: "I want you to tell me everything that you can remember about this story which I just read to you." Then the child was handed a stuffed animal and told, "Now I want you to tell the story to this animal. Pretend it didn't hear the story and would like you to tell it the story."

Table 1 (Continued)

WRAT. Given in Times 1 and 5, there were 13 upper case letters for children to name, with partial credit given for matching letters with ones in another row, and 2 points given for writing their name. There were also 75 words for children to name. Scores were separated into number of letters correct and the number of words correct.

Degrees of Reading Power, Form PA-8. The DRP, given in Time 5, contains eight expository passages with five to seven paragraphs. One or two blanks are in each paragraph where words are missing (cloze items). There are 56 items altogether. Children mark one response from five possible choices listed to the right of each paragraph. An example is: "Whales do not swim alone. They have _____. (a) company (b) lips (c) diseases (d) oil (e) flesh."

CIRCUS--Listen to the Story, Form D. This Time 5 listening test of 40 items is similar to the Time 1 test except that there are four pictured choices from which to choose the correct response and there are more items on each page.

Word and pseudoword reading. In Time 5, 10 pseudowords and 3 common words were intermixed in one list, and children were asked to read each word and then tell how they figured out the pronunciation. Pseudoword items included one, two, and three-syllable letter strings. The three real words were added to determine whether children would use different decoding strategies. In this analysis, only the sum of the number of words and pseudowords read correctly was used.

Illinois Goal Assessment Program. In Time 6, two full-length, grade-appropriate passages--one narrative and one expository passage--were given for children to read. Each passage was followed by 15 comprehension question items, each with five answer-choice responses. Each question could have one, two, or three correct answers. To score each item, 12 points were divided equally among all correct answers and 12 negative points were divided among the wrong answer responses. Scores were then transformed to produce a total score with a range between zero and 15.

Table 2

Parent Questionnaire Factor Loadings for a Four Factor Solution (N = 129)*

Item Description	Item No.	Factor 1 Story Centered Activity	Factor 2 Home Problems	Factor 3 Social Class	Factor 4 Literacy Interest and Involvement
Parent Read to Child Yesterday	6	.81			
Freq. Parent Read To Child	1	.76			
# Minutes Child is Read To	7	.72			
Child Asks to be Read To	3	.63			
Family Story Telling	21	.55			
Child Looks At Books	9	.52			
Child Reads To Parent	16	.51			.44
Child Attends Daycare	44-47		.69		
Child Has After School Care	48		.69		
Father At Home	53		-.66		
# Hours Mother Works	57		.65	.45	
# Younger Sibs	50		-.55		
Father Education	55			.80	
Mother Education	54			.79	
Prestige of Father's Work	58			.66	
Prestige of Mother's Work	56		.48	.65	
# Items Child Reads	14	.32	.32		.64
# Books at Home	8				.60
# Items Child Prints	24				.60
Positive Child Qualities	41-43				.59
Age Began Reading To Child	2				-.56
Child Reads at Home	18				.54
Parents Help Child Read	17	.38	.35		.51
Child Reads To Others	19	.26			.51
Child Does Chores	37				.51
Frequency Child Reads	15	.42			.47

Table 2 (Continued)

Item Description	Item No.	Factor 1 Story Centered Activity	Factor 2 Home Problems	Factor 3 Social Class	Factor 4 Literacy Interest and Involvement
Parents Help Child Print	25				.43
# Hours Child Watches TV	27-28				-.40
Child Tells Stories	22	.33	.27	-.27	
Regular Reading Time	5	.50		.37	
Family Buys Games	13		.30		
# Magazines at Home	11	.26	-.34	.28	
Child Does Homework	33		.31		

*Factor 1 accounted for 12.3% of the variance; Factor 2, 9.5%; Factor 3, 9%; and Factor 4, 11.7%.

Table 3

Descriptive Statistics for Language Understanding Subtests (N = 129)

Subtest	Split half Reliability	Max Possible	$\bar{X}$	SD	Obs min	Obs max	Factor 1 load (42%)
Word Definition	.77	44	20.8	7.2	0	40	.69
Analogy	.62	12	5.6	2.8	0	11	.85
Classification	.73	16	6.8	4.3	0	16	.78
Sentence Repetition	.70	30	11.8	5.8	0	27	.77
Listening Comprehension	.56	25	17.5	4.2	0	25	.69
Pic-Story (# Words)	.75	--	121.4	38.4	28	251	.08
Pic-Story (Syntax)	.58	--	6.8	3.7	0	18	.21

Table 4

Statistics on Reading Assessment Instruments

	Split half reliability	Max possible	$\bar{X}$	SD	Obs min	Obs max	Factor 1 Load (66%)
Reading Time 1 Measures (N = 129)							
Pseudoword Reading	.87	12	1.0	2.8	0	11	.85
Consonant Sounds	.98	24	3.7	7.8	0	24	.92
Decoding Level	.98	4	1.4	.8	0	4	.97
Common Word Reading	.82	12	.8	1.8	0	12	.92
WRAT Word Reading	.94	75	1.4	4.1	0	34	.76
Spelling (letters)	.94	22	4.2	6.4	0	19	.86
WRAT (letters)	.95	25	20.4	6.4	0	25	.47
Envir Print Reading	.77	20	4.4	4.4	0	19	.61
Reading Time 2 Measures (N = 126)							Factor 1 Load (65%)
Spelling (letters)	.89	22	13.2	5.5	0	22	.83
Decoding Level	.95	4	2.8	1.0	1	4	.93
Consonant Sounds	.98	24	13.4	10.0	0	24	.90
Pseudoword Reading	.92	12	4.5	4.8	0	12	.84
Common Word Reading	.86	12	4.2	3.6	0	12	.86
Story Word Reading	.80	26	18.0	6.9	0	26	.91
Letter Names	.86	10	9.8	1.0	2	10	.38
Envir Print Reading	.68	20	9.5	5.2	0	20	.77
Reading Attempt	.72	1	.7	.4	0	1	.85
Word Location	.70	2	1.2	.8	0	2	.87
Word Error	.61	1	.5	.4	0	1	.78
Reading Explanation	.46	5	2.7	1.0	0	5	.50

Table 4 (Continued)

	Split half reliability	Max possible	$\bar{X}$	SD	Obs min	Obs max	Decode Factor 1 Load 50.5%	Compre. Factor 2 Load 12.9%
Reading Time 3 Measures (N = 115)								
Pseudoword Reading	.87	20	5.3	5.8	0	20	.86	-.01
Consonant Sounds	.94	40	17.7	15.1	0	40	.86	.17
Common Word Reading	.90	20	5.4	5.4	0	20	.85	-.08
Spelling (words)	.66	8	1.3	1.3	0	7	.79	-.08
Spelling (letters)	.89	30	18.4	7.3	0	29	.80	.15
Word Location	.71	8	4.8	2.8	0	8	.79	.38
Story Word Reading	.77	75	49.8	26.7	0	73	.79	.38
Word Reading Explanation	.87	36	15.0	10.3	0	36	.62	.54
Point to Print	.63	6	2.3	1.2	0	5	.70	.50
Story Recall	--	--	4.3	3.2	0	15	.15	.75
Listening Comp. Questions	.59	6	2.0	.8	0	6	-.08	.62
Reading Time 4 Measures (N = 102)							Decode Factor 1 Load 42.5	Compre Factor 1 Load 21.7
Uncommon Word Reading	.85	20	11.2	5.8	0	20	.85	-.18
Common Word Reading	.83	20	16.8	4.1	4	20	.89	-.04
Story Word Reading	.60	108	103.2	101.8	65	108	.89	-.12
Story Questions	.61	15	9.8	2.3	3	14	.00	.82
Story Recall	--	--	9.1	5.0	0	23	-.13	.85
Story Recall Ques	.61	10	9.8	2.3	0	9	-.01	.82
Story Reading Time (sec.)	.77	--	106.6	51.8	45	39.7	-.90	-.00
Word Reading Time (sec.)	.80	--	88.6	42.8	32	25.6	.70	.05
Reading Time 5 Measures							Decode Factor 1 Load 43.7	Compre Factor 2 Load 33.7
Pseudoword Reading	--	0	6.7	2.3	2	10	43.7	.16
WRAT Word Reading	.62	100	63.2	8.0	46	83	.80	.42
Common Word Reading	--	3	2.5	0.6	1	3	.81	.21
Listening Comprehension	.69	40	31.3	4.6	17	39	.15	.90
Reading Comprehension		56	28.2	11.9	4	54	.36	.80
Reading Time 6 Measure (N = 83)								
Illinois Test	.84	45	23.4	2.8	16	28	--	--

Table 5

Pearson Product Moment Correlation Matrix

	EREAD1	LANU	CHILDLIT	STORYACT	SOCIAL
EREAD 1	1.000				
LANU	0.603	1.000			
CHILDLIT	0.400	0.237	1.000		
STORY ACTIVITY	0.160	0.152	-0.017	1.000	
SOCIAL CLASS	0.474	0.394	0.025	0.003	1.000
HOME PROBLEMS	-0.178	-0.117	-0.004	-0.017	0.009
EREAD2	0.749	0.542	0.382	0.040	0.351
DECODE3	0.702	0.470	0.426	0.173	0.309
COMPRE3	0.219	0.361	0.040	0.052	0.080
DECODE4	0.404	0.179	0.299	-0.018	0.039
COMPRE4	0.303	0.601	0.119	0.173	0.092
DECODE5	0.304	0.102	0.290	-0.093	0.082
COMPRE5	0.558	0.666	0.175	0.136	0.339
COMPRE6	0.536	0.488	0.417	0.071	0.306

	HOMEPROB	EREAD2	DECODE3	COMPRE3	DECODE4
MOMALONE	1.000				
ERT2	-0.152	1.000			
DECODE3	-0.192	0.861	1.000		
COMPRE3	-0.098	0.178	-0.015	1.000	
DECODE4	-0.255	0.636	0.661	-0.093	1.000
COMPRE4	-0.021	0.270	0.222	0.327	0.001
DECODE5	-0.092	0.516	0.555	-0.155	0.741
COMPRE5	-0.227	0.417	0.429	0.240	0.223
COMPRE6	-0.190	0.491	0.483	0.049	0.331

	COMPRE4	DECODE5	COMPRE5	COMPRE6
COMPRE4	1.000			
DECODE5	-0.009	1.000		
COMPRE5	0.495	0.003	1.000	
COMPRE6	0.314	0.158	0.706	1.000

Table 5 (Continued)

Frequency Table

	EREAD1	LANU	CHILDLIT	STORYACT	SOCIAL
ERT1LOG	127				
LANU	127	127			
CHILDLIT	127	127	127		
STORYRDG	127	127	127	127	
SES	127	127	127	127	127
MOMALONE	127	127	127	127	127
ERT2	127	127	127	127	127
DECODE3	114	114	114	114	114
COMPRE3	114	114	114	114	114
DECODE4	109	109	109	109	109
COMPRE4	109	109	109	109	109
DECODE5	98	98	98	98	98
COMPRE5	98	98	98	98	98
COMPRE6	83	83	83	83	83

	HOMEPROB	EREAD2	DECODE3	COMPRE3	DECODE4
MOMALONE	127				
ERT2	127	127			
DECODE3	114	114	114		
COMPRE3	114	114	114	114	
DECODE4	109	109	108	108	109
COMPRE4	109	109	108	108	109
DECODE5	98	98	97	97	98
COMPRE5	98	98	97	97	98
COMPRE6	83	83	82	82	83

	COMPRE4	DECODE5	COMPRE5	COMPRE6
COMPRE4	109			
DECODE5	98	98		
COMPRE5	98	98	98	
COMPRE6	83	83	83	83

Table 6

Time 1 Prediction of Early Reading and Language Understanding

Dep Var: Read Time 1 N: 127 Multiple R: .667 Squared Multiple R: .444
Adjusted Squared Multiple R: .417 Standard Error of Estimate: 0.548

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	2.269	0.814	0.000		2.787	0.006
Literacy Interest	0.282	0.050	0.388	0.979	5.646	0.000
Story Activity	0.116	0.050	0.158	0.997	2.311	0.023
Social Class	0.336	0.051	0.462	0.945	6.601	0.000
Home Problems	-0.128	0.049	-0.177	0.999	-2.595	0.011
Gender	-0.032	0.103	-0.022	0.892	-0.307	0.759
Age	0.019	0.013	0.101	0.951	1.443	0.151

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	28.773	6	4.795	15.994	0.000
Residual	35.979	120	0.300		

Dep Var: Lang.Under. N: 127 Multiple R: .508 Squared Multiple R: .258
Adjusted Squared Multiple R: .221 Standard Error of Estimate: .879

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	-1.922	1.306	0.000		-1.471	0.144
Literacy Interest	0.234	0.080	0.232	0.979	2.918	0.004
Story Activity	0.154	0.081	0.150	0.997	1.903	0.059
Social Class	0.380	0.082	0.376	0.945	4.643	0.000
Home Problems	-0.117	0.079	-0.115	0.999	-1.467	0.145
Gender	0.030	0.165	-0.015	0.892	0.183	0.855
Age	0.029	0.021	0.114	0.951	1.412	0.160

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	32.230	6	5.372	6.954	0.000
Residual	92.692	120	0.772		

Table 7

Time 1 Prediction of Early Reading at End of Kindergarten

Dep Var: Read Time 2 N: 127 Multiple R: .774 Squared Multiple R: .598
Adjusted Squared Multiple R: .571 Standard Error of Estimate: 0.641

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	-1.828	1.016	0.000		-1.800	0.074
Literacy Interest	0.076	0.066	0.076	0.772	1.146	0.254
Story Activity	-0.087	0.060	-0.087	0.946	-1.443	0.152
Social Class	0.002	0.071	0.002	0.676	0.030	0.976
Home Problems	-0.020	0.060	-0.020	0.945	-0.341	0.734
Gender	-0.135	0.121	-0.069	0.890	-1.122	0.264
Age	-0.015	0.015	-0.058	0.929	-0.959	0.340
Lang. Under.	0.160	0.073	0.163	0.610	2.183	0.031
E.Read1	0.875	0.118	0.641	0.457	7.423	0.000

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	72.265	8	9.033	21.973	0.000
Residual	48.510	118	0.411		

Table 8
Time 1 Prediction of Reading at Beginning of First Grade

Dep Var: Decode T3 N: 114 Multiple r: .740 Squared Multiple R: .547
Adjusted Squared Multiple R: .513 Standard Error of Estimate: 0.693

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	-2.910	1.163	0.000		-2.503	0.014
Literacy Interest	0.192	0.075	0.192	0.780	2.577	0.011
Story Activity	0.021	0.070	0.020	0.919	0.298	0.766
Social Class	0.059	0.081	0.058	0.686	0.731	0.466
Home Problems	-0.070	0.068	-0.070	0.931	-1.027	0.307
Gender	-0.209	0.137	-0.106	0.896	-1.527	0.130
Age	0.010	0.018	0.040	0.945	0.592	0.555
Lang.U.	0.097	0.084	0.095	0.650	1.162	0.248
E.Read1	0.745	0.132	0.532	0.484	5.636	0.000

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	60.937	8	7.617	15.862	0.000
Residual	50.421	105	0.480		

Dep Var: COMPRE T3 N: 114 Multiple R: .382 Squared Multiple R: .146
Adjusted Squared Multiple R: .081 Standard Error of Estimate: 0.958

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	0.162	1.608	0.000		0.101	0.920
Literacy Interest	-0.072	0.103	-0.071	0.780	-0.700	0.485
Story Reading	-0.042	0.097	-0.041	0.919	-0.432	0.666
Social Class	-0.101	0.112	-0.099	0.686	-0.905	0.367
Home Problems	-0.040	0.094	-0.039	0.931	-0.422	0.674
Gender	0.115	0.190	0.058	0.896	0.605	0.546
Age	-0.012	0.024	-0.044	0.945	-0.474	0.636
Lang.U.	0.381	0.116	0.368	0.650	3.293	0.001
E.Read1	0.120	0.183	0.085	0.484	0.658	0.512

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	16.520	8	2.065	2.249	0.029
Residual	96.400	105	0.918		

Table 9
Time 1 Prediction of Reading at End of First Grade

Dep Var: Decode T4 N: 109 Multiple R: .537 Squared Multiple R: .289
Adjusted Squared Multiple R: .232 Standard Error of Estimate: 0.866

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	0.596	1.500	0.000		0.398	0.692
Literacy Interest	0.125	0.094	0.127	0.782	1.331	0.186
Story Activity	-0.098	0.090	-0.096	0.915	-1.087	0.280
Social Class	-0.102	0.104	-0.099	0.700	-0.983	0.328
Home Problems	-0.186	0.087	-0.187	0.942	-2.151	0.034
Gender	-0.341	0.175	-0.173	0.898	-1.947	0.054
Age	-0.014	0.023	-0.054	0.944	-0.627	0.532
Lang.U.	-0.029	0.105	-0.028	0.671	-0.276	0.783
E.Read1	0.577	0.166	0.416	0.497	3.475	0.001

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	30.416	8	3.802	5.073	0.000
Residual	74.939	100	0.749		

Dep Var: Compre T4 N: 109 Multiple R: .623 Squared Multiple R: .388
Adjusted Squared Multiple R: .339 Standard Error of Estimate: 0.804

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	0.674	1.392	0.000		0.484	0.629
Literacy Interest	-0.028	0.087	-0.028	0.782	-0.316	0.753
Story Activity	0.053	0.084	0.052	0.915	0.632	0.529
Social Class	-0.155	0.096	-0.151	0.700	-1.612	0.110
Home Problems	0.059	0.080	0.059	0.942	0.728	0.468
Gender	0.147	0.163	0.075	0.898	0.906	0.367
Age	-0.017	0.021	-0.065	0.944	-0.808	0.421
Lang.U.	0.650	0.098	0.635	0.671	6.651	0.000
E.Read1	0.053	0.154	0.038	0.497	0.341	0.734

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	40.897	8	5.112	7.918	0.000
Residual	64.563	100	0.646		

Table 10

Time 1 Prediction of Reading at End of Second Grade

Dep Var: Decode T5 N: 98 Multiple R: .399 Squared Multiple R: .159
Adjusted Squared Multiple R: .083 Standard Error of Estimate: 0.957

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	-0.697	1.756	0.000		-0.397	0.693
Literacy Interest	0.186	0.116	0.181	0.738	1.601	0.113
Story Activity	-0.128	0.107	-0.122	0.902	-1.196	0.235
Social Class	-0.037	0.125	-0.034	0.715	-0.298	0.767
Home Problems	-0.061	0.101	-0.061	0.935	-0.609	0.544
Gender	0.048	0.203	0.024	0.912	0.236	0.814
Age	-0.019	0.026	-0.071	0.930	-0.704	0.483
Lang.U.	-0.079	0.123	-0.077	0.656	-0.640	0.524
E.Read1	0.524	0.239	0.319	0.448	2.194	0.031

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	15.415	8	1.927	2.102	0.044
Residual	81.575	89	0.917		

Dep Var: Compre T5 N: 98 Multiple R: .744 Squared Multiple R: .553
Adjusted Squared Multiple R: .513 Standard Error of Estimate: 0.698

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	2.089	1.280	0.000		1.632	0.106
Literacy Interest	0.008	0.085	0.008	0.738	0.097	0.923
Story Activity	0.013	0.078	0.013	0.902	0.169	0.866
Social Class	0.107	0.091	0.099	0.715	1.179	0.242
Home Problems	-0.133	0.073	-0.132	0.935	-1.807	0.074
Gender	-0.017	0.148	-0.009	0.912	-0.116	0.908
Age	-0.053	0.019	-0.201	0.930	-2.738	0.007
Lang.U.	0.540	0.090	0.527	0.656	6.020	0.000
E.Read1	0.358	0.174	0.218	0.448	2.056	0.043

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	53.637	8	6.705	13.761	0.000
Residual	43.361	89	0.487		

Table 11

Time 1 Prediction of Reading at End of Third Grade

Dep. Var: Read T6 N: 83 Multiple R: .696 Squared Multiple R: .485
Adjusted Squared Multiple R: .429 Standard Error of Estimate: 0.114

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	1.187	0.233	0.000		5.088	0.000
Literacy Interest	0.048	0.015	0.305	0.722	3.103	0.003
Story Activity	0.001	0.014	0.005	0.864	0.060	0.953
Social Class	0.024	0.017	0.139	0.749	1.437	0.155
Home Problems	-0.023	0.013	-0.155	0.949	-1.814	0.074
Gender	0.032	0.027	0.105	0.890	1.183	0.240
Age	-0.008	0.004	-0.202	0.906	-2.301	0.024
Lang.U.	0.049	0.016	0.300	0.701	3.007	0.004
E.Read1	0.053	0.033	0.194	0.481	1.615	0.111

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	0.910	8	0.114	8.714	0.000
Residual	0.966	74	0.013		

Table 12

Prediction of Decoding in First and Second Grades

Beginning of first grade
Dep Var: Decode T3 N: 114 Multiple R: .876 Squared Multiple R: .768
Adjusted Squared Multiple R: .762 Standard Error of Estimate: 0.485

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	-0.677	0.326	0.000		-2.078	0.040
Literacy Interest	0.127	0.050	0.126	0.850	2.535	0.013
E.Read1	0.184	0.095	0.132	0.459	1.943	0.055
E.Read2	0.760	0.071	0.722	0.467	10.740	0.000

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	85.511	3	28.504	121.309	0.000
Residual	25.846	110	0.235		

End of first grade
Dep Var: Decode T4 N: 108 Multiple R: .708 Squared Multiple R: .501
Adjusted Squared Multiple R: .482 Standard Error of Estimate: 0.714

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	-0.378	0.218	0.000		-1.732	0.086
Decode3	+0.355	0.137	+0.353	0.264	+2.602	0.011
E.Read2	+0.327	0.142	+0.308	0.271	+2.304	0.023
Home Prob.	-0.155	0.070	-0.156	0.971	-2.207	0.030
Gender	-0.288	0.139	-0.146	0.972	-2.066	0.041

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	52.782	4	13.196	25.887	0.000
Residual	52.504	103	0.510		

Table 12 (Continued)

End of Second Grade

Dep Var: Decode T5 N: 98 Multiple R: .763 Squared Multiple R: .582
Adjusted Squared Multiple R: .569 Standard Error of Estimate: 0.657

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	+0.415	0.209	0.000		-1.983	0.050
Home problems	-0.117	0.069	-0.117	0.929	-1.692	0.094
Gender	-0.297	0.135	-0.149	0.965	-2.194	0.031
Decode4	+0.827	0.073	+0.799	0.898	+11.357	0.000

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	56.451	3	18.817	43.632	0.000
Residual	40.539	94	0.431		

Table 13

Prediction of Comprehension in First, Second, and Third Grade

Beginning of first grade

Dep Var: Compre T3 N: 114 Multiple R: .361 Squared Multiple R: .130
Adjusted Squared Multiple R: .123 Standard Error of Estimate: 0.936

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	0.009	0.088	0.000		0.100	0.920
Lang.U.	0.373	0.091	0.361	1.000	4.097	0.000

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	14.719	1	14.719	16.787	0.000
Residual	98.201	112	0.877		

End of first grade

Dep Var: Compre T4 N: 108 Multiple R: .601 Squared Multiple R: .361
Adjusted Squared Multiple R: .355 Standard Error of Estimate: 0.794

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	-0.005	0.076	0.000		-0.068	0.946
Lang.U.	0.614	0.079	0.601	1.000	7.768	0.000

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	38.029	1	38.029	60.345	0.000
Residual	67.431	107	0.630		

End of Second Grade

Dep Var: Compre T5 N: 98 Multiple R: .711 Squared Multiple R: .505
Adjusted Squared Multiple R: .489 Standard Error of Estimate: 0.715

Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	-1.420	0.511	0.000		-2.777	0.007
Lang.U.	0.525	0.091	0.512	0.670	5.778	0.000
Home problems	-0.124	0.074	-0.124	0.970	-1.685	0.095
E.Read1	0.398	0.147	0.242	0.660	2.713	0.008

Table 13 (Continued)

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	48.972	3	16.324	31.950	0.000
Residual	48.027	94	0.511		

End of Third Grade
Dep Var: Read T6 N: 83 Multiple R: .767 Squared Multiple R: .588
Adjusted Squared Multiple R: .578 Standard Error of Estimate: 0.098

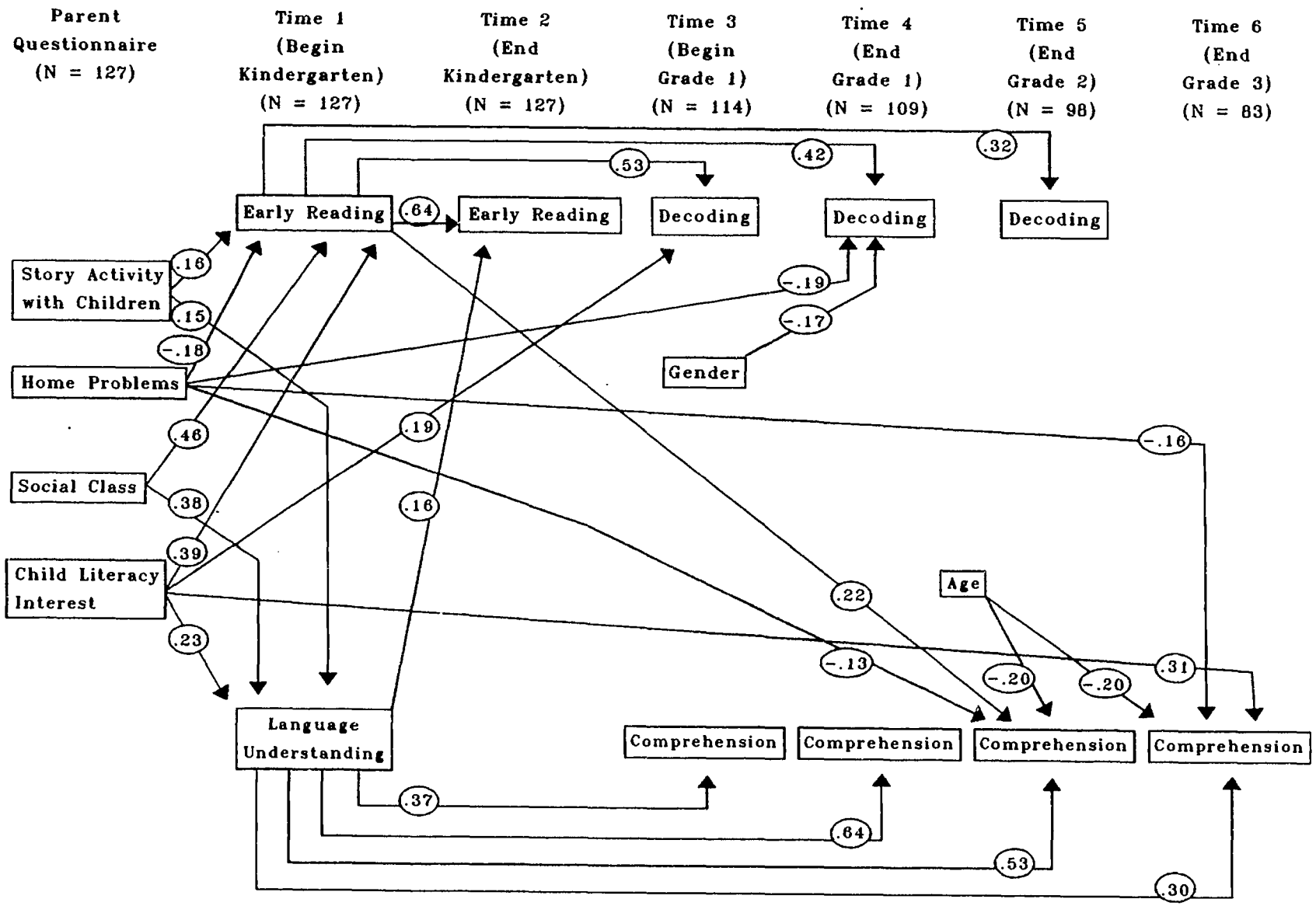
Variable	Coefficient	Std Error	Std Coef	Tolerance	T	P (2 Tail)
Constant	0.906	0.011	0.000		83.772	0.000
Literacy Interest	0.048	0.011	0.304	0.970	4.176	0.000
Compre5	0.100	0.011	0.654	0.970	8.975	0.000

ANALYSIS OF VARIANCE

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	1.103	2	0.551	57.147	0.000
Residual	0.772	80	0.010		

Figure 1

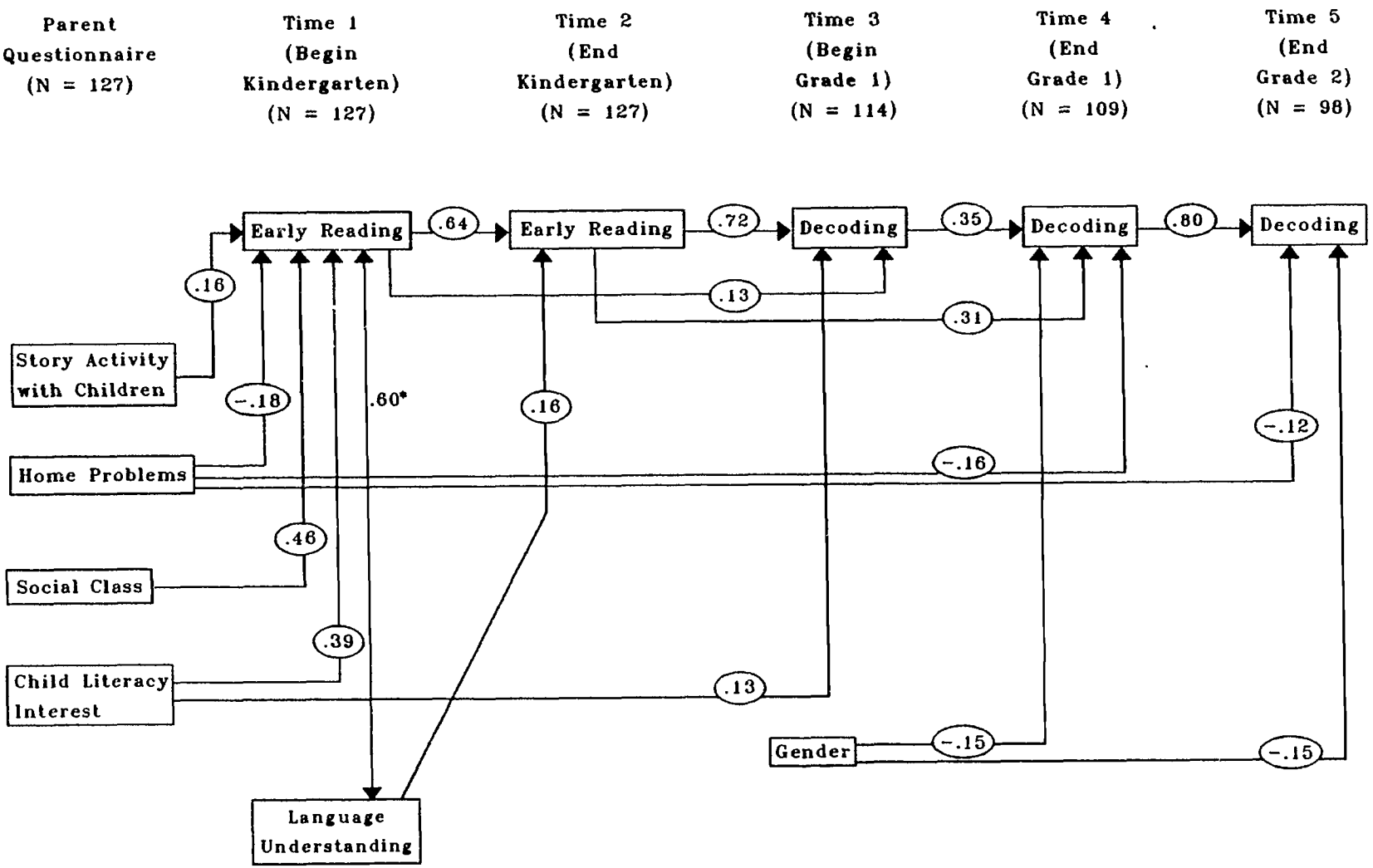
Path Analysis Diagram of Results*



* All values above the path indicate standard coefficients predicting each subsequent dependent variable ($p < .10$).

Figure 2

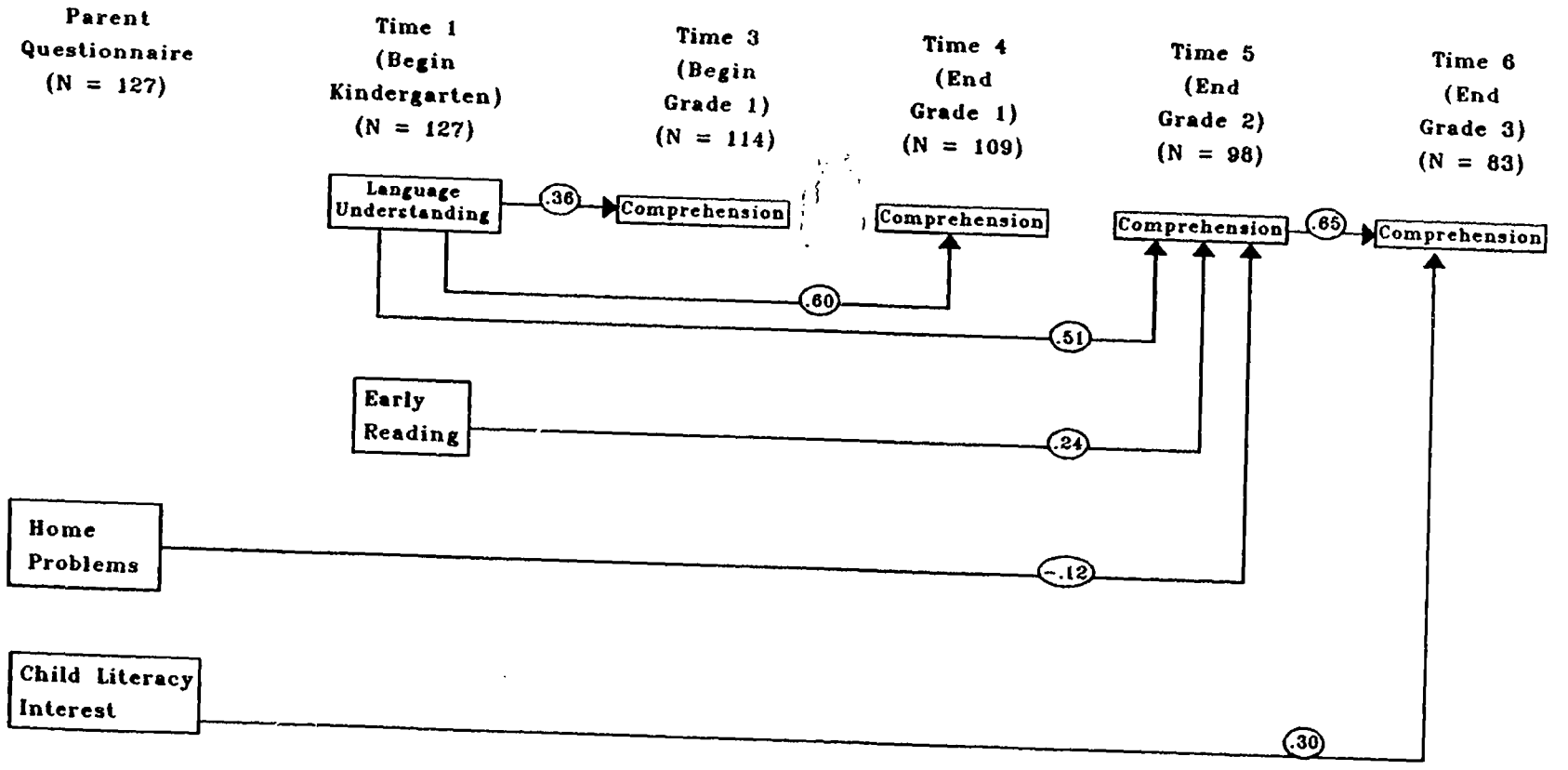
Prediction of Early Reading and Decoding from Beginning of Kindergarten to End of Second Grade



*Correlation. All circled values indicate standard coefficients ($p < .05$)

Figure 3

Prediction of Comprehension from Beginning of Kindergarten to End of Third Grade



APPENDIX

Appendix: Parent Questionnaire

Overall Analysis of 4 schools (13 classrooms)*

Reading

1. Do you read to your child?

DAILY	WEEKLY	OCCASIONALLY	HARDLY EVER	NO
4	3	2	1	0

43% are read to daily; 82% read daily or weekly
$\bar{X}$ = 3.23 (.82)

2. If you read to your child, when did you begin?

Age 1, 2, 3, 4, 5

64% began reading to child by age 1, 86% began reading to child by age 2
$\bar{X}$ = 1.55 (.86)

3. Does the child ask to be read to?

DAILY WEEKLY OCCASIONALLY HARDLY EVER NO

46% of children ask to be read to daily, 76% of children ask at last weekly
$\bar{X}$ = 3.15 (.95)

4. Does the child have a favorite book? YES NO
If yes, about how many times have you read it? _____

47% of children have a favorite book which 7% of parents have read over 50 times.
$\bar{X}$ = .54 (.62)

5. Is there a regular time for reading? YES SOMETIMES NO

46% have a regular time for reading.
$\bar{X}$ = 1.14 (.87)

6-7. Did any family member read to the child yesterday? YES NO
If yes, how long? _____

65% (of all children) were read to yesterday.
(6) $\bar{X}$ = .66 (.48)

8-9. Circle what the child likes to look at: picture books, children's reading books, coloring books, comics, alphabet books, number books, school books, newspapers, magazines. How often?

DAILY WEEKLY OCCASIONALLY HARDLY EVER NO

Model length of reading was 15 minutes (20%) or 30 minutes (15%)
(8) $\bar{X}$ = 4.58 (2.33) Range = 0-11
(9) $\bar{X}$ = 3.58 (.73)

10. About how many children's books do you have at home? _____

$\bar{X}$ = 85 (75.46) (Range = 0 - 500)

11. Does the child have any magazine or book subscriptions? YES NO
If yes, how many? _____

$\bar{X}$ = .93 (1.00) (Range = 0 - 5)

12. Do you buy reading materials to help you child learn to read?
VERY OFTEN OCCASIONALLY NO

58% of parents occasionally buy reading materials.
$\bar{X}$ = 1.08 (.64)

13. Do you buy games to help your child learn to read?
VERY OFTEN OCCASIONALLY

60% of parents occasionally buy games.
$\bar{X}$ = .81 (.61)

14-15. Circle what the child tries to read: Bible, newspapers, comics, magazines, jokes, favorite story, school books, stories, T-shirts, food labels, traffic signs, billboards, TV words. How often?

DAILY WEEKLY OCCASIONALLY HARDLY EVER NO

63% of children try daily to read, 75% of children try at least weekly to read
(14) $\bar{X}$ = 5.16 (2.75) (Range = 0-13)
(15) $\bar{X}$ = 3.32 (1.00)

16. Does the child try to read to you?
DAILY WEEKLY OCCASIONALLY HARDLY EVER NO
$\bar{X}$ = 2.32 (1.18)

17. Do any family members help the child read?
$\bar{X}$ = 2.59 (1.16)

VERY OFTEN OCCASIONALLY NO

18. Does the child read alone?
DAILY WEEKLY OCCASIONALLY HARDLY EVER NO
$\bar{X}$ = 1.67 (1.55)

19. Does the child read to other children?
DAILY WEEKLY OCCASIONALLY HARDLY EVER NO

20% try to read alone or to parents daily, 5% to other children daily, 41% try at least weekly alone or to read to parents and 14% to other children.
$\bar{X}$ = 1.13 (1.23)

Listening

20. Does the child listen to stories on records and cassettes?
DAILY WEEKLY OCCASIONALLY HARDLY EVER NO

17% listen to story cassettes daily; 48 listen at least weekly.
$\bar{X}$ = 2.43 (1.06)

21. Is story telling without a book a regular family activity?
DAILY WEEKLY OCCASIONALLY HARDLY EVER NO

Story telling is an occasional activity for 34% of families.
$\bar{X}$ = 1.34 (1.17)

22. Does the child tell stories to others?
DAILY WEEKLY OCCASIONALLY HARDLY EVER NO

53% of children tell stories occasionally, 10% daily
$\bar{X}$ = 2.10 (.95)

Writing

23-24. Does the child try to print letters, words, or stories?
DAILY WEEKLY OCCASIONALLY HARDLY EVER NO
Circle what the child prints: alphabet letters, words, stories, cards or letters, telephone messages, shopping lists, copying reminder notes, labeling pictures, own name,

_____

73% try to write daily; 87% try at least weekly.
(23) $\bar{X}$ = 3.55 (.86)

25. Do any family members help the child print?
DAILY WEEKLY OCCASIONALLY HARDLY EVER NO

34% of families help child write daily; 67% help at least weekly.
$\bar{X}$ = 2.91 (1.00)

Other Activities

26. Does the child take books from a public library? YES NO

$\bar{X}$ = .64 (.48)

27. About how many hours in a school day does the child usually watch TV? _____
$\bar{X}$ = 2.69 (1.39) (Range = 0-9)

28. How many hours on Saturday does the child usually watch TV? _____
$\bar{X}$ = 3.57 (1.80) (Range = 0-9)

29. Does the child watch Sesame Street? YES OCCASIONALLY NO
$\bar{X}$ = 1.47 (.64)

30. Does the child talk to you about TV programs?
DAILY WEEKLY OCCASIONALLY HARDLY EVER NOT AT ALL
$\bar{X}$ = 3.06 (1.00)

Children watch TV $\bar{X}$ = 2.7 hrs per day on a school day, $\bar{X}$ = 3.6 hrs on Saturday; 55% watch Sesame Street regularly; 46% of children discusses TV with parents daily.

32. Does the child "play school" with others? YES SOMETIMES NO

49% of children "play school" regularly.
$\bar{X}$ = 1.32 (.75)

33-34. Does the child do school work at home? YES SOMETIMES NO
What kind of work: read library books, read school books, finish work, study words or letters, other _____

48% of children do school work at home regularly.
(33) $\bar{X}$ = 1.32 (.74)
(34) $\bar{X}$ = 1.71 (1.17)

35. Does the child get any help on school work? YES SOMETIMES NO

60% get help form parents regularly.
$\bar{X}$ = 1.44 (.75)

36-37. Does the child help with chores? YES SOMETIMES NO
Circle how child helps: making bed, cleaning room, dusting, caring for younger child, caring for pet, picking up toys, cooking, dishwashing, setting table, taking out garbage, mowing lawn, weeding, gardening, raking leaves, shoveling snow, other _____.

72% do chores regularly.
(36) $\bar{X}$ = 1.72 (.47)
(37) $\bar{X}$ = 5.77 (2.79)

Background of child and family:

38-40. Circle any problems the child has had since birth: major illness, poor hearing, poor vision, hard to toilet train, hard to discipline, tantrums, fearful, overactive, fussy eater, poor sleeper, emotional, distractible, short attention, not adaptable, unpredictable, slow.
other _____

38. (physical problems) (3 items): $\bar{X}$ = .24 (.53)

39. (temperamental problems) (7 items); $\bar{X}$ = 1.08 (1.42)

40. (developmentally delayed) (1 item): $\bar{X}$ = .05 (.22)

41-43. What do you think are this child's good qualities: calm, confident, considerate of others, emotionally stable, outgoing, friendly, cheerful, understands others' feelings, sense of humor, honest, good-natured, sincere, socially well-adjusted, well-liked, bright, clear thinking, curious, inventive, a talker, imaginative, other _____

41. (temperamental stability (3 items): $\bar{X}$ = 1.16 (1.06)

42. (sociability) (11 items): $\bar{X}$ = 6.28 (3.06)

43. (cognitive ability) (6 items): $\bar{X}$ = 3.74 (1.74)

44-47. If the child regularly went to school or to a babysitter before kindergarten, please check the kind of care and when the child attended.

	Age 1	Age 2	Age 3	Age 4
half day school	_____	_____	_____	_____
whole day school	_____	_____	_____	_____
part day babysitting	_____	_____	_____	_____
whole day babysitting	_____	_____	_____	_____

35% of children have had 2 or more years of half or whole day school;
19% have had 2 or more years of half or whole day baby sitting.

48. Who usually watches the child after school now? parent, other adult, older child, babysitter, after school program, self-care

67% parents watch child after school
10% other adults
3% older children
10% babysitter
9% after school program

49-50. How many brothers and sisters does this child have? _____
How many are younger _____ than this child?

$\bar{X}$ = 1.5 brother and sisters; 44% have 1 sibling
.5 are younger; 59% have no younger siblings
(49) $\bar{X}$ = 1.47 (1.18)
(50) $\bar{X}$ = .47 (.61)

51-53. How many adults live at home? _____ Circle what adults:
mother, father, grandparent(s), other relatives or friends

85% have 2 adults in home; 5% no mother; 12% no father
(51) $\bar{X}$ = 1.94 (.46) (R = 1-5)
(52) (mother) $\bar{X}$ = .99 (1.0)
(53) (father) $\bar{X}$ = .88 (.33)

54. Circle the highest school that the child's other completed:
elementary, junior high, high school, junior college, university, graduate school

44% of mothers completed high school; 18% went for 2 years college; 19% 4 years college
$\bar{X}$ = 13.59 (2.58)

55. Circle the highest school that the child's father completed:
elementary, junior high, high school, junior college, university, graduate school

4% of fathers completed high school; 14% 2 years college; 17% 4 years college
$\bar{X}$ = 13.79 (2.97)

56-57. What kind of work outside the home does the child's mother do? _____
About how many hours of work each week: _____

35% of mothers do not work; 10% are typists or shopkeepers; 11% are elementary school teachers; 8% have higher prestige jobs than teacher.
(56) $\bar{X}$ = 28.65 (23.26) (where housewife = 0)
(57) $\bar{X}$ = 21.16 (18.33)

58-59. What kind of work does the child's father do? _____
About how many hours of work each week: _____

3% of fathers do not work; 13% are sales clerks, plumbers, or masons; 9% are mechanics or office clerks, higher occupations account for remaining 50%
(58) $\bar{X}$ = 45 (15.06)
(59) $\bar{X}$ = 43.32 (11.28)

*Where appropriate we have listed means and standard deviations (in parentheses) or score ranges.

Parent Questionnaire Summary of Literacy

Reading at Home

Most kindergarten children in this sample are read to at home. Over 80% are read to at least once a week, with reading beginning be age 2. Also nearly half (48%) listen to stories on cassette at least once a week, about 17% listen every day. Nearly half, have a regular time for reading and are read to every day; nearly 2/3 (64%) have been read to since age 1. Nearly half of the children have a favorite book which 7% of the parents say they've read over 50 times. Children are typically read to for 15-30 minutes (35% of parents), with a reported maximum of 75 minutes.

Reading Interest

Most children appear to be interested in reading, 71% like to look at reading material every day, and 76% ask to be read to at least once a week (46% ask daily).

Reading Materials

Most children have books at home ($\bar{X}$ = 85, range 0-500). Fewer have magazine subscriptions ($\bar{X}$ - 1, range of 0-5). However, 64% take books from the libary, and 58% of the parents occasionally buy books or game materials to help children learn to read.

Reading and Writing Attempts

Kindergarten children try to read, 63% try daily, 75% try at least once a week. 20% try to read alone or to parents every day. 40% try at least once a week. A few try to read to other children (14% try at least once a week). Even larger number of children try to write, 73% trying daily, 87% at least once a week.

Story Telling

Story telling hardly ever takes place ($\bar{X}$ = 1.3), but is an occasional activity for 34% of families. Children occasionally listen to stories or tell stories to others.

TV Watching

Children watch TV 2.7 hours per day on school days and 3.6 on weekends, 55% watch Sesame Street (yes and occasional)

Parent Help

Parents provide some help for literacy: 25-34% help every day with reading or writing; 53-67% help at least once a week; 46% discuss Sesame Street with their child every day; 60% get help in school work regularly.

Child Responsibility

72% do chores regularly.

Background of Families

In over 60% of the families both mother and father work outside the home; 3% of fathers and 35% of mothers do not work outside the home. Common occupations of fathers are accountants, sales or office clerks, repairmen, farmers, army personnel, factory workers, and mechanics. The most common occupations of mothers are typists, shopkeepers, and elementary school teachers. Nearly 75% of the children have had 2 or more years of day care or schooling *before* kindergarten.

Eighty-four percent of the families contain 2 adults, 11% have one adult. Twelve percent have the father missing, and 1% do not have the mother. Sixteen percent (16%) of kindergarten children have no siblings, 44% have 1, 26% have 2. Forty percent of their siblings are younger.

About 45% of mothers and fathers completed high school. Of those, about 35% went on to college, nearly 20% completing at least four years of college.

Parents' description of their kindergarten child's health was generally positive. Eighty-one percent indicated no illness, hearing or vision problems, 45% described no adjustment (e.g., problems with eating, toilet training, sleeping, disciplining; has tantrums, overactive, emotional, distractable) or emotional problems, and 95% marked that the child was not slow. Sixty-five percent said the child was calm, confident, or stable, 99% checked outgoing, friendly, cheerful, sense of

humor, understanding. Ninety-five percent said the child was bright, clear thinking, curious, inventive, a talker, or imaginative.

Care of Children

Nearly 75% of the children have had two or more years of help of whole day babysitting or daycare schooling before going to kindergarten.

During the kindergarten year, 67% of parents watch the child after school, 30% have another adult or an after school care program, and the remaining 3% are watched by an older child.