Factors that predict success in an early literacy intervention project

Literacy acquisition is based on complex cognitive, emotional, social, and instructional factors (Libion & Wilson, 1997). At the heart of the matter is how quickly children acquire strategies for decoding words. For some children, it is easy to internalize the alphabetic principle because they have experienced many literacy-related activities that often include parent modeling and scaffolding of reading behaviors. These children recognize words automatically and consequently find reading to be a meaningful and rewarding experience. This leads to more reading, more exposure to vocabulary and concepts, and more rewards.

Many at-risk children have significantly fewer opportunities to engage in meaningful literacy-related experiences and are less likely to develop automatic decoding skills (Adams, 1990). Because so much cognitive capacity is focused on decoding, many at-risk children find reading to be difficult and frustrating and are less likely to engage in it on their own. If they don't read, they are less likely to develop automatically, vocabulary, and concepts about the world as well as intrinsic motivation to read. This downward spiral of reading achievement has been proposed as a major determinant of school failure (Stanovich, 1986).

The consequences for children who do not learn to read in the early grades have been well documented. Juel (1988) reported that 88% of the children who scored in the lowest quartile in reading comprehension at the end of first grade remained below the 50th percentile at the end of fourth grade. Although difficulties achieving literacy proficiency are not limited to poor, urban youngsters, it is these children who are most at risk.

Convinced of the accuracy of this description of reading failure, our profession initiated two areas of instructional research: (a) how to prevent early reading failure by designing print-rich, developmentally appropriate literacy instruction, and (b) for those children who needed more individual attention, how to design effective early intervention programs. Our Literacy Project was designed to improve the literacy achievement of urban children who were at risk because of poverty and minimal early reading skills.

Early intervention research

The success of five quite different early intervention programs has been documented within the last 10 years. Hiebert, Goh, Cato, and Gary (1992) examined the effects of a structured Chapter 1 reading program that included systematic word study and practice of reading in easy-to-read books. Seventy-seven percent of the first graders who participated in the structured program were able to read at a primer level at the end of the year, compared with 18% in the traditional Chapter 1 program. Effect size (ES) for word recognition and comprehension were 1.39 and 1.16, respectively. First graders in the structured program were able to perform comparably to their average peers on end-of-year reading and writing assessments. These results offered promise for small-group tutoring programs that include word study and reading text. However, the study did not examine which instructional components were related to success.

Taylor and her colleagues (Taylor, Arne, Short, & Shepherd, 1992) designed an in-classroom, small-group tutoring program for struggling first-grade readers. The goal of the program was to develop fluency through repeated reading of summarized children's trade books, with children gradually making the transition to reading.
Factors that predict success in an early literacy intervention project

The reported studies were conducted over 2 years to examine the effectiveness of an early literacy intervention project for minority children. The group of children who were either nonreaders or were one or more years below grade level had received small-group literacy instruction from preschool teachers who taught for 10 weeks each semester until they reached grade-level reading. Parents were involved by attending literacy events and reading with their child at home. Children enrolled in the project made more progress after one semester than a group of untreated children. Children who began a semester reading at primer or first-grade levels made more progress than children reading at lower or higher levels. The context that predicted reading growth was the number of books parents bought, story grammar instruction, the number of words the child read at home, and parent involvement in recreational reading. The results and implications are discussed in relation to other early intervention projects.

Factores que predicen el éxito en una intervención temprana

Los estudios reportados fueron condujados durante dos años con el fin de examinar la efectividad de un proyecto de intervención temprana para niños de 3-4 grado de medias urbanizadas. Niños que no leían o mal leían en montículos de seguimiento basados en una intervención educativa en grupos pequeños con futuros docentes. La intervención se realizó después de la escuela durante 10 semanas cada semestre hasta alcanzar el nivel de lectura correspondiente al grado escolar. Los padres participaron asistiendo e invitando y leyendo con sus hijos en el hogar. Los niños participantes en el proyecto progresaron más después de un semestre que un grupo de niños sin intervención. Aquellos niños que comenzaron el semestre leyendo en el nivel de primer grado progresaron más que los que iniciaron no leían o superaban. Los factores que predicen el crecimiento de la lectura fueron el número de libros de libros comprados, la lectura en cuentos, el número de palabras que el niño leyó en casa y la participación de los padres en la lectura recreativa. Los resultados e implicaciones se discuten en relación con otros proyectos de intervención temprana.

Faktoren, die Erfolg durch ein frühzeitiges Interventionsprojekt voraussagen

初期の介入教育プロジェクトの成功を予測する要素

この研究では、スクリュ過程に住む小学生1年から4年までの児童に対する初期の読み書き介入教育プロジェクトの効果を調査するために、2年間の間にわたって実施されたものである。読めない児童や読めのレベルが1学年以上遅い児童が対象となった。読め始めの児童の場合は、指導を受けた。指導は、中心に小学校1年生レベルの読め始めの児童である。指導の内容は、読み書きの基本的な知識を学習することである。

ファクター・プルーティフィックスのの実行を成功するための介入プロジェクト

LES ÉTUDES rapportées ont été conduites pendant 2 ans afin de connaître l'efficacité d'un projet d'intervention précoce destiné à des enfants de 1er à 4e année vivant en milieu rural. Les enfants, qui étaient souvent non lecteurs, ont appris à lire et à écrire à un niveau supérieur à ceux qui n'avaient pas été aidés. Les enseignants ont ainsi pu identifier parmi des équipes de professionnels en formation à raison de 10 semaines par semaine, jusqu'à ce qu'eux-mêmes améliorent le niveau correspondant à leur âge. On a impliqué les parents au moyen de newsletters sur la lecture et la lecture avec leurs enfants à la maison. Les enfants dans ce projet ont fait plus de progrès après un semestre qu'un groupe d'enfants vivant en milieu rural. Les enfants commençaient à lire à un niveau de première année ou de deuxième année. Les résultats ont été une amélioration de la lecture grâce à la participation des parents, le nombre de types de mots enseignés, l'enseignement de la grammaire du texte, le nombre de mots appris à la maison, et l'application des parents dans la lecture à la maison. On observe des résultats et des implications par rapport à d'autres groupes d'intervention précoce.
full-length texts. Teachers modeled segmenting and blending phonemes and used multiple error systems for decoding. At the end of the intervention, 50% of the tutored children compared with 20% of non-tutored children were able to read first-grade level text (ES = .40). Although tutored children reduced the gap between themselves and their more able classmates, their mean percentile rank on a standardized reading achievement test was still lower (57th vs. 51st percentile). Although Taylor et al.'s (1992) program also showed evidence of success, as with Hiebert et al. (1992), the relative contribution of the various instructional variables cannot be determined.

Success for All (Stevan, Maddox, Karwek, Lemonov, & Delan, 1993) is a one-on-one tutoring program designed to be integrated with first-grade classroom instruction. In addition to their regular assignments, teachers tutored three children individually per hour using structured lessons. Comprehension and recognition were emphasized, and children read texts written to include phonetically regular words. Effect sizes favor of first-grade Success for All students averaged 50 across all measures of reading achievement.

Other early intervention studies examined the instructional features related to achievement growth. Several studies have shown that Reading Recovery can be successful with diverse populations (Carter, Wheldall, Freeman, Outhred, & McNaught, 1995; Clay, 1993; Deford, Lyons, & Pinell, 1991, 1995; Pinell, Deford, Place, & White, 1990; Wheeler, 1984). Reading Recovery (RR) is founded on the premise that learning takes place in social contexts with scaffolding from adults, and that the child is a problem solver who discovers that the key is reading is in using multiple clue systems.

Pinell, Lyons, Deford, Byrth, and Seltzer (1994) examined which of several important features of RR—the instructional methodology, the size of the group tutored, and the length and type of teacher training—were most essential to children's literacy growth. Four experimental groups were constructed: (a) a traditional RR program in which teachers received a standardized reading training and children were tutored individually; (b) Reading Recovery, based on the RR instructional framework, except that the teacher training model differed from traditional RR both in length of training and process; (c) Direct Instructional Skills (DIS), a one-on-one, skills-based method unrelated to the RR methodology; and (d) Reading and Writing Group, in which traditionally trained RR teachers taught small groups rather than individuals. Although the test reading level testing in February revealed statistically significant differences in favor of RR-like groups with standardized effect sizes ranging from .40 to .50, these differences did not persist in standardized posttesting in May. Follow-up testing in the fall showed that only children who received one-to-one instruction from teachers who had received intense RR teacher training and who had graduated from the tutoring program were able to show statistically significant growth on test reading levels (ES = .75) and derivational (ES = .25). The results supported central features of the RR program: one-to-one instruction, intensive teacher training, and lesson format and content. Based on Clay's (1984) research other large-scale studies of Reading Recovery have found similar positive effects (Carter et al., 1995; Sternberg, & Turner, 1983).

Despite favorable findings for RR by those involved in the program, several critiques of the program have surfaced. Russek (1995) cited one confounding factor in the Pinell et al. (1994) study. Students in the traditional RR program received more instructional time than students in the other treatment conditions. In an independent evaluation of RR, Shanahan and Barr (1995) cited several other research design features that should be included in evaluations of early intervention programs: (a) control for regression to the mean, (b) examination of the reading abilities of students who were not successful in these programs, and (c) enrollment of students later than first or second grade to permit stable identification of reading difficulties. Our studies included these design features.

Juel (1996) examined the instructional features of a reading training program that was correlated with reading growth. College-age poor readers were tutors for first-grade at-risk children. When compared to a group of first graders who were monitored but not tutored by college students, the tutored children were more successful on a variety of reading and writing measures. Yet the mean percentile score for the tutored children on the Iowa Test of Basic Skills was still below that of their classroom peers. Using quantitative and qualitative analyses of videotapes, Juel compared the most and least successful tutoring pairs. The most successful pairs engaged in more modeling and scaffolding teacher behaviors, instruction about words and word families along with time spent reading materials and repeated these words were statistically significantly correlated with growth.

Summary: Children at risk for reading failure benefited from intensive tutoring experiences. The average effect size was above 1.0 and was quite variable; the variability was likely because of differential tutor effectiveness. Although one-to-one tutoring appeared to be highly effective, several small-group programs had positive results and represent less expensive alternatives for schools with a high percentage of at-risk children. Several instructional practices were evident in all inter-
ventions: (a) teacher modeling and scaffolding of how to use multiple cues strategies for decoding, (b) word study, and (c) time spent practicing skills and strategies when reading connected text.

Our study adds to the existing research in several ways. First, whereas most of the previous studies have been with first graders only, our Literacy Project (LP) focused on children in Grades 1–4. Stanovich and Barr (1995) suggested that intervention programs enroll children in late first grade or second grade because the beginning reading abilities of these students can be more reliably assessed. Second, our project had a large pool of beginning readers so we could examine whether children’s reading growth was related to their present levels. We also continued to teach children until they reached grade-level ability or moved from our partner schools. Therefore, we studied children who had required varying degrees of intervention to reach grade level.

Understanding the instructional needs of children who had different learning needs could help others decide who might be good candidates for small-group instruction. Third, we examined the relationship between specific program components and children’s growth in reading in order to determine which factors to include in an early intervention program.

Theoretical foundation and description of the Literacy Project

The theoretical foundation underlying the Literacy Project reflects research findings on what works for at-risk learners: developmentally appropriate word recognition and comprehension strategies combined with opportunities for reading quality children’s literature (Morrow, 1987; Schonell, 1994). We combined the strength of explicit instruction and the use of authentic literature to develop strategic readers who choose to read. The research support for each component of the Literacy Project follows.

Strategies instruction

Rhyme, rime, and key words. Research has consistently demonstrated that phonological abilities are critical to early reading success (Ball & Blachman, 1991; Lundeberg, Frost, & Peterson, 1989). Bradley and Bryant (1985) believed that the phonological processes of alliteration and rhyme were central to learning that orthographic parallelism, over (e) and the (e) are sound. Instruction stemming from this research has been developed and used successfully with poor and good readers (Gaskins et al., 1988; Gaskins, Gaskins, Anderson, & Schommer, 1993).

In the Literacy Project, tutors selected developmentally appropriate books and based word identification instruction on the children’s needs (Allen, 1998). For example, some of the children were in the emergent reading stage and did not fully understand the concepts of rhyme or alliteration, so tutors selected predictable books and followed up with appropriate games and activities to develop those concepts. Once the children grasped the concept of rhyme, tutors chose words (called key words) from the selected literature that contained rhymes for word study. For example, when using the book Silly Sally (Wood, 1994), the patterns /g/ (from big) and /ow/ (from down) might be used. In every lesson, tutors modeled how to use key words to spell and read words. Using letter cards, children built words with the same rhyme and then read target words in sentences either created by the tutor or drawn from the text. Children were encouraged to use this decodability analysis strategy in subsequent readings of the literature.

Core words. High-frequency words are often those that have less regular sound-symbol correspondences (e.g., there). These words must be recognized automatically with less emphasis on phonemic principles. In the Literacy Project, tutors were encouraged to select high-frequency core words from the literature they were using and to teach children to recognize the words automatically.

Cross-checking: The spontaneous use of self-correction using multiple cue sources to verify that what was read made sense is an important indicator of strategic reading (Clay, 1985). This strategy, called cross-checking, has various levels of complexity. Our goal was to teach the children to monitor their meaning construction. Beginning readers were encouraged to cross-check using initial sounds and picture clues. More advanced beginning readers were told to try to read beginning with the same sound(s) and then finish reading the sentence, in order to cross-check with meaning clues (e.g., to ask themselves, “Did that make sense?”). More advanced readers were taught to use beginning sounds, rime patterns, and meaning to figure out an unknown word.

Comprehension strategies. The type and degree of comprehension instruction differed among children because the literature used varied with the stage of reading development. At the earliest stages, primarily narrative texts with predictable plots were used; as the children could read more text, narratives and poems predominated. For children reading at second- or third-grade level, biographies became a popular choice of instructional material. During shared and guided reading, children were encouraged to make predictions and find support to verify their answers to questions. When using texts with more developed narratives, children were taught the elements of story structure to facilitate comprehen-
sion and to help them write better-developed stories of their own (Cigarette & Spiegel, 1983).

Opportunities to read and share books

Research in the last decade confirms that children should spend significant time engaged in authentic reading experience. The amount of time children read during the school day as part of the instructional program has been linked to reading achievement (Allington, 1984; Joel, Griffith, & Geva, 1987; Taylor, Pye, & Itayuma, 1990). As indicated in the review of early intervention programs, children's reading of connected text during the reading program was a component of all successful programs. Research has also revealed the powerful contribution that out-of-school, recreational reading can make to children's growth (Allen, Gifford, & Stanovich, 1982; Anderson, Wilson, & Fielding, 1989; Gitelson & Stanovich, 1992).

In addition to providing time to read books, either at school or at home, education advocates advocated that children be given time to talk about books with their teachers and peers (i.e., to become members of a literacy club (Smith, 1989)). Social interaction with peers may provide additional motivation for reading as an activity of choice and thus affect reading growth. For example, Manning and Manning (1984) found that social interaction involving books was linked to growth in positive reading attitudes and reading achievement.

In the Literacy Project, children had many opportunities to engage with quality books. Children's literature was used in shared and guided reading lessons. Teachers selected books for the children to take home that were appropriate to the children's reading levels and interests so that children could practice their reading strategies and develop fluency. In addition, books beyond the children's independent reading levels were sent home for parent involvement in reading aloud to their children.

Parent involvement

The importance role that parents play in children's literacy development has been documented by decades of research (Calfee & Moxley, 1997; Christakos, 1987; Snow, Barnes, Chandler, Goodman, & Hargrave, 1991; Wells, 1985). Snow et al. (1991) found that parent involvement was correlated with academic achievement and could compensate for ineffective classroom instruction. Duberet and Epstein (1992) found that parent involvement activities contributed independently to younger children's growth in reading and that the strongest and most consistent predictors of parent involvement were the specific school programs and teacher practices that encouraged and guided parent involvement. These results suggest that parents can provide effective support for children as they develop reading skills.

As part of the Literacy Project, parents learned about their role in supporting their child's literacy development. They were urged to set aside time for the child to read independently and with them and to encourage their children to use strategies taught by the tutors. In addition, parents attended conferences to discuss their children's progress and literacy-related special events such as author or storyteller visits.

Contribution to the literature

Although the literature reviewed indicated that each of the Literacy Project components had been related to reading achievement, there is little research on how to combine these components into an effective early intervention program, especially one for at-risk children. In an era when local and federal agencies are calling for during- and after-school early intervention programs, we need more information about which components should be included and how they should be implemented. What type of after-school intervention is required? Which children might benefit most from tutoring? What type of materials should be used? Should the children be included in the instructional program? We believe that before guidance can be offered to those who design intervention programs, more research is needed to evaluate the factors that contribute to the success of such projects.

The present article reports two studies that addressed these questions. (a) What degree was the Literacy Project effective? (b) Was the Literacy Project differentially successful with children who entered with different reading abilities? (c) Which of the following components of the program were correlated with growth in reading achievement?

- Instructional variables number of days taught, number of core words taught, amount of story grammar instruction.
- Recreational reading variables that reflect interaction among the children, their parents, and instructional components of the Literacy Project: number of words read by the child in books and home and number of words read by parents and children together in those materials.
- Parent variables: attendance at literacy events and number of parent involvement forms returned.

Study 1

The Literacy Project began in the fall of 1982 when we piloted various measures of instructional intervention and parent involvement. Our partners were two private, non-segregated, inner-city schools where over 85% of the
children qualified for free or reduced-price lunch, and over 90% of the children were African American. During the second year we continued to gather data to evaluate the effectiveness of our program, however, because of the popularity of the Literacy Project, we were unable to obtain a sufficiently large comparison group that did not receive tutoring. We conducted analyses of Literacy Project children's growth to determine which factors were correlated with growth in reading achievement. In that way we could determine which, if any, of our instructional variables were important to include the next year. This study presents data from 1984–85 as evidence of the replicability of our results.

Method

Participants. In the fall of 1994 there were 17 tutors and 52 children enrolled. Twelve of the children continued from the previous year, and 40 were new to the Literacy Project. At the end of the fall semester, 11 students continued into the winter term and 6 students graduated. Five children left the Literacy Project because they transferred to other schools, and 5 new students were admitted to produce a winter enrollment of 46. In May 19 students graduated, all of whom had been tutored at least one year. The remaining 27 were in the Literacy Project the next academic year.

All children who were in Grades 1–4 were reading at emergent through first grade levels. The children enrolled in Literacy Project comprised all but one first grader at one school and 76% of the second graders at the other school.

Assessment materials and procedures. Each child was assessed individually within the first 2 weeks of September, January, and May in determining abilities important to form instructional groups. Rhyming ability was tested through a 20-item inventory requiring a yes/no response to pairs of words (Yopp, 1988). The reliability of this measure on end-of-kindergarten children from middle class families was .76 and its correlation with word learning was .47 (Yopp, 1988). We used this measure as a predictor of growth, but rather as a measure of an important emergent reading ability (McClean & Bradley, 1987).

Reading ability was assessed using the Qualitative Reading Inventory–II (QRI–II) (1995). Children read grade-level word lists and they scored less than 50% on a list, then they read stories of varying difficulty. For the first testing, the easiest narrative text within each readability level was used. Test difficulty was determined by using mean comprehension scores presented in the QRI–II. At the second and third testing, each child read a more difficult narrative text within the same readability level as the child's previous instructional reading level, followed by a text at the next higher readability level or levels, until a new instructional reading level was determined. Therefore, growth in reading level was always determined by the child's reading of unfamiliar text. Instructional reading level was defined as the highest level passage on which the child read orally with at least 90% accuracy and 70% comprehension. The reliability of the instructional level sections exceeded .80 on all passages; the alternate-form reliability of level decision averaged .80% agreement across the levels of 4th grader through fourth grade; the reading levels obtained in protest and protest by the children in our studies. Instructional levels have been based on Norms of scores within three to six or above with National Curve Equivalents on group-administered reading assessment measures, and .75 with scores on individualized reading assessments.

Grouping decisions. Children were assigned to groups of two to four without regard to the school they attended. Group membership was based on reading level and rhyming ability. All children within a group were of the same reading level (e.g., emergent, proficient, proficient). Emergent readers were those who could read fewer than 50% of the words on the preprimer word list. Emergent and proficient readers were also grouped according to whether they scored above or below chance on the rhyming task, because the ability to rhyme is thought to be a necessary precursor to teaching reading by analogy (Bradley & Bryant, 1985). At the end of each semester children were reassessed and regrouped if they were at different reading levels or if the behavior among the children was not conducive to learning.

Instructional program. Tutors were students in the elementary teacher education program enrolled in a required reading practicum. They had completed two semesters of study on the integrated teaching of reading and language arts in children's literature, these courses were designed and taught by one of the authors. Both authors read lesson plans to maintain the integrity of the instructional program, and tutors were observed and received feedback approximately every third time they taught. Tutoring occurred twice per week for 10 weeks each semester, resulting in 50 hours of instruction per semester. Each 90-minute session consisted of a stick, a bathroom break, and instruction.

Although the specific skills taught differed somewhat according to the children's levels of literacy development, several features were common for all groups. A typical instructional session began with book sharing, during which each child retold parts of the books that she or he read at home. Next, the tutor presented either a shared or guided reading lesson based on a literature selection, and a lesson on rhyme, alliteration, word identification, or comprehension strategies, depending on the
reading level of the group. Word identification lessons focused on high-frequency core words, key words with time patterns, and cross-checking, with the emphasis on using a variety of strategies to construct meaning from text. Tutors modeled how children could use the strategies to make sure that they were reading made sense. Comprehension strategies included (a) prediction and verification from pictures, titles, and text clues; (b) learning about story structure; and (c) using prior knowledge and text information to make inferences.

Writing in response to reading was a daily or weekly activity, with children keeping journals and writing poetry and stories based on literature they had read or, in more advanced groups, creating their own stories. Children read daily, either in shared, guided, or partner formats. Children chose books to take home to read from among those selected by their tutor. Books at the student's independent and instructional levels were selected to provide independent reading practice or opportunities for the parents to support their child's use of strategies as they read books together. Books that were above the child's instructional reading level reflected the child's interests and provided opportunities for the parents to read to their child. At the end of each tutoring session, tutors conducted brief book talks to generate interest in the books. Six to eight books were sent home each week.

Observations of tutors, their lesson plans, final reports, and records of the books read by the child were analyzed to determine the explicit instruction that occurred. The tutoring described their instructional program, tested all times and core words taught, and reported books used for instruction in their final reports. Instructional variables predicted to be related to growth in reading were (a) number of core words taught, (b) number of stories taught, and (c) rating of the amount of story grammar instruction that occurred. The ratings of story grammar instruction (0 = none, 1 = infrequently, 2 = occasionally, 3 = moderately often, 4 = frequently, 5 = regularly) were given by both faculty and graduate students who observed the tutors; the percentage of agreement was 92%. No known validity evidence exists for these measures; however, they provide a measure of what was taught and our studies provided evidence of validity if any of these measures correlated with reading growth. Because we provided group instruction, each child within the group received the same score for each instructional measure.

Recreational reading. At the beginning of each session children demonstrated that they had read the books by brief readings or by answering questions. In this way, the number of words read by the children could be assessed whether or not the parent had signed the involvement form. A computer-based reading history was developed for each child. Recreational reading was measured by the number of words read independently by the child and the number of words read with a parent. The number of words read was limited to books provided by the Literacy Project because we could count words only in books to which we had access.

Parent involvement. Parents were involved in the Literacy Project through participation at special events. Parents were invited to four special events each semester. The first event was a presentation by a noted author or a storyteller. The second event was a meeting where the university faculty described how to help children select books for independent reading and modeled, what to do when children encountered unknown words. Handouts were provided that included lists of favorite children's books and a description of the strategies we were teaching the children. The third event was a conference where tutors met individually with parents (and often their children) to explain the program, model strategies taught, and report progress. The final event in the semester was an award ceremony during which each child received a participation award and a book of his or her choice. Additional awards were given to the children who read more and to parents who demonstrated maximum participation. Attendance at these events constituted one measure of parent involvement.

Parents were also involved in the Literacy Project by reading with their children at home. A parent involvement form was sent home with the child's recreational reading books. The parent was to sign the form verifying who had read the book: parent, child, or parent and child together. A second measure of parent involvement was the number of forms signed and returned.

Child variables. The two child variables measured were the child's reading ability at pretreatment and attendance at tutoring sessions. Attendance reflected each child's exposure to the instructional variables described previously.

Growth measures. Growth measures were calculated in two ways. First, the growth in instructional reading level was determined by subtracting the focusing level achieved in the fall from the level obtained in the winter or spring depending upon whether we were analyzing semester or yearlong growth. As with most informal reading inventories, the QUI-H identifies reading levels within first grade as primer (PP), primer (P), and first grade (1.0); therefore, we represented these levels as different points within first grade. Primer was coded as .25 reading level, primer as .50 reading level, first grade as 1.0, and second grade as 2.0. A child who entered the program reading at EP level was coded .25, and if within the instructional reading level was first grade, the growth was 1.0 - .25 = .75. If a child could not read 50%
or more of the words on the PP list of the QBIH, he or she was not given a story to read. Pilot data indicated that children who were given the easier PP story to read were unable to read it with even 80% accuracy; such children were coded as having an instructional reading level of 0. Although we believed the children’s actual ability surpassed 5, the scores for children who were at instructional level 0 on the pretest passages received scores of 2.8, so a 0 on the scale was not mathematically inappropriate.

Second, weighted growth measures were calculated on all dependent variables. Weighted scores were calculated to reflect growth within and between instructional levels. If only growth in instructional reading level was used, there would be no measure of growth for those children who had improved within a level but not enough to increase an entire level, we calculated weighted means and percent scores for all dependent measures by using the same weighting as before (e.g., preprim = .25). Word recognition score was the summation of scores on all lists read.

The same weighting system was used for the contextual reading measures (percent of words read correctly when only passages that changed the meaning were counted, comprehension, and rate), but only scores on the instructional level passage were used. The use of instructional level scores resulted in a range of semantically acceptable accuracy scores from 0%–100%. Comprehension scores ranged from 0%–100%. Scores on different passages at the same readability levels were weighted using the mean percent comprehension scores on the QBIH, in the following manner. The test with the highest mean comprehension score was on *The Trip* (81%), so the weight for the other narrative, *The Pig Who Learned to Read* was 81/76 = 1.07. These weights resulted in the children receiving higher scores on harder text. If at present the child’s instructional level was primer on *The Trip*, the weighted comprehension score would be 87% × 5 × 1.07 = 40.54, resulting in a growth score of 7.04. If instead the child’s instructional level was now first grade, and the child read *Dear Miss Rabbit*, we would first-grade test, and receive a 67% comprehension score, the weighted score would be 67% × 1 × 1.07 = 71, and the growth score would be 71 – 33 = 38.

Weights assigned for levels scores first were the level itself (second level = 2.0, third level = 4.0, etc.). This weighting system assumes, for example, that a gain from first to second represents a greater gain than from primer to first. We believe that this assumption is consistent with perceptions of primary-grade reading levels. However, gains from first to second, and second to third, etc., represent the same amount of gain. For example, assuming 80% comprehension on all passages, the weighted score on a first-grade passage = 80 and a second-grade passage = 160 for a gain of 80; similarly a gain from second (160) to third (240) would be 80. This weighting system has been used in several other studies that found them sensitive measures of word identification level (Levin & Colhoun, 1959) and of short-term growth of children’s reading ability at different levels (Regier, 1982).

We analyzed data both at the end of Semester 1 and at the end of the year because certain instructional variables may be particularly important to children in the earliest stages of reading development, whereas other instructional variables may become important as children become more proficient. These developmental differences could be the result of changes in the types of material children are reading or may be specific to their developing understanding of the reading process (Bridgwater, 1966).

### Results

Semantic level. Table 1 presents the percentages of Literacy Project children with instructional reading levels of emergent through fourth grade in fall, winter, and spring, 1984–95. The first two columns are pertinent to our presentation of Semester 1 results. At present, 83% of the children had instructional reading levels of emergent through primer, but after one semester of instruction 54% of them had achieved first, second, or third grade.
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<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Word recognition</td>
<td>25.12</td>
<td>25.86</td>
<td>25.12</td>
</tr>
<tr>
<td>Semantic accessibility</td>
<td>40.35</td>
<td>40.35</td>
<td>40.35</td>
</tr>
<tr>
<td>Comprehension</td>
<td>40.09</td>
<td>40.09</td>
<td>40.09</td>
</tr>
<tr>
<td>Raw</td>
<td>25.12</td>
<td>25.86</td>
<td>25.12</td>
</tr>
<tr>
<td>Percent sessions attended</td>
<td>89.09</td>
<td>89.09</td>
<td>89.09</td>
</tr>
<tr>
<td>Instructional</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number core words taught</td>
<td>25.12</td>
<td>25.12</td>
<td>25.12</td>
</tr>
<tr>
<td>Number core words taught</td>
<td>11.09</td>
<td>11.09</td>
<td>11.09</td>
</tr>
<tr>
<td>Story grammar rating</td>
<td>2.78</td>
<td>2.78</td>
<td>2.78</td>
</tr>
<tr>
<td>Parental reading</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number words read by child</td>
<td>18.97</td>
<td>18.97</td>
<td>18.97</td>
</tr>
<tr>
<td>Parent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number parent forms returned</td>
<td>5.44</td>
<td>5.44</td>
<td>5.44</td>
</tr>
<tr>
<td>Parental involvement in literacy</td>
<td>2.51</td>
<td>2.51</td>
<td>2.51</td>
</tr>
<tr>
<td>Note: <em>n</em> = 92, <strong>n</strong> = 91, Table 2-4, 5, 6, 7, and 8 in Semester 1 and 2, respectively.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Correlations of Pretend, Sessions attended, Instructional, recreational reading, and parent variables with growth scores for Semester 1, 1994, and yearlong 1994-95

<table>
<thead>
<tr>
<th>Growth scores</th>
<th>Word recognition</th>
<th>Semantic accessibility</th>
<th>Comprehension</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRETEND</td>
<td>-24.13</td>
<td>33.20</td>
<td>30.47</td>
<td>13.32</td>
</tr>
<tr>
<td>ED. PERSENT</td>
<td>-24.13</td>
<td>33.20</td>
<td>30.47</td>
<td>13.32</td>
</tr>
<tr>
<td>GROUP PRESENT</td>
<td>-24.13</td>
<td>33.20</td>
<td>30.47</td>
<td>13.32</td>
</tr>
<tr>
<td>RAW PRESENT</td>
<td>-24.13</td>
<td>33.20</td>
<td>30.47</td>
<td>13.32</td>
</tr>
<tr>
<td>PERCENT SESSIONS ATTENDED</td>
<td>-24.13</td>
<td>33.20</td>
<td>30.47</td>
<td>13.32</td>
</tr>
<tr>
<td>CORE WORK</td>
<td>-24.13</td>
<td>33.20</td>
<td>30.47</td>
<td>13.32</td>
</tr>
<tr>
<td>PARENT COACH</td>
<td>-24.13</td>
<td>33.20</td>
<td>30.47</td>
<td>13.32</td>
</tr>
<tr>
<td>PARENT COACH</td>
<td>-24.13</td>
<td>33.20</td>
<td>30.47</td>
<td>13.32</td>
</tr>
<tr>
<td>WRITING</td>
<td>-24.13</td>
<td>33.20</td>
<td>30.47</td>
<td>13.32</td>
</tr>
<tr>
<td>.....</td>
<td>-24.13</td>
<td>33.20</td>
<td>30.47</td>
<td>13.32</td>
</tr>
</tbody>
</table>

Note: Table 3 shows the correlations among the variables in Semester 1 and yearlong growth. As Table 3 illustrates, pretend scores frequently correlated positively with growth, that is, children with high pretend scores tended to achieve more growth than children with less ability. Therefore, growth seen in the first semester was not due to regression to the mean.

All the data in Table 2 illustrate, we had very high average attendance (99%) and little variability (9%), which may explain the lack of relationship between attendance and growth. The children were transported to the university, so in most cases Literacy Project sessions reflected absence from school that day. We examined the instructional results to provide information to sup-
port or modify the program. Growth in the semantic acceptability of oral reading miscues and reading rate was statistically significantly correlated with the number of times taught.

Yearlong. All children were below grade level when they entered the Literacy Project. Table 3 indicates that in spring testing, 63% of students met the entire year's growth at second-grade level or above, which was grade level for these children. An examination of yearlong data in Table 4 showed similar growth patterns to results in Semester 1. Positive correlations were noted between growth scores and growth (statistically significant on word recognition and comprehension only), and no statistically significant correlations were found between sessions attended and growth. The rating of story grammar instruction correlated statistically significantly with growth in reading comprehension. The number of weeks taught by children showed the highest statistically significant correlation with yearlong growth on all dependent measures. The parent participation measure of formal norms was also correlated with growth in reading.

Summary. Child, instructional, recreational reading, and parent involvement variables all contributed to growth in reading. The child's reading ability upon entrance to the Literacy Project was positively correlated with Semester 1 and yearlong growth. Support for our instructional program emerged on two measures. First, the number of times taught was positively correlated with Semester 1 growth. Second, the more story grammar instruction provided at a developmentally appropriate time (when students were reading books with goals, problems, and resolutions), the greater the growth. The number of words the child could read and the number of signed parent involvement forms were correlated with yearlong growth.

Rationale for Study 2. The second study was conducted to replicate the first and to compare the gain in reading ability of Literacy Project children to children who were not taught. Although we took care to obtain children similar to those enrolled in the Literacy Project, this group should not be seen as a control group in the customary sense of the term. In the best experimental designs, control groups differ from experimental groups on only one factor and, if differences occur, differences are made that the single factor is the cause of the difference. In our study, and many intervention studies, the two comparison groups differed from teachers in group in several ways. First and foremost, our children received extra time in reading instruction; second, they had easy access to more books (for recreational) reading than the nonattended children. Finally, all children were receiving instruction in their classrooms, so any gains among

Literacy Project children are the result of both classroom instruction and tutoring.

Study 2

Method

Participants. In year 3 of the Literacy Project (1995-96), a new school became a partner. More children from this school qualified for free or reduced-price lunch, bringing the total to over 90%. Ninety-five percent of children in the Literacy Project and 100% of comparison children were African American, Latino, or Hispanic. The comparison group had 9% more males and 7% more second graders than the Literacy Project group. Educational level of the mothers was only available for 75% of Literacy Project children and 52% of comparison children but was similar in range (10 years-16 years of education) and medium years of education (15 years for Literacy Project; 12 years for Comparison). Because more tutors enrolled in the previous year, we were able to enroll 84 children. There were 27 children continuing from the previous year, and 51 newly enrolled. There were also 6 children who had been in the Literacy Project in 1993-94 as first- or second-graders and had graduated but who were now in fourth grade and reading at a third-grade level.

The children in the Comparison group attended either our new partner school (n = 16) or the second campus of one of our partner schools (n = 11). The children from our new partner school were from the same classrooms as Literacy Project children. All children were proficient on reading ability and fluency, and children most similar to those in the Literacy Project group on these measures were selected. We kept the grade level of 2nd and Comparison children the same whenever possible.

Classroom Instruction of 2nd and Comparison Children. Classroom instruction in two of our partner schools and the second campus of one partner school was taught by teachers who attended literacy training. Teachers described their reading instructional program as being organized for the whole group. Small readers from the early 1980s were used to develop fluency through choral or round robin oral reading. Discussion focused, with an emphasis on sequence and story elements. No systematic word identification instruction took place. A few teachers reported using worksheets occasionally to practice phonics skills, however, it was, in one teacher's words, "haphazard." Teachers devoted time most days for journal writing to encourage children's invented spelling. The third partner school was a Montessori school that provided instruction in single-letter sounds in kindergarten and core words in Grade 1. No other reading instruction in word identificat-
Table 4  Percentages of children in the Literacy Project and Comparison groups by reading levels in fall, winter, and spring, 1995-96

<table>
<thead>
<tr>
<th>Reading level</th>
<th>Full 1995</th>
<th>Winter 1996</th>
<th>Spring 1996</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LP</td>
<td>Comparison</td>
<td>LP</td>
</tr>
<tr>
<td>Kindergarten</td>
<td>17</td>
<td>64</td>
<td>13</td>
</tr>
<tr>
<td>Preprimer</td>
<td>25</td>
<td>19</td>
<td>16</td>
</tr>
<tr>
<td>Primer</td>
<td>13</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>First grade</td>
<td>15</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Second grade</td>
<td>18</td>
<td>35</td>
<td>42</td>
</tr>
<tr>
<td>Third grade</td>
<td>12</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>Fourth grade</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

* Spring 1996 data for the 37 Literacy Project (LP) children who were tested yearlong and 20 comparison children with similar control levels.

...on or text comprehension was provided. As is true in many inner-city schools, materials to support reading instruction were inadequate. In all our schools, classroom recreational reading materials were minimal and school libraries contained outdated materials, most of which were beyond the children’s reading levels. Providing time each day for recreational reading had a low priority and occurred randomly when time permitted. None of the teachers issued a formal request to parents to set aside time for reading at home.

Assessment materials. All materials and procedures were the same as in Study I.

**Instructional program.** The instructional program was the same as in Study I.

Results

Semester 1 differences. Table 4 presents the percentages of Literacy Project and Comparison children reading at emergent through fourth-grade levels in fall, winter, and spring, 1995-96. The data in the first four columns are relevant to Semester 1 results. Whereas 70% of the Literacy Project and 74% of the Comparison children were reading at first-grade level or below in fall, at winter assessment 54% of Literacy Project and 36% of Comparison children were reading at second-, third-, or fourth-grade level. Levels of change ranged from -10 to 30 and were divided into two categories for analysis, those who made 10 level of gain or more and those who made less than 1 level gain. A chi-square analysis found a statistically significant difference between the groups (likelihood ratio = 6.77, p < .01). Thirty-six percent of the children in the LP group but only 11% of those in the Comparison group gained one or more reading levels.

Semester 2 differences. Table 5 presents pretest and posttest scores of Literacy Project and Comparison groups. Pretest scores indicated no statistically significant differences between groups. However, because the means were somewhat higher for the Literacy Project children, we chose the more conservative test of our treatment by testing the interaction of time (pretest, posttest) by group (Literacy Project versus Comparison). A statistically significant interaction of group by time was found. Literacy Project children grew more in semantic acceptability of stories (F(2, 40) = 2.81, p < .05), comprehension (F(2, 40) = 6.45, and reading rate (F(2, 40) = 2.51, p < .05, 6.53, and 3.25, respectively, p < .05. Although children’s growth could be partially attributed to classroom instruction, our results indicated moderate to strong benefits of the additional tutoring Literacy Project children received.

Were Semester 1 growth rates different? Because of the large number of Literacy Project children enrolled in Semester 1, we analyzed growth data grouped by pretest level. This allowed us to address whether children made differential progress depending upon their pretest levels. We also could examine whether some instructional variables were correlated with reading growth for some levels of reading development and not others. It was theoretically reasonable to expect that nine patterns were important after children learned to rhyme and before they became automatic decoders of one-syllable words.

Figure 1 illustrates growth rates as a function of pretest for each dependent measure. A multivariate analysis of variance found statistically significant differences in growth rates as a function of pretest levels, F(8, 150) = 2.13, p < .05. Univariate analyses indicated statistically significant differences on the semantic acceptability of oral reading, F(2, 81) = 4.01 and 7.35, p < .05 and .001, respectively. As Figure 1 illustrates, the greatest growth on these measures occurred...
Table 5  Means and standard deviations of Semester 1 pretest and posttest weighted scores for children in the Literacy Project and Comparison groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Word recognition</th>
<th>Semantic acceptability</th>
<th>Comprehension</th>
<th>Fluency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Literacy Project</td>
<td>53.13</td>
<td>68.00</td>
<td>92.41</td>
<td>109.62</td>
</tr>
<tr>
<td>SD</td>
<td>60.60</td>
<td>80.67</td>
<td>91.95</td>
<td>118.72</td>
</tr>
<tr>
<td>Comparison</td>
<td>39.57</td>
<td>52.53</td>
<td>75.19</td>
<td>108.62</td>
</tr>
<tr>
<td>SD</td>
<td>47.77</td>
<td>67.95</td>
<td>95.95</td>
<td>119.62</td>
</tr>
</tbody>
</table>

* a = 0.05  b = 0.25

Among children who entered the Literacy Project reading at primer or first-grade levels, compared to either less able or more able readers, the differences in comprehension and word identification were not statistically significant.

Figure 1  Semester 1 growth rates of children in the Literacy Project (1995–96) on word recognition, semantic acceptability of oral reading mechanics, comprehension, and reading rate as a function of pretest level.
Table 6 Means and standard deviations of pretest, instructional and parental involvement variables and growth scores for Semester 1, 1995

<table>
<thead>
<tr>
<th>Variables</th>
<th>Emerging/Primerer (n = 33)</th>
<th>Prereader First (n = 29)</th>
<th>Prereader Third (n = 24)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>Growth</td>
</tr>
<tr>
<td>Child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Word recognition</td>
<td>6.61</td>
<td>1.69</td>
<td>20.20 (8.59)</td>
</tr>
<tr>
<td>Semantic complexity</td>
<td>25.93</td>
<td>3.81</td>
<td>48.89 (14.37)</td>
</tr>
<tr>
<td>Comprehension</td>
<td>16.67</td>
<td>1.71</td>
<td>48.38 (6.58)</td>
</tr>
<tr>
<td>Rate</td>
<td>8.21</td>
<td>0.60</td>
<td>25.63 (32.57)</td>
</tr>
<tr>
<td>Song with vibrations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of parent homes</td>
<td>1.64</td>
<td>0.60</td>
<td>8.86 (5.77)</td>
</tr>
<tr>
<td>Parent attendance at home</td>
<td>2.00</td>
<td>1.27</td>
<td>10.00 (1.27)</td>
</tr>
<tr>
<td>Instructional</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of words taught</td>
<td>12.21</td>
<td>10.22</td>
<td>19.36 (10.58)</td>
</tr>
<tr>
<td>Number of words read</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Song grammer</td>
<td>0.94</td>
<td>0.94</td>
<td>2.13 (1.77)</td>
</tr>
<tr>
<td>Recreational reading</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of words read/child</td>
<td>5.051</td>
<td>4.22</td>
<td>19.54 (15.15)</td>
</tr>
<tr>
<td>Number of words read/child</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6 presents the means and standard deviations of pretest scores, growth scores, child, instructional, recreational reading, and parental involvement variables as a function of pretest level. Table 7 presents the correlation of pretest scores, instructional, recreational reading, and parental involvement variables with Semester 1, 1995, growth scores as a function of pretest level.

Emergent/Primerer As in the previous year, the amount of recreational reading predicted growth. If the child entered the Literacy Project at the emergent or primer level, then the number of words the child read accounted for 19% of the variance in word recognition growth, $r = .41$, $p < .01$. Rate that the number of words read by the child also correlated statistically significantly with growth in the semantic acceptability of oral reading. Moreover, the correlation between number of words read by the child and sessions attended was .58, so the number of words read did not account for enough independent variance to enter the regression equation. Growth in reading rate was predicted by any instructional variables for these beginning readers.

Prereader First. The growth of students with prereader reading levels of primer or first grade was predicted by the number of words parents and children read together; 56% of the variance in word recognition growth, $r = .76$, $p < .01$. Growth in the semantic acceptability of oral reading messages was predicted by parent attendance at events, $r = .59$, $p < .01$. Growth in reading comprehension and rate were predicted by the number of forms returned by the parents, $r = .48$, $p < .05$, and $r = .59$, $p < .01$.

Second/Third. The growth of students who entered the Literacy Project at second- and third-grade levels was predicted by the amount of any instructional or recreational reading that they received, $r = .35$, $p < .01$. No other instructional, recreational reading, or parental involvement variables predicted growth on any of the other dependent measures.

Reading descriptive data. Because of a reduction in the number of undergraduates in the program, only 33 children were able to continue into Semester 2, and a second and third grade reading at primer level were added. We chose to continue those who were farthest below grade level reading based on their midyear instructional reading level. All but one of these children were reading at first-grade level or below in fall, 1995, and in winter, 1996.
The data in the right column of Table 4 present the spring scores of Literacy Project children who were inferred yearlong compared with Comparison children with similar winter levels. Forty-four percents of the Literacy Project children were now reading at second-grade level or higher, compared with 30% of the Comparison children. Yearlong gain was divided into two levels. For more years of gain or less than 1 year gain. Forty-four percent of yearlong Literacy Project children gained 1 or more years, compared with only 30% of Comparison children, although the results were not statistically significant. The lack of statistically significant differences may be a result of the smaller number of children in both groups.

Yearlong analysis A multivariate analysis of variance found no statistically significant difference between Literacy Project and Comparison children on any dependent measure. Semester 2 Literacy Project growth rates. The midyear reading levels of 32 children who were injured yearlong were 0.80% (1.36) and primer or first-grade levels (6.70). This distribution of reading levels at showed us to determine whether the growth patterns seen in Semester 1 could be cross-validated. That is, could we address whether the children who had progressed from emergent or preprimer to primer and first-grade level by midyear made more growth than children who were at primer or lower. Growth analyses among yearlong Literacy Project children were conducted to examine developmental differences in growth rates. The between-subjects measure was winter instructional level, preprimer or less versus primer at first grade, and the four dependent measures were word recognition, semantic acceptability, comprehension, and rate. The MANOVA showed a statistically significant effect of Group, F(4, 27) = 3.53, p < .05, and statistically significant univariate results were found on rate and comprehension. Greater growth in comprehension and rate was found in children whose instructional levels were primer/first grade rather than emergent/preprimer, replicating the results found in Semester 1.

Semester 2 Literacy Project analysis: variance in word recognition growth was predicted by the number of words read in the past year and words read in the words read and growth in the semantic acceptability of oral reading measures. No unique variance was explained because of the high correlation between the number of words read and growth in the semantic acceptability of oral reading measures. No unique variance was explained because of the high correlation between the number of words read and growth in the semantic acceptability of oral reading measures.

Discussion

The three purposes of the studies were to (a) examine the effectiveness of the Literacy Project; (b) determine if either the effectiveness of the Literacy Project or the factors predictive of its growth were developmentally related; and (c) identify the instructional, recreational
To what degree was the literacy project effective?

Approximately 20% of Literacy Project children who began with reading levels far below their grade level reached grade level reading at the end of a semester or year of tutoring. Furthermore, children enrolled in the Literacy Project in Fall 1985 gained more in reading over one semester than Comparison children when assessed by levels of growth and weighted growth scores. However, the smaller group of Literacy Project children who were the lowest readers and had made the least progress in Seminar I were tutored all year but did not make greater reading gains than the Comparison group. The small sample size of the low initial reading levels of these children could explain the lack of statistically significant effects.

Supporting evidence was obtained from statewide assessment scores on the Wisconsin Third Grade Reading Test (WTGRT) administered by school personnel in spring 1997. Of the 54 Literacy Project and Comparison children from the 1995-96 sample who were now third graders, 79% of the Literacy Project children performed above the standard, compared with 39% of the Comparison group. These 1997 third graders included the second year Literacy Project children who had not reached grade level in spring 1996 and who continued in the Literacy Project in 1995-97. Thus, many of the second readers from the fall 1995 group were able to reach the state's standard with 2 years of small-group tutoring in addition to classroom instruction.

Effect sizes are useful because they allow standard comparison across intervention programs independent of sample size. However, factors such as group size, length of intervention, and program cost must also be considered (Shamah, 1998). Our data compared favorably to those of other intervention studies when these factors are examined. Effect sizes for the Literacy Project ranged from .66 to .69 in contextual reading for one semester (30 hours) of small-group instruction. Other small-group interventions reported similar effect sizes with close to double the amount of intervention (Osher et al., 1992) or fewer effect sizes (.48) for similar hours of intervention (Taylor et al., 1992). Furthermore, effect sizes for the Literacy Project were similar to those of one-on-one interventions even though these programs provided many more hours of Instructional Reading Recovery (50 hours), Success for All (45 hours), and Juel's tutoring program (40-54 hours).

In addition to program effectiveness, policy makers must consider cost-effectiveness of intervention programs. As reported in the literature (Unserman, Rosemary, Joel, & Richa, 1997; Shamah & Barr, 1995), reading recovery is expensive (US$1,600), according to Shamah & Barr whereas Taylor et al.'s (1992) and Juel's (1986) programs are probably the least expensive (although indirect benefits to the school and university had not been factored in). Our program costs (for transportation, materials, and literacy events total US$22,000, adding in two graduate assistant stipends totals US$42,000. The average cost per pupil, assuming a maximum enrollment of 84, is US$500 for the entire year. This is less expensive than Juel's volunteer tutoring program (Unserman et al., 1997), and the Literacy Project has the added benefit of preservice teacher training.

As noted by other authors (Juel, 1996; Waldo et al., 1990), intervention projects should anticipate that some percentage of children will take longer than 1 year to reach grade level. Because our instructional intervention is ongoing, we were able to comply with Shamah and Barr's (1995) recommendation that researchers study the success of these children. Approximately 30% of the Literacy Project children remained an additional semester or year of tutoring to reach grade level. Thus, instructional time for these students ranged from 90 to 210 hours (i.e., three to four semesters). As indicated previously, most of the Literacy Project children who took 2 years to achieve grade-level reading performed above the state standard on the group-administered WTGRT. These results suggest that continued support can help slower-progressing children meet grade-level expectations. The children who did not read at grade level even after 2 years of tutoring, were few (N = 1/32), but in all cases, the children had serious physical or emotional difficulties.

Were the effects developmental?

We have some preliminary evidence that the effectiveness of the Literacy Project and the factors that contributed to its success were developmentally related. Progress in learning to read was related to percol level. The greatest gains in contextual reading (semantic acceptability, rate, and comprehension) were made by children who began the Literacy Project with instructional reading levels of primer and first grade compared to other more able (second and third grade) or less able (emergent and primary) readers. We hypothesize that these differences are the result of the developmental nature of our instructional program and development patterns in early reading acquisition. When children began a seminar with instructional reading levels of primer or first grade, they had already learned something of the decoding process. In the Literacy Project they received instruction in cross-checking and using rules for decoding. This instruction may have been particularly suited to
children at these precut levels, and may have enabled them to read more fluently. As Stanovich (1980) suggested, fluent reading leads to meaningful and rewarding experiences that in turn result in more practice. Recall that children reading at primer and first-grade levels who read the greatest number of words outside the training sessions also showed the greatest growth.

We cannot determine whether these growth rate patterns are typical of all beginning readers because the number of children in our Comparison group at each of these levels is too small for a reliable analysis. As we obtained larger Comparison groups, we hoped to address whether the growth rates are typical of children at these reading levels or whether they are specific to our instructional program.

The only factor that predicted growth for children whose precut levels were second and third grade was the amount of story grammar instruction they received. Such growth could be because of the appropriateness of story grammar instruction for the children's developmental stage of reading, or it may be that teaching any comprehension strategy at this point would be related to growth. Further research with larger samples is necessary to examine the developmental nature of our instruction and its effects.

What instructional, recreational reading, and parental factors predict growth?

We examined the Literacy Project components that most consistently correlated with growth once the children's precut scores and attendance were entered into regression analyses. Because these data are correlational, one cannot conclude that one or more of these program factors will cause growth in reading. However, these analyses informed our program development and suggest important program features to be considered in early intervention programs.

**Instructional program.** The number of stories taught during 1994-95 accounted for statistically significant variance in growth in the instructional acceptability of oral reading miscues and comprehension, and rate (see Table 3). Although the number of stories taught yearlong during 1993-94 correlated with word identification growth, it did not add independent variance. The raw data are not as consistent as the other factors that accounted for independent variance. We suspect that some of the variability in our findings is related to limited research on instructional intervention. For example, how many stories need to be taught before children can generalize the analogy strategy and apply it whenever they come to a word they do not know (e.g., bring), which shares the same root with a known word (e.g., bring)? How critical is the modeling of decoding using times to its application in contextual reading? And how much guided practice is necessary to automatize the process? Further research should be conducted using observational measures to document instructional practices that lead to growth.

Although the number of stories taught was statistically significantly correlated with growth in reading, the number of core words taught was not. It was negatively correlated with growth on both dependent measures. There were several possible explanations for this lack of relationship. Our instructional program encouraged tutors to teach three to five unfamiliar core words that occurred frequently in their chosen literature. Thus, the more books used for instruction, the more core words were presented. Perhaps there was a trade-off between the number of words presented by the tutors and the thoroughness with which words were learned by the children. We certainly cannot conclude that teaching core words is not related to reading growth, but we did not find evidence for the relationship. Perhaps word identification strategy instruction, such as using times for decoding and cross-checking rather than word learning, provides pathways to independence necessary for growth in reading achievement. Our results confirm those of other early intervention studies.

**Story grammar instruction.** Exploratory word identification strategy instruction that helps children use multiple cues sources is a critical aspect of beginning reading instruction.

Story grammar instruction accounted for independent variance in the growth of semantic acceptability of oral reading miscues and comprehension over the year 1993-94 and was the only variable to account for growth in reading comprehension among children who entered in fall 1995 reading at second- or third-grade level. Because so little of it occurred, story grammar instruction did not correlate with 1994-95 yearlong growth of children who began the Literacy Project at emergent and preprimer levels. They entered only at primer level midyear. The beginning readers were reading predictable text with rhyme patterns to improve their word recognition ability and had not developed to the point where they were able to read stories, therefore story grammar instruction was not recommended as a major part of the instructional program. However, when children were reading at a late first-grade level or higher, story grammar instruction became an integral part of our program and predicted growth.

**Recreational reading.** The number of words read by the child outside of the instructional sessions in books provided by the Literacy Project predicted growth. What factors likely contributed to this effect? First, the amount of recreational reading could result in a practice effect. Educators have long argued that the more children read, the more likely they are to develop fluency, build a
vocabulary base and gain knowledge. As Stanovich (1986) so aptly put it, the rich get richer. Time spent reading during the school day has been linked to students' reading ability (Allington, 1984; Jed, 1988). Other evidence suggests that this practice effect may be at work for children in intervention programs. For example, as reported by Pinneit et al. (1994), children in Reading Recovery and Reading Success programs spent more than 50% of the instructional time reading children's trade books. In contrast, less successful programs devoted under 20% of the time to reading connected text. Several successful interventions have included children's reading of specially constructed text as part of the instructional format, although no attempt has been made to describe or report on the impact of print exposure (Taylor et al., 1992; West & Shelton, 1993). Jed (1995) also found that those tutors who read with their tutees from build-up readers were the most successful.

Although children spent time during the Litarcy Project sessions reading books, they did not spend the same amount of time reading trade books as their academically successful peers. Instead, they read books that were selected for them by their teachers or tutors. In the Litarcy Project, the number of words read was recorded as growth in word recognition in isolation, oral reading of connected text, and reading comprehension. These data add to the accumulating evidence that exposure to print affects both lower and higher order reading abilities (Cipolka & Stanovich, 1992; Jed, Griffith, & Gough, 1987).

Another reason independent reading played such a key role in children's reading growth may be that we only included books that were selected for them by their teachers or tutors. In the Litarcy Project, the opportunity to read developmentally appropriate material may have allowed the children to apply the strategies they had been taught. Further research is needed to shed light on the relationship among independent reading, text difficulty, and reading growth in beginning readers.

As equally feasible explanation of the effect of recreational reading could be motivation. Anecdotal evidence indicated that motivational factors were at work for Litarcy Project children. Many teachers and parents told us that the books sent home were among the first they children were able to read independently. Many children sought permission to read aloud to their classroom peers. The self-esteem provided by successful reading experiences, as Stanovich (1986) argued, likely increased the desire to read. In addition, the book charts that occurred during the tutoring sessions, which included books that the pupils read and the opportunity to share the content of the books in a socially supportive environment, may have been highly motivating (Grais, Schaff, Wang, & Affleck, 1995). For example, in the Litarcy Project evaluation, the two most successful intervention programs studied accounted for an average of 19% of the instructional time as "talking about books" (p. 25). Similarly, studies of avid readers have shown that peer recommendations are important in motivating them to read (Engel, 1987; Wonneken, 1987; Wooden & Zief, 1989). Further in the Litarcy Project consistently reported that children wanted to take home books discussed by others in the group.

Our study provides encouragement to those teachers and tutors working with struggling readers who desperately need to get hooked on books. It is important to note that the children read authentic trade books. Popular titles ranged in difficulty and included The Cat in the Hat (Geisel, 1957), Mary Were Her Red Dress and Henry Wore His Green Socks (Peck, 1988), Is Your Mama a Llama? (Graff, 1989), and Henry and Mudge: The First Book (Sianti, 1987). These teachers did not require revision, summarization, or edited texts, rather, the materials were books that could be found in any elementary classroom or library. In addition, the overwhelming majority of the books were paperback and affordable. This suggests that developmentally appropriate literature can be found in an authentic, quality materials and that avid readers need not be denied the privilege of enjoying them, even at beginning stages of reading development.

Parental involvement. Parental involvement, whether measured by the number of forms that accompanied recreational reading books or attendance at literacy-related events, was a frequent independent predictor of growth in reading. Of our two measures of parental involvement, return rate of reading forms was the more consistent factor. As described previously, our recreational reading component consistently predicted children's growth in reading. We measured children's exposure to print by validating through discussion and questioning whether or not children had read the text and then counted the number of words. This measure was obtained independently of whether parents signed the forms. Yet children whose parents signed the forms made more reading progress than children whose
parents did not. These children may have received an additional boost from a home environment that fostered recreational reading.

Because previous research indicated that mother's involvement is correlated with mother's educational level (Conner & Epstein, 1993), we examined the correlation between mother's education and the number of reading forms returned. The only statistically significant correlation was between mother's education and attendance at literacy events in fall 1995, so in general mother's education did not relate to participation. Our finding that parental involvement was related to children's growth during an early intervention program extends previous, more global research indicating parental involvement is important for children's academic development (Snow et al., 1991). Other early intervention programs need to consider how parental involvement can enhance their results, and longitudinal studies are necessary to examine the long-term effect of parent involvement.

Limitations and future research directions: Our study has several limitations. The most obvious is the lack of a control group to weed out the factors that caused reading growth. Similarly, our comparison group participants did not receive any instruction outside of their classrooms. All we can conclude is that children who participated in a 30-hour after-school literacy intervention program gained more in reading during one semester than children who did not receive such instruction. Although our correlational data indicate that the program components that were correlated with growth, we cannot identify which of these caused the growth. In all likelihood, many factors contributed to the children's achievement. Future studies could be designed to determine the components of our program that caused growth.

Second, the results of our study cannot be generalized to all populations. Our intervention program was designed for children in inner-city schools who did not have ready access to quality children's literature. Similar results may not occur in school settings with fully stocked libraries, where teachers provide recreational reading to whose children were read to frequently as preschoolers. Although we believe that the amount of reading a child engages in develops reading ability, the power of our recreational reading program cannot be assumed to apply to all children. Third, the measures received by the children were carefully supervised both in design and implementation. Our results cannot be generalized to programs that use tutors without training in the teaching of reading or that allow tutors to design their own instructional programs.

The finding that children with reading levels of primer and first grade made more gains over a semester than children with more or less reading ability may be particular to children in the literacy Project. The growth pattern typical of children in general, or does it apply only to children who have had difficulty learning to read? What instructional variables contribute to this growth pattern? More precise observational measures of instructional intervention are needed to better assess the effects of explicit instruction and modeling on reading growth.

Recommendations for the design of intervention programs: What advice do we have for designing an early intervention project for inner-city children at risk for reading failure? On the basis of our research, we tentatively conclude that carefully designed, well-supervised, small group tutoring by teachers in training can help at-risk beginning readers improve their literacy skills. Children's literacy abilities should be assessed and used for making instructional grouping decisions. An intervention program should include word identification and comprehension strategy instruction, a well-stocked library to facilitate recreational reading, and parental involvement in reading with their children.

Further considerations: Given the national concern to upgrade children's literacy skills, we are currently concerned with decisions that have an impact on classroom and children. Where should time and money be spent? We agree with others who argue that improving the quality of classroom instruction is critical if we are to consistently and significantly improve literacy for all children. However, for children most at risk for reading failure, we may not be able to wait for large-scale, long-term staff development to be implemented. In addition, even with excellent staff development and better trained teachers, intervention programs may be needed for some students. A viable alternative might be to involve preschool teachers in literacy intervention projects. Thus, in the Literacy Project worked directly with at-risk readers and their families and experienced firsthand the success the majority of children achieved. We suspect that many tutors will be able to take the knowledge they gained from these experiences and apply it when they take responsibility for literacy learning in their own classrooms. Therefore, intervention projects designed with preschool teachers as tutors may provide both short- and long-term benefits.

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