

Promoting Toddlers' Language Development Through Community-Based Intervention

COLLEEN E. HUEBNER

University of Washington

This study evaluated an adaptation of a developmentally based, 6-week parent-child reading program ("dialogic reading") demonstrated to facilitate vocabulary and syntactic skills of toddlers, including those at risk for language problems. In this study, dialogic reading was modified for broad dissemination through four branches of a city library system. Children's librarians taught parents the reading techniques in two 1-hour sessions. The study design was an efficacy trial with two thirds of families randomly assigned to the dialogic reading condition ($n = 88$) and one third to a comparison condition. The comparison condition was comprised of existing library services for parents and children ($n = 41$). Analysis of baseline to post-test change showed a significant intervention-group effect on parent-child reading style and children's expressive language. In addition, at a 3-month follow-up assessment, parents in the dialogic reading group reported less parenting stress, specifically stress resulting from characteristics of their child.

Studies of social interaction between parents and young children have identified many ways in which everyday conversation supports the child's task of language learning. Among the most common examples are parents' use of expansions, repetitions, extensions, responses, and questions that follow the child's interest (Barnes, Gutfreund, Satterly, & Wells, 1983; McDonald & Pien, 1982; Messer, 1978; Morisset, Barnard, & Booth, 1995; Murphy, 1978; Ninio & Bruner, 1978; Ninio, 1980; Snow, Barnes, Chandler, Goodman, & Hemphill, 1991; Snow, Perlmann, & Nathan, 1987; Wells, 1985). In addition to encouraging development implicitly, parents also encourage language explicitly by teaching social routines with prompts such as "say thank you," providing object labels, asking the child to name objects, and correcting errors in word meaning or linguistic form (Gleason, Perlmann, & Greif, 1984; Messer, 1978; Moerk, 1974; Murphy, 1978; Ninio & Bruner, 1978; Ninio, 1980; Sokolov, 1993).

Direct all correspondence to: Colleen E. Huebner, Maternal and Child Health Program, Box 357230, Department of Health Services, School of Public Health and Community Medicine, University of Washington, Seattle, WA 98195. <colleenh@u.washington.edu>.

Journal of Applied Developmental Psychology 21(5): 513-535
ISSN: 0193-3973

Copyright © 2000 Elsevier Science Inc.
All rights of reproduction in any form reserved.

Shared picture book reading appears to be an excellent activity for drawing forward the types of verbal exchanges that support young children's language development. Descriptive studies of book reading with toddlers and preschool children show that many parents naturally intersperse reading with conversation about the pictures that accompany the story. In doing so, parents capitalize on opportunities to teach new vocabulary and sentence-level skills through the use of tutorial questions (i.e., what-, when-, where-, and why-type questions), directive pointing, object labeling, fine-tuning utterances to the child's level of understanding, and corrective, informative feedback (Beals, De Temple, & Dickinson, 1994; Demetras, Post, & Snow, 1986; Moerk 1974, 1976; Nelson, 1973; Newport, Gleitman, & Gleitman, 1977). Interestingly, studies of social class differences in mother-child conversation find that working-class mothers are more apt to use a language-facilitating speech style during shared reading than in other interactive settings (Dunn, Wooding, & Herman, 1977; Hoff-Ginsberg, 1991; Snow, Arlmann-Rupp, Hassing, Jobse, Joosten, & Vorster, 1976). One reason may be that the simple story line and imaginative illustrations of picture books evoke "optimal motherese, ready-packaged and presented in a stimulating way for mothers who might not have the capacity or inclination . . ." (Moerk, 1985, p. 563).

Studies of shared reading over time have identified progressive changes in the demands made on children from ages 1 to 4 years (e.g., DeLoach, cited in Brown, Bransford, Ferrara, & Campione, 1983; Wheeler, 1983). Labeling routines directed by relatively concrete questions (e.g., "What's that?") are more characteristic with children at the younger ages, whereas at the older ages, mothers tend to ask more open-ended questions that go beyond the immediate scope of the book (e.g., "Do you think George will get in trouble?"). Evidence from cross-sectional research with 4- and 5-year olds, with and without communication delays, indicates that progressive changes in shared reading interactions are the result of adults' adjustments to children's burgeoning language skills, rather than differences in children's age (Pellegrini, Brody, & Sigel, 1985).

Taken together, over 20 years of correlational research suggests that shared book reading can be a valuable context for oral language development, particularly if the reading is collaborative rather than passive, and if the nature of the interaction supports the child to achieve just beyond her current level of mastery. Experimental support for these assertions is just beginning to accumulate (i.e., Scarborough & Dobrich, 1994; Bus, van IJzendoorn, & Pellegrini, 1995). Causal links between aspects of shared picture book reading and 2-year-old children's oral language development were demonstrated first by Whitehurst and his colleagues in a study of a shared reading program called *dialogic reading* (Whitehurst et al., 1988). Dialogic reading integrates and amplifies the language-facilitating behaviors described above. The program is based on three general principles: (a) the use of evocative techniques that encourage the child's active participation in telling the story, (b) use of feedback to the child in the form of expansions, corrections, and praise, and (c) progressive change to stay at or beyond the child's current level of independent functioning (Arnold & Whitehurst, 1994). Instruction in dialogic reading consists of as few as two brief sessions; the techniques are straightforward and easy to demonstrate.

The results of multiple, independent studies have demonstrated positive effects

of dialogic reading on the expressive language skills of 2- and 3-year-old children from lower- and middle-income homes; in daycare and home-based programs, and with children with normal development and developmental disabilities (Dale, Notari, Craine-Thoreson, & Cole, 1993; Lonigan & Whitehurst, 1998; Whitehurst et al., 1988; Valdez-Menchaca & Whitehurst, 1992). The most consistent positive findings are from implementations that include home reading, with or without a concomitant school or daycare dialogic reading component (Lonigan & Whitehurst, 1998; Whitehurst et al., 1994). Perhaps as Bronfenbrenner speculated, engaging the mother-child dyad as an interactive system generates a momentum that becomes independent of the formal intervention (Bronfenbrenner, 1974, as reported in Levenstein, Levenstein, Shiminski, & Stolzberg, 1998).

The goals of the present study were to adapt dialogic reading for broad-based implementation through neighborhood public libraries and to evaluate the effect of these modifications with parents and their 2-year-old children. Public libraries were chosen as the place to reach families with 2-year-old children because, unlike younger children who have frequent contact with the health care system or older children who are in school daily, 2-year olds are not within the purview of any specific institution. A second goal was to test the hypothesis that dialogic reading, designed to enhance young children's oral language skills, would have an added beneficial effect on self-reported parenting stress during this period of childhood characterized by rapid developmental change, often accompanied by heightened resistance and negativity (Kopp, 1992), and more commonly known as the "terrible two's."

The study was of a randomized, controlled design in which two thirds of participating parents received group instruction in dialogic reading and one third were assigned to a comparison parent-child reading condition.

METHOD

Recruitment and Participants

Community Context. The setting of the study was Seattle, Washington. Compared with the state and nation as whole, Seattle's residents are on average well educated. More than 86% of adults more than 25 years of age have completed high school, and 38% have a 4-year college degree. Although many enjoy a comfortable income, at the time of this study, 16.5% of the children less than 6 years of age lived in poverty (City of Seattle, 1992). At the last decennial census, in 1990, there were more than 7000 births to city residents. Most were to white mothers (66%), followed by births to Asian mothers (14%) and to African American mothers (13%; Washington State Department of Health, 1991).

The program described in this study took place at four different branches of the Seattle Public Library. Two of the four libraries were located in south and central area neighborhoods where the proportion of minority residents in the adjacent zip code regions was 50% to 75%, and the median household income was in the range of \$7500 to \$45,000 per year. In contrast, the two other library sites were in north-end, predominately white, middle-income neighborhoods with a median yearly

income in the range of \$15,000 to \$30,000 dollars (Seattle Office for Long-Range Planning, 1990).

Recruitment. To maximize sample size, yet minimize the size of the parent-training groups and limit study demands on library staff, the program was conducted in four successive “waves” at each of the four library locations. Recruitment into the four successive waves was continuous throughout the study. Announcements were posted in neighborhood businesses and brief articles describing the program were placed in local newspapers. Informational fliers that included a telephone and address contact form and a brief developmental screening questionnaire were available at participating libraries and in other nearby locations including children’s health clinics and daycare, community, and activity centers within a low-income housing facility. Most parents indicated their interest by completing the contact information requested in the flier and returning it to the project office. Alternatively, some interested parents were referred to the project by community agencies and then project staff initiated contact by phone.

Criteria for inclusion in the study were: (a) signed informed consent, (b) parent’s self-report of adequate reading skill, confirmed later by observation of their ability to complete written questionnaires, (c) a child 24 to 35 months of age at the pre-test date who scored at or above age level on a developmental screening test, (d) the family residing in the vicinity of the participating libraries, and (e) English being the primary language spoken in the home. Eligibility was determined by telephone interview. Interested families who did not meet the criteria received a children’s book as a token of appreciation and, if indicated, were referred for appropriate services such as developmental testing or alternative library programs for younger, or older, children. One hundred eighty-four families were recruited and interviewed; of these, 89% (164) met the eligibility criteria. The reasons for exclusion were: children were too young or too old, were bilingual, were language delayed (and attending speech therapy), or lived outside the study area. No family was excluded because of parent’s low reading skill.

Run-in. Families who met the eligibility criteria were contacted in the month before the first parent group session to arrange a meeting at the library for child language pretesting and baseline data collection. Because in this study instruction in dialogic reading was modified for community-based implementation, it was essential to determine whether these changes diluted the effect of the training to change parents’ reading style. Thus the 1-month span between child pretesting and group assignment was used as a run-in period during which parents who did not read very often could be excluded from randomization into one of the study groups. That is, to continue eligibility, parents were expected to complete the appointment for child pre-testing and report parent-child reading of four or more times per week.

Twenty-three of 164 eligible families were dropped before the pre-test appointment. Most could not be contacted by phone, had disconnected phone numbers, or had moved out of the area. A few mothers reported they had returned to work recently and were no longer interested in participating in the study. No one was dropped because of infrequent reading.

Table 1. Sample Size by Assessment and Study Period

	<i>Screened & Eligible</i>	<i>Pretested & Randomized</i>	<i>Post-tested</i>	<i>Follow-Up Assessment^a</i>
Family Background				
Sociodemographics and Family				
Composition	165	—	—	—
Parenting Stress Index (PSI) and Life Stress Scale	—	123	—	49
Child Characteristics				
Developmental Status (R-PDO)	165	—	—	—
Age, Sex, Birth Order, Health Status, Child Care	—	129	—	—
Child's Language Ability				
Peabody Picture Work Vocabulary Test (PPVT)	—	126	117	50
Early One-Word Picture Vocabulary Test (EOWPVT)	—	125	117	49
Illinois Test of Psycholinguistics Abilities, Verbal	—	—	117	48
Expression Subtest (ITPA V.E.)				
Audiotapes of Language During Reading with Parent	—	127	— ^b	48
Child's Exposure to Reading				
Frequency and Enjoyment	—	129	113	50

Notes: Dashes indicate the data were not collected during this period. The study involved four different library locations and four successive waves of families at each site. Within each cohort, pretesting occurred before randomization (up to 6 weeks before the first parent group session), and post-testing occurred within 6 weeks after the intervention. Of 184 families screened, a total of 164 met eligibility criteria for the study. Of these, 131 completed the pretesting appointment and 129 with pretest data were randomized. Of these, post-test data were collected for 117. Follow-up data were collected for 50 of 62 eligible families.

^a For families in the first two waves of the study, follow-up data were collected approximately 3 months after the post-test appointment.

^b Audiotapes of parent-child reading in the home were collected during the intervention between the pre- and post-test periods; data were available for 117 families after the first parent training session and 103 families after the second training session.

Of the remaining 141 families, 131 completed pre-test appointments. During the pre-test appointment, parents (usually the mother) and children were audiotaped reading a book of their choice. After the reading, children completed a language assessment while parents filled out a sociodemographic survey and a stress inventory (see Table 1 for a summary of all parent and child assessments and time of data collection). At the end of the pre-test appointment, parents were given a gift of a children's book and asked to read at home with their child daily. Parents were telephoned weekly to maintain contact and to remind them to read with their child. The interval between child pre-testing and the first parent group session varied for individual families but did not exceed 6 weeks. This interval was a practical necessity to complete all scheduled child testing and establish an adequate group size for the parent meetings.

One week before their first parent-group session, parents were telephoned and informed of the date and time of the meeting. An additional two families were lost between pre-testing and this telephone call because they moved out of the area.

Randomization. At the time of the phone call to schedule the first parent meeting, families were assigned to either the dialogic reading or comparison group. Allocation to the two study conditions was random and determined by an individual who had no knowledge of the baseline or pretest data. Two thirds of the families ($n = 88$) were assigned to the dialogic reading group and one third ($n = 41$) was assigned to the comparison group.

Content of the Intervention. The intervention was based on the dialogic reading program as described by Whitehurst and his colleagues (Whitehurst et al., 1988). Training in the dialogic reading method consists of two 1-hour parent-training sessions (session 1 and session 2) that occurred 3 weeks apart. Typically, instruction in dialogic reading is conducted by University-based research staff on a one-to-one basis. In the present study, children's librarians were taught to conduct parent training at the library sites, and training procedures were modified to accommodate small groups of 6 to 12 parents at a time.

The content of the training followed the recommendations of Arnold and Whitehurst (1994). Parents were asked to diminish reading behaviors that minimized the child's verbal participation in favor of evocative techniques that facilitate the child's active participation in telling the story. Adult reading behaviors to diminish included: reading (without the child's participation) and asking the child pointing questions, yes/no questions, and criticism. Specific dialogic reading behaviors taught during session 1 included the use of "What?" questions, questions about function and attributes, praise, and repetition. In session 2, parents were shown how to use verbal expansions of child utterances and open-ended questions to help children build more sophisticated sentence-level skills. During each session, videotape illustration was used to provide real-life examples of the new reading techniques, followed by interactive stop-action segments that asked, "What could this parent have done differently?" or "What else could this mother have done?" The videotape was complemented by one-to-one practice that included role-play and corrective feedback. At the end of each session, parents received a single-page review of the dialogic techniques and were asked to use the new way of reading with their children daily, 5 to 10 minutes per day, during the following 3 weeks.

The experience of parents in the comparison condition was similar to those in the dialogic-reading group except they did not receive any instruction to change their reading style. Instead, the curriculum drew from the library's regular services for parents and young children. Several activities were combined to form two 1-hour sessions that took place, like the dialogic reading training sessions, in weeks 1 and 4 of each wave of the intervention. At each comparison group meeting, the children's librarian described story books and related craft projects that are appropriate for 2-year olds. Each meeting was thematically related to a children's book that all parents (dialogic and comparison) received during the parent meetings.

To review, all aspects of the dialogic and comparison programs were identical except that for parents in the dialogic-reading group, parent sessions focused on

learning the dialogic-style of reading. Parents in both groups participated in two group sessions approximately 1-hour in length, conducted by the resident children's librarians and held at the library. Each session was offered on at least two occasions to accommodate parents' various work and caregiving responsibilities; the sessions were scheduled to occur approximately 3 weeks apart.

Monitoring Program Integrity and Strength. To monitor the integrity and strength of the program, as modified in this study, parent-child reading was coded from audiotapes at four successive points in time: baseline (taped in the library), during the intervention period after parent training session 1 and after session 2 (taped in the home), and at follow-up testing (taped in the library). The purpose of the coding was to determine the extent to which parents actually used the targeted techniques, either spontaneously or as a result of training, and whether parents' dialogic reading behavior had the intended effect to increase the child's verbal involvement in shared reading. To facilitate audiotaping at home, small battery-operated tape recorders were provided to parents at the group meetings. Parents in both the dialogic and comparison groups were asked to read daily with their children and to audiotape at least one reading session per day. Families were contacted weekly to answer questions, to problem solve, and to remind them to continue reading.

Measures

Parent questionnaire data and assessments of children's language ability were collected during four periods: screening (by telephone), baseline and pre-test (up to 6 weeks before the intervention), post-test (within 6 weeks after the intervention period), and follow-up (3 months after the post-test appointment). Because of budget and time constraints, only families enrolled in the first two waves of intervention were included in the follow-up testing. An overview of measures by time and type of assessment is provided in Table 1 each is discussed in turn below.

Adult's Reading Ability. Parent's skill level was assessed during the telephone-screening interview by asking them about their reading habits, particularly their ability to read the newspaper. Experts in adult literacy estimate that a fifth-grade reading level is required to read the newspaper and that asking adults general questions about their functional reading skills gives a better indication of reading difficulty than brief screening tests (R. Allen, personal communication, 1991). Parents' self-assessment was confirmed later by observing the ease with which they completed written questionnaires in person, at baseline.

Developmental Status. The Revised Denver Prescreening Developmental Questionnaire (Frankenburg, 1986) is a parent-report questionnaire that provides information about four domains of development: personal-social, fine motor, language, and gross motor. Children are considered to be developing normally if they pass all items that correspond to their chronological age. In the present study, age-appropriate items from the Revised Denver Prescreening Developmental Questionnaire were included in the information fliers used to announce the reading program. Parents reported their responses during the telephone-screening interview. The

Revised Denver Prescreening Developmental Questionnaire was used to screen out children with obvious developmental delays. Children whose parents reported they had one language delay and those reported a total of two or more delays were excluded from the study and referred to their health care provider for further evaluation.

Sociodemographics. Information about child health status, family composition, and social status was ascertained at baseline and follow-up by parent questionnaire. Questions included the child's age and sex, birth status (recollection of gestational age), and whether the child had noticeable speech or language problems. Questions about family composition included: the number of adults in the home and their relation to the study child; the number of children in the home and their ages and relation to the study child; and parity of the study child. Additional questions were asked about ethnicity and what languages other than English were spoken in the home.

Children's Reading Exposure. Children's exposure to books in the home was based on a survey developed for Whitehurst's original study of dialogic reading (Whitehurst et al., 1988). The questions include who reads to the child, how frequently, and whether the child enjoys being read to.

Parenting Stress. Self-reported parenting stress was assessed with the Parenting Stress Index (PSI; Abidin, 1990). The PSI consists of items that tap parent, situation, and child characteristics. Responses reflect the degree to which the statements are true for oneself or one's child (e.g., "I enjoy going to the movies," "My child is not able to do as much as I expected"). The items are divided into two domains: parent's personality and pathologic status, and stress resulting from parent's perception of child characteristics. Each domain comprises several subscales. The parent domain (54 items) assesses: depression, attachment, restrictions of role, sense of competence, social isolation, relationship with spouse, and parent health. The child domain (47 items) assesses: adaptability, acceptability, demandingness, mood, distractibility or hyperactivity, and reinforces parent. The PSI contains an optional 19-item life stress scale. The life stress scale reflects the accumulation of recent stressful events including divorce, loss of job, and change in residence. The PSI takes approximately 20 to 30 minutes to complete and can be understood by mothers with at least a fifth-grade education. In this study, the PSI was completed in its entirety at baseline and at follow-up.

Percentile scores are used to interpret an individual's PSI scores. The percentile scores are derived from a norming sample of over 2600 mothers with children ages 1 month to 12 years. Scores within the 15th to 80th percentiles are considered in the normal range. High scores, at or above the 85th percentile, indicate a need for clinical assessment and, possibly, intervention. The PSI has been shown to discriminate between typically developing children and clinical groups (Abidin, 1990). It is widely used in evaluation research to identify changes in parent-child dyads experiencing, or at risk for, parenting problems and child behavior disorders (e.g., Caughy, Grason, Guyer, Hughar, Jones, & Strobino, 1996; Mathematica Policy Research & Administration on Children Youth and Families, 1997).

Standardized Tests of Child Language. Standardized assessments of child language ability were identical to those used in Whitehurst's previous studies (see Whitehurst et al., 1988; Valdez-Menchaca & Whitehurst, 1992). They are: the Peabody Picture Vocabulary Test, the Expressive One Word Picture Vocabulary Test, and the verbal expression subtest of the Illinois Test of Psycholinguistic Abilities. Language testing was conducted at the library by evaluators trained for this project; where possible, a different version of the test was used at pretest than at post-test and follow-up. Descriptions of the measures are provided below.

The Peabody Picture Vocabulary Test—Revised (PPVT-R; Dunn & Dunn, 1981) is a standardized, multiple-choice test of receptive vocabulary. Testing encompasses both recognition and visual comprehension skills; the child is asked to look at a plate of four pictures and point to the object named by the examiner. The PPVT has two forms, L and M, with 175 plates in each form. The two forms are highly correlated (Pearson r coefficients range from .65 to .89; Braken, Prasse, & McCallum, 1984). In the current study, Form L was used at pretesting, and form M was used at post-test and again, 3 months later, at the follow-up testing.

The Expressive One-Word Picture Vocabulary Test (EOWPVT; Gardner, 1979; EOWPVT-R; Gardner, 1990) is a test of expressive vocabulary that asks the child to name pictures of common objects. Test items fall into four categories: general concepts, groupings, abstract concepts, and descriptive concepts. Concurrent correlations with scores of receptive language, as measured by the Peabody Vocabulary Test, range from .67 to .78, with a median of .70 (Gardner, 1979). The two forms used in this study are the older 1979 version and the revised 1990 version. The two forms are highly correlated; coefficients range from .84 to .93 and the average correlation across all age groups is .87 (Gardner, 1990). The EOWPVT was administered at baseline, the revised version was used at post-test and follow-up.

The third standardized test used in this study was the verbal expressive subtest of the Illinois Test of Psycholinguistic Abilities (ITPA; Kirk, McCarthy, & Kirk, 1968). This subscale assesses children's ability to put ideas into words by asking them to describe simple objects. For instance, the child is handed a button and asked, "Tell me all about this." If the description is incomplete, the examiner encourages the child with prompts such as "What do we call it?" or "What can you do with it?" Scoring focuses on the number of discrete concepts expressed by the child (e.g., label and classification, shape, function, color). Because there is only one version of the ITPA, it was not administered at baseline to avoid potential item familiarity. It was administered at post-test and follow-up.

RESULTS

Sociodemographics

Family sociodemographics and characteristics of the study children are presented in Tables 2 and 3. Similar to the city as a whole, most mothers (81%) were white. The largest minority group to participate in the study was of African American mothers (12%), the next largest was Asian (3%). Mothers' average age was 34 years. Most (88%) were living with a spouse or partner. It was not uncommon

Table 2. Baseline Sociodemographics and Family Stress for the Randomized Sample

	<i>Combined Group</i> (<i>N</i> = 129), M (SD) or %	<i>Dialogic Reading</i> (<i>n</i> = 88), M (SD) or %	<i>Comparison</i> (<i>n</i> = 41), M (SD) or %
Mother's Age (yrs)	34.08 (5.28)	34.41 (4.68)	33.337 (6.40)
Mother's Education (yrs)	15.65 (2.09)	15.77 (2.07)	15.39 (2.15)
Mother's Race or Ethnicity			
White	81%	82%	81%
African American	12%	11%	12%
Asian	3%	3%	2%
Other and Mixed	4%	4%	5%
Living with Spouse or Partner (yes)	88%	92%	78%
Mother Works Outside Home (yes)	49%	47%	54%
Source of Family Income (government assistance)	10%	8%	15%
No. Children in Home	1.74 (1.05)	1.76 (1.02)	1.71 (1.12)
No. Adults in Home	2.08 (0.68)	2.10 (0.68)	2.02 (0.69)
PSI Parenting Stress Total ^a	215.89 (37.03)	213.55 (33.91)	221.05 (43.19)
PSI Parent Domain	117.95 (22.16)	117.07 (20.39)	119.89 (25.83)
PSI Child Domain	97.93 (17.29)	96.48 (16.26)	101.16 (19.20)
PSI Life Stress Scale	6.37 (6.02)	6.19 (5.95)	6.79 (6.25)

Notes: Tests for differences between groups were not statistically significant except for the proportion of mothers living with versus without a spouse or partner ($\chi^2 = 5.04, p < .05$).

^a *N* = 129 for the combined group on all variables except the PSI, *n* = 122.

for households to include extended family and unrelated adults; 10% of households had three or more adults, the number of adults in the home was reportedly as high as six. Approximately half the study children were first-born children without younger siblings. Only 6 households (5%) had four or more children. The most common source of income was from two wages; nearly half the study mothers worked outside the home. Ten percent reported government assistance as their main source of income.

As may be expected from the neighborhood demographics presented earlier, families that comprised the north- and south-end library groups differed significantly ($p < .01$). Proportionally more of the south-end mothers were minority women (39% vs. 5% in the north end), more were single parents (26% vs. 4% in the north end), and proportionally more of the south-end families received public assistance (20% vs. 4%).

Parenting Stress and Life Stress at Baseline

At intake to the study, the average PSI total score was 216 points; 12% of parents scored above the recommended cutoff for high parenting stress. The separate parent and child domain subscores indicated that characteristics of the child most frequently contributed to overall stress. The two subscales that were most frequently elevated were related to parents' view of their child's mood as unhappy (child mood, 13%) or their interactions with their child as unrewarding (child reinforces parent, 20%).

Table 3. Child Characteristics of the Randomized Sample

	<i>Combined Group, M (SD) or %</i>	<i>Dialogic Reading, M (SD) or %</i>	<i>Comparison, M (SD) or %</i>
Chronological Age (mos)	28.71 (3.32)	28.61 (3.21)	28.93 (3.59)
Sex (male)	61%	64%	56%
Birth Order (firstborn)	68%	70%	63%
Premature Birth (yes)	4%	5%	3%
Health or Speech Problem (yes)	7%	7%	7%
Ear Infection or Pain (yes)	66%	63%	56%
In Preschool or Daycare (yes)	59%	60%	56%
Read to 4 or More Times per Week (yes)	91%	93%	88%
Enjoys Reading Very Much or "Loves It"	92%	93%	90%
Standardized Language Tests			
PPVT Standard Score	105.19 (16.71)	106.42 (17.35)	102.55 (15.10)
EOWPVT Standard Score	110.74 (25.08)	114.39 (24.44)	102.97 (24.94)

Note: $N = 129$ for the combined group on all sociodemographic and health variables. For the standardized tests, $n = 126$ for the PPVT and $n = 125$ for the EOWPVT; three children declined both tests; one declined only the EOWPVT. Within the dialogic reading group, sample size for child variables ranged from 84 to 88; sample size ranged from 38 to 41 in the comparison group. Tests for differences between groups based on baseline child characteristics were not statistically significant except for the t -test of differences in EOWPVT ($t = 2.42, p < .05$).

The sum of all six child subscales form an overall child domain score; it exceeded the recommended high-stress cutoff for 12% of sample.

Parent domain scores were elevated for 7% of the sample. The two parent subscales most frequently elevated were related to poor health (parents' health, 21%) and a stressful relationship with their spouse or partner (relationship with spouse subscale, 13%). In addition to overall and domain scores, the PSI contains a subscale that reflects defensive responding; this subscale was elevated for 11% of the respondents.

At baseline, the average score on the PSI Life Stress Scale was approximately 6.4 points; total scores ranged from 0 to 27 points. Only 7% of families earned scores above the recommended cutoff for high life stress (see Abidin, 1990).

Child Characteristics and Language Ability at Baseline

The average age of the study children at pretesting was 28 months; the age range spanned the inclusion criteria, from 24 through 35 months. Sixty-one percent were boys, and 68% were firstborn. Only 4% of the sample was reportedly born 4 or more weeks early. Mothers reported health or speech problems for 7% of the study children; 66% had been medically treated for ear infections or ear pain. Fifty-nine percent of the children attended preschool or daycare programs outside their own homes. Most parents (81%) reported reading with their child four or more times per week.

Not surprisingly, given the eligibility criteria and screening process, few children evinced speech or language problems of the degree to warrant professional services. There was, however, considerable variability in baseline test scores and baseline

parent-child reading. For example, of the 126 who completed the PPVT test of vocabulary comprehension (3 children declined), 43 scored below 100. Of these, 22 children (17% of the total sample) could be considered "at risk" for language problems because of below-average test performance and one or more of the following concomitant psychosocial risk factors: maternal education less than 12 years; mother single; family poverty; PSI parent, child, or life stress score above cutoff; or high defensive responding.

Intervention Group Differences at Baseline

Random assignment resulted in study groups that were roughly equivalent in terms of intake family and child characteristics. Table 2 shows a tendency for the families in the comparison group to be at slightly greater social disadvantage; however, statistical tests of differences between groups were significant only for one demographic variable, marital status. Compared with mothers in the dialogic-reading condition, mothers in the comparison group were less likely to report living with a spouse or partner (92% vs. 78%, $p < .05$).

One test for differences in baseline child language scores reached statistical significance. The difference, in EOWPVT, was approximately 11 points, equivalent to nearly one half of one standard deviation ($t = 2.42$, $p < .05$) and favored the dialogic-reading group. Pretest PPVT scores were also higher in the dialogic group, but the difference was not statistically significant (Table 3). In contrast, analyses of language skill during baseline reading favored children in the comparison group, but did not reach statistical significance (Table 4).

Analysis of Parent-Child Reading Over Time

Coding Method. Audiotapes of reading sessions at baseline, after sessions 1 and 2, and at follow-up were used to monitor reading style over time. The purpose was to identify parents' use of interactive behaviors that characterize dialogic reading. The coding scheme was a time-interval based scheme in which coders listened to 10-second intervals of taped reading and indicated the frequency of parent and child behaviors that occurred in that period. Coders were unaware of families' study group assignment and all other assessments. Five minutes of reading were coded from the baseline and follow-up audiotapes (recorded in the library), and 10 minutes were coded from the intervention-period audiotapes (recorded in the home).

Coders were trained on 17 audiotapes that included multiple examples of reading behaviors that parents in the dialogic group were asked to increase (e.g., "What?" questions, questions about function or attributes, repetition, labeling, imitative directives, praise, open-ended questions, and expansions) and to decrease (e.g., reading without including the child, use of yes-or-no questions, pointing questions, and criticism). Counts of children's language behaviors included the frequency of nonlexicalized vocalizations, one-word utterances, and multiword phrases. Coding proficiency, between the coder and an "expert" (the project coordinator), was demonstrated on a second set of 12 tapes. Intraclass correlations between the coder and expert ranged from .75 to .98 and averaged .91 for 10 of the 12 parenting behaviors. Two parent behaviors (pointing questions and criticisms) were omitted

Table 4. Parent and Child Reading Behaviors Over Time

	<i>Baseline</i>		<i>After Training Session I</i>		<i>After Training Session II</i>	
	<i>Dialogic</i> (n = 85), M (SD)	<i>Comparison</i> (n = 40), M (SD)	<i>Dialogic</i> (n = 82), M (SD)	<i>Comparison</i> (n = 35), M (SD)	<i>Dialogic</i> (n = 73) M (SD)	<i>Comparison</i> (n = 30), M (SD)
Parent						
Dialogic Reading	20.50 (11.79)	24.79 (12.83)	54.15 (15.85)	19.73 (15.27)	47.14 (16.10)	19.22 (16.69)
Behaviors to Minimize	52.67 (7.99)	51.11 (11.67)	31.64 (11.64)	57.08 (13.67)	31.08 (13.74)	56.18 (14.04)
Child						
Multiword Utterances	10.51 (7.31)	13.38 (8.07)	21.78 (10.07)	11.99 (9.11)	20.01 (7.44)	11.16 (7.98)
One-Word Utterances	10.15 (7.76)	12.26 (7.54)	17.96 (10.57)	10.33 (9.40)	13.69 (8.08)	7.66 (6.41)
MLU-5 (Words)	3.61 (1.61)	3.91 (1.80)	4.85 (1.94)	3.81 (1.75)	5.39 (1.97)	3.68 (1.96)

Notes: Means reflect the average number, per 5 minutes, of reading behavior types coded from audiotapes of parent–child reading. Dialogic reading behaviors include: what questions, function or attribute questions, repetition, labeling, imitative directives, praise, open-ended questions, and expansions. Reading behaviors to minimize include: reading (without conversing with child), yes or no questions, pointing questions, and criticism. All between-group comparisons after each of the two parent-training sessions were statistically significant ($p < .001$).

from the computation because they rarely occurred. Intraclass correlations for child behaviors were .61 for vocalizations, .98 for one-word utterances, and .97 for multiword phrases. Because vocalizations were not a targeted child behavior, yet one-word and multiword utterances were, this level of agreement was judged to be adequate. Training to this level of proficiency took approximately 90 hours. Inter-rater reliability was computed for 20% of the tapes chosen at random over the coding period. The average intraclass correlation for parents' reading behaviors was .92; the range was .78 to 1.00. Coefficients for the three child behaviors were .98 or above.

Three coders unaware of all other assessments transcribed the child's spoken language from the same set of audiotapes used for behavior coding. The written transcripts were used to compute a free-speech measure of children's syntactic maturity, mean length of utterance (MLU). The measure used in analyses reported here, MLU-5, was based on words (Nelson, 1977) rather than morphemes, and on the longest five utterances rather than the entire speech sample, because in this study, the amount and clarity of child speech varied greatly. Mean length of utterance-5 was computed based on the child's longest five utterances from transcripts of the in-library reading sessions and from the first 5 minutes of the home reading sessions.

Training to compute MLU-5 took place on a subset of 30 practice tapes. Proficiency was demonstrated on a set of 10 tapes. Inter-rater agreement, indicated by Pearson correlation with an "expert" (the study investigator) was .98 for coder A and .97 for coder B. Training to this level of proficiency took approximately 40 hours. Inter-rater reliability between coders A and B was computed for 10% of the tapes chosen at random during the coding period; the correlation was .90.

Changes in Parent-Child Reading Over Time. Table 4 summarizes the content of parent-child reading over time by intervention group. At baseline, parents were remarkably similar in their *lack* of dialogic reading behaviors. At baseline, the sum of dialogic reading behaviors over the 5-minute period was 20 for parents in the dialogic group and 24 for parents in the comparison group. The groups were also similar in the frequency of behaviors the dialogic-reading group would be instructed to diminish. On average, these nondialogic reading behaviors occurred 53 times (in 5 minutes) among parents in the dialogic group and 51 times among parents in the comparison group. The most common behavior in both groups was for parents to read the text without engaging the child in conversation about the story.

After the parent sessions, the reading behavior of parents and children in the dialogic-reading condition changed dramatically. Audiotapes of home reading in the weeks after each of the two training sessions showed that the frequency of dialogic-reading behaviors among dialogic-group parents increased to approximately 2.5 times their own baseline level, which was more than 2.5 times the concurrent level of the comparison group (Table 4). Likewise, dialogic-group parents diminished nondialogic reading behaviors to two thirds of their own baseline, a level that was approximately one half that of their comparison-group counterparts. In contrast, the reading style of comparison-group parents changed little during the intervention period.

Table 5. Means of Child Language Test Scores at Post-test and ANCOVA by Intervention Group

<i>Language Test</i>	<i>Dialogic Reading</i>		<i>Comparison</i>		<i>ANCOVA</i>	<i>p</i>
	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>		
PPVT	115.00 (15.33)	79	111.11 (12.03)	36	$F(1,112) = .67$.41
EOWPVT	117.36 (16.22)	78	114.03 (17.48)	36	$F(1,111) = .27$.60
ITPA V.E.	40.73 (8.90)	78	34.44 (6.11)	36	$F(1,111) = 9.46$.003

Notes: 7% of each study group was lost from contact between pre- and post-testing.

Analyses of children's language during reading also revealed group differences. Compared with the comparison group, during book reading the dialogic-reading group children used almost twice as many multiword utterances, more one-word utterances, and had longer MLU-5s.

Pearson correlations were computed to assess the strength of concurrent relations between parent's behavior and child language during shared reading. The association between dialogic reading behaviors and the frequency of multiword and one-word utterances was highly significant after training sessions 1 and 2 (r ranged from .55 to .64, $p < .001$). Likewise correlations between the sum of nondialogic behaviors and child language were consistently strong and negative (r ranged from $-.39$ to $-.66$, $p < .001$).

Intervention Group Differences at Post-Test

Having established that training in dialogic reading achieved the goal of changing the interactive behavior of both parents and children, the next step was to examine group differences in postintervention scores on the child language tests: the PPVT, the EOWPVT, and verbal expression as measured by the ITPA. Post-testing took place at the library within 6 weeks after the end of the 6-week intervention period.

Analyses of differences between the dialogic-reading and comparison groups at post-test were by "intent to treat," meaning that families were grouped as originally assigned to the dialogic or comparison condition regardless of their actual reading style or home reading habits. This analytic approach preserves the value of randomization to control baseline confounders that could be related to compliance with the intervention (Hulley & Commings, 1988). Although possibly attenuating the magnitude of the intervention effect, the advantage of this analytic approach is that it increases the generalizability of these findings to other community-based implementations of the dialogic reading program. Post-test data were available for 93% of the dialogic reading group and 93% of the comparison families.

Because of the imbalance in language scores between groups at pretesting, differences in post-test scores were determined by analysis of variance; pretest scores were used as covariates to correct for initial differences. The results are presented in Table 5. Differences, favoring the dialogic reading group, were significant for one of the three standardized tests. After adjusting for differences in expressive language at pretest (using pretest EOWPVT scores), the average post-

test ITPA verbal expressive subtest score was 41 points for the dialogic-reading group and 34 points for the comparison group ($F(1,111) = 9.46, p < .01$). The difference, equivalent to more than one half of one standard deviation, is considered a medium effect size (Cohen, 1977). Differences in post-test PPVT and EOWPVT-R scores also favored the dialogic-reading group, but did not reach statistical significance.

Intervention Group Differences at Follow-Up

Parents who participated in the first two waves of the intervention were contacted approximately 3 months after their post-test appointment for additional follow-up testing. Fifty of the 62 eligible families (81%) returned for the follow-up evaluation.

As before, analysis of the child language test scores showed no intervention-group effect on the follow-up PPVT or EOWPVT-R scores. In addition, at follow-up, the difference between groups on the ITPA verbal expressive subtest had diminished and was no longer statistically significant. Between post-test and follow-up, the mean score of both intervention groups increased. The adjusted mean for the dialogic reading group was 41.03 points, a negligible increase over the adjusted post-test mean of 40.73. The adjusted mean for the comparison group was 38.78 points, 4 points higher than the adjusted post-test mean for that group.

At first glance, it appears that dialogic reading gave children a boost in expressive skills, but that by follow-up, comparison group children had begun to catch up. Perhaps catch-up was the result of maturational gains within the comparison group; however, two alternative, or additional, explanations are also likely. Inadvertently, there was group mixing in the 3-month interval after post-testing and before the follow-up. As soon as the formal intervention period ended, librarians and parents relaxed their allegiance to group secrecy and information about the two conditions was shared casually. No data were available on the frequency of this practice, although the extent to which dialogic-group parents continued using dialogic reading and to which comparison group parents adopted the dialogic style on their own was assessed with families who participated in the follow-up testing. Analyses of audiotapes of parent-child reading recorded in the library at the follow-up test appointment showed persistent group differences in parents' reading style, yet the means were more similar than before. The mean number of dialogic reading behaviors among the trained dialogic reading group was 39 ($SD = 14$); the mean of the comparison group was 27 ($SD = 18, p < .05$; data not tabled). Compared with all three prior data points, for the first time, dialogic reading increased among comparison-group parents. Presumably this change was brought about by their recent exposure to the intervention techniques.

Group Differences in Parenting Stress at Follow-Up

An a priori hypothesis of this study concerned the effect of the intervention on self-reported parenting stress. Because the techniques of dialogic reading are similar to the play skills taught in interventions with parents of behaviorally difficult preschool children (see Webster-Stratton, 1991, for a discussion of these treatment

Table 6. Means of Parenting Stress Scores at 3-Month Follow-Up and ANCOVA by Intervention Group

<i>Parenting Stress Index (PSI)</i>	<i>Dialogic Reading</i>		<i>Comparison</i>		<i>ANCOVA</i>	<i>p</i>
	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	<i>n</i>		
Total Score	206.00 (32.38)	34	220.86 (47.32)	14	$F(1,45) = 4.48$.04
Parent Domain	111.47 (20.12)	34	116.86 (25.79)	14	$F(1,45) = 2.33$.13
Child Domain	94.53 (16.68)	34	104.00 (25.00)	14	$F(1,45) = 5.89$.02

Notes: Only families who were among the first and second waves to participate in the intervention were eligible for the follow-up assessment; PSI follow-up data were available for 48 of these 62 eligible families.

strategies), it seemed likely that dialogic reading could alleviate or prevent parenting stress, especially stress emanating from characteristics of the child. Comparisons of PSI parenting stress scores at baseline and follow-up suggest this was so.

Analysis of variance with baseline PSI as a covariate revealed significant group effects on overall parenting stress and the child domain score (see Table 6). Analyses based on the proportion of high scores in the two groups showed a similar pattern. The proportion of high child domain scores in the two groups was not significantly different at baseline for the full sample or for the subset who participated in follow-up testing. However, at follow-up, there was a five-fold difference between the two groups' child domain scores ($p < .05$, Fisher's exact test). Twenty-nine percent of comparison-group families and 6% of the dialogic-reading group families scored above the cutoff for high stress. For the follow-up subsample as a whole, the three most frequently elevated child subscales were related to negative mood, difficulty adjusting to changes, and the parent's view of the child as rewarding. Only 4% of parent domain scores were above the recommended cutoff for high stress; the most frequently elevated parent subscale reflected feelings of emotional closeness to the child (i.e., parental attachment).

Effect of Recruiting Method on Sample Composition

Despite widespread recruiting and the participation of four different neighborhood libraries, relatively few families of lower socioeconomic status volunteered for this study. Lack of variation within the sample precluded the opportunity to examine potential socioeconomic status differences in baseline home reading practices or in the effects of dialogic training on parents' reading style. Interestingly, post-hoc analyses revealed that family sociodemographics were related to the success of various recruiting methods. When the recruiting methods were categorized by source, a different pattern emerged for the central and south-end participants than for the north-end participants (see Table 7). Although the manner of recruiting was similar in all four library sites, the passive methods (e.g., posting fliers in community centers, grocery stores, newspapers) were notably less successful in attracting families in the central and south-end (mixed-income) neighborhoods. Most of the lower-income, central, and south-end families who expressed interest in the program came as a result of personal contact with study personnel or as a

consequence of participating in other library activities. That is, for these parents, establishing a relationship with project personnel preceded their involvement. In contrast, approximately half of the north-end parents came to the program having heard about it second-hand through a friend, a flier in a store, coffee house, or community center.

DISCUSSION

This study tested the usefulness of a simple and effective shared reading method that helps facilitate young children's language development. Dialogic reading, as modified here, led to favorable changes in parent-child reading style, in children's language use during reading, and as measured by a standardized test of expressive language skill. These findings encourage further dissemination and evaluation of the dialogic-reading method within other programs for parents and their "pre" preschool-age children.

Because this study modified the original dialogic-reading program to reach more parents via community-based trainings, the integrity of the intervention was monitored closely. Audiotapes of parent-child reading at home and at the library were coded to determine parents' reading style before, during, and after the intervention period. Analyses of the baseline tapes showed that parents typically did not use an interactive, dialogic style. The result of brief instruction by neighborhood librarians was remarkable. Dialogic-reading group parents changed their reading style dramatically after only one 1-hour training session. Audiotapes of home reading showed they used the new dialogic techniques at home and continued to do so 3 months after intervention, at the follow-up assessment. In contrast, during the intervention period, comparison group parents continued reading as they had at baseline. Within the dialogic-reading group, changes in parent's manner of reading were associated with changes in the child's reading style. During book reading, children in the dialogic-reading group became more involved in telling the story: they spoke more often and used more multiphrase utterances and more complex speech.

Future research is needed to learn whether training in dialogic reading changes the interaction style of parents and children in settings other than shared book reading. In this study, assessment of its effects on vocabulary knowledge and conversational skill outside the context of reading was limited to the children's performance on three standardized tests. Two tests, moderately correlated with each other (the PPVT and the EOWPVT-R), were of single-word vocabulary, whereas the ITPA verbal expressive subtest elicited the use of language to express ideas. Analysis of pre- to post-test change showed significant intervention-group differences on one test, the ITPA verbal expressive subtest. In light of the initial skill level of the children in this study, this finding is not entirely unexpected. Recall that at baseline, all children were talkative, intelligible, and capable of combining words; on average, their maximum sentence length during reading was between 3 and 4 words (Table 4). It is likely this level of proficiency limited the ability to document increases in vocabulary as measured by a brief standardized test. For younger or less mature groups of children in the midst of the vocabulary growth spurt, one could expect

program effects to be more apparent in tests of single-word vocabulary. In fact, previous studies of dialogic reading with less highly functioning children reported significant intervention-group gains as measured by the EOWPVT and PPVT, but not the ITPA verbal expressive subtest (Lonigan, 1993; Whitehurst, Arnold, Epstein, Angell, Smith, & Fischel, 1993).

It is perhaps surprising that within this study of relatively advantaged families, there were children who could be considered at risk for future language, and possibly school, difficulties. Although a single test or testing series can not be considered diagnostic, a nontrivial subset of study children did earn lower than average test scores. At baseline, 34% scored less than 100 on the PPVT, a receptive vocabulary test, including 10% who scored 4 or more months below age level. Of those who scored below 100, more than half (or 17% of the total sample) could be considered at risk for language delay by virtue of having PPVT scores below average *and* one or more family risk factors such as low maternal education or high family stress (Levenstein et al., 1998). The fact that so many children were identified as early as age 2, even within this low-risk sample, underscores the value of this inexpensive parent-toddler reading program as a universal preventive intervention activity. Widespread community-based programs such as this, designed for young children in a stage of rapid maturation, can serve three related goals: to promote the language development of all children, to identify those at risk for language problems, and to refer those in need to ameliorative services early and during a developmental period that is particularly amenable to intervention.

An unusual hypothesis explored in this study was that an interactive, language-focused intervention would have an additional positive effect on self-reported parenting stress. It is well recognized that throughout the lifespan, but particularly in early childhood, physical, mental, and emotional capacities are functionally integrated such that maturation in one domain can be associated with advances in another (Zeanah, Boris, & Larrieu, 1997). Conversely, delays and difficulties can also affect multiple areas of development. Specifically, among preschool and school-age children, language and behavior problems are highly correlated (Benasich, Curtiss, & Tallal, 1993; Cohen, Davine, Horodezky, Lipsett & Issacson, 1993; Purvis & Tannock, 1997; Stevenson & Richman, 1978). Thus it seemed likely that the dialogic reading could benefit parents and children negotiating the "terrible two's" because it offers parents a way to let their child practice autonomy and independence within a developmentally appropriate and widely valued context: shared book reading. The data supported this proposition. Analyses of follow-up scores on the PSI showed a five-fold difference between the study groups after controlling for baseline scores. Parents in the comparison group were most likely to report elevated stress because of acceptability of the child and child's negative mood. Both sources of stress threaten parents' availability to a child who is perceived as demanding and unrewarding. Because brief community-based programs such as dialogic reading are intended for all families, and thereby do not stigmatize selected groups, they could be a way to help parents smooth out difficulties that are common in the preschool years, while offering a first step to more intensive services for families experiencing more persistent problems.

A limitation of the program, as carried out here, was that it was difficult to

recruit families and children at greatest socioeconomic risk for language problems. Analyses of study enrollment by recruiting method yielded an important lesson—lower-income mothers and those with less formal education were more likely to join the study as a result of in-person, one-to-one recruiting methods. This finding has important implications for those interested in providing parenting-support services to lower-income, higher-risk families. Considerable time and resources may be needed, in advance of program enrollment, to build personal relationships between program staff, community leaders, and parent participants.

Findings from this study are being used to generate ideas about how to reach families who were not eligible, or did not volunteer, for the present program, including parents with low literacy skills, those who read infrequently, and those who find trips to the library too inconvenient (Huebner, in press). In families whose parents have difficulty reading or are in distress, overwhelmed, or socially isolated, children are at highest risk for communication and behavior problems (Morisset, Barnard, Greenberg, Booth, & Spieker, 1990). For them especially, simple book give-away programs and public service announcements to encourage reading are not enough. Young children need adults who can help them make the most out of book-reading experiences.

To bolster the cognitive and social functioning of children in low-resource, high-risk families requires comprehensive, intensive, two-generational, individualized programs (Levenstein et al., 1998; The Infant Health and Development Program, 1990; Ramey & Campbell, 1984; Ramey & Ramey, 1998), including on-going instruction in parent-child literacy activities (Cronan, Cruz, Arriaga, & Sarkin, 1996).

Children whose parents are unable to provide home learning experiences, including reading, may gain even more from one-to-one interaction with other caregivers, such as child care workers, preschool teachers, or volunteers. Whether parents and professionals who work with very young children can find time, daily, for 5 to 10 minutes of one-to-one reading depends on their priorities and beliefs about the value reading (DeBaryshe, 1995). Dialogic reading is an interactive reading style that is inexpensive, simple to teach, and easy to adopt. Even more importantly, it is a potent intervention that can maximize the benefits of shared reading for language development right from the start.

Acknowledgments: This research was conducted while the author was a post-doctoral fellow at the University of Washington and was supported by grants from the John D. and Catherine T. MacArthur Foundation. Major support for this study was provided by the John D. and Catherine T. MacArthur Foundation through grants to Kathryn E. Barnard under whose mentorship this work was completed.

REFERENCES

- Abidin, R. R. (1990). *Parenting stress index* (3rd ed.). Charlottesville: Pediatric Psychology Press.
- Arnold, D. S., & Whitehurst, G. J. (1994). Accelerating language development through picture book reading: A summary of dialogic reading and its effects. In D. K. Dickinson (Ed.), *Bridges to literacy: Children, families, and schools* (pp. 103–128). Oxford, UK: Blackwell.

- Barnes, S., Gutfreund, M., Satterly, D., & Wells, G. (1983). Characteristics of adult speech which predict children's language development. *Journal of Child Language*, 10, 65–84.
- Beals, D. E., DeTemple, J. M., & Dickinson, D. K. (1994). Talking and listening that support early literacy development of children from low-income families. In D. K. Dickinson (Ed.), *Bridges to literacy: Children, families and schools* (pp. 19–40). Oxford, UK: Blackwell.
- Benasich, A. A., Curtiss, S., & Tallal, P. (1993). Language, learning, and behavioral disturbances in childhood: A longitudinal perspective. *Journal of the American Academy of Child and Adolescent Psychiatry*, 32, 585–594.
- Braken, B. A., Prasse, D. P., & McCallum, R. S. (1984). Peabody Picture Vocabulary Test-Revised: An appraisal and review. *School Psychology Review*, 13, 49–60.
- Brown, A., Bransford, J., Ferrara, R., & Campione, J. (1983). Learning, remembering, and understanding. In J. Flavell & E. Markman (Eds.), *Handbook of child psychology: Cognitive development* (pp. 77–166). New York: Wiley.
- Bus, A. G., van Ijzendoorn, M. H., & Pellegrini, A. D. (1995). Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of Educational Research*, 65, 1–21.
- Caughy, M., Grason, H., Guyer, B., Hughart, N., Jones, A., & Strobino, D. (1996). *Healthy steps for young children program: Evaluation design*. Baltimore, MD: Johns Hopkins University, Department of Maternal and Child Health.
- City of Seattle. (1992). *Seattle 1990: Who we are, Current planning research bulletin No. 52*. Seattle, WA: Seattle Planning Department.
- Cohen, J. (1977). *Statistical power analysis for the behavioral sciences* (p. 40). New York: Academic Press.
- Cohen, N. J., Davine, M., Horodezky, N., Lipsett, L., & Issacson, L. (1993). Unsuspected language impairment in psychiatrically disturbed children: Prevalence and language and behavioral characteristics. *Journal of the American Academy of Child and Adolescent Psychiatry*, 32, 595–603.
- Cronan, T. A., Cruz, S. G., Arriaga, R. I., & Sarkin, A. J. (1996). The effects of a community-based literacy program on young children's language and conceptual development. *American Journal of Community Psychology*, 24, 251–271.
- Dale, P., Notari, A., Crain-Thoreson, C., & Cole, K. (1993). Parent-child storybook reading as an intervention technique for young children with language delays. *Society for Research in Child Development Abstracts*, 9, 310.
- DeBaryshe, B. D. (1995). Maternal belief systems: Linchpin in the home reading process. *Journal of Applied Developmental Psychology*, 16, 1–20.
- Demetras, M., Post, K., & Snow, C. E. (1986). Negative feedback to first language learners. *Journal of Child Language*, 13, 275–292.
- Dunn, J., Wooding, C., & Herman, J. (1977). Mothers' speech to young children: Variation in context. *Developmental Medicine and Child Neurology*, 19, 629–638.
- Dunn, L. M., & Dunn, L. M. (1981). *Peabody Picture Vocabulary Test-Revised*. Circle Pines, MN: American Guidance Service.
- Frankenburg, W. E. (1986). *Revised—Denver Prescreening Developmental Questionnaire*. Denver: University of Colorado Medical Center.
- Gardner, M. F. (1979). *Expressive one-word picture vocabulary test*. Novato, CA: Academic Therapy Publications.
- Gardner, M. F. (1990). *Expressive One-Word Picture Vocabulary Test-Revised*. Novato, CA: Academic Therapy Publications.
- Gleason, J. B., Perlmann, R. Y., & Greif, E. B. (1984). What's the magic word: Learning language through politeness routines. *Discourse Processes*, 7, 493–502.
- Hoff-Ginsberg, E. (1991). Mother-child conversation in different social classes and communicative settings. *Child Development*, 62, 782–796.
- Huebner, C. E. (2000). Community-based support for preschool readiness among children in poverty. *Journal for the Education of Students Placed At Risk*, 5(3), 291–314.
- Hulley, S. B., & Cummings, S. R. (1988). Appendix 11. In *Designing clinical research* (pp. 212–214). Baltimore: Williams and Wilkins.
- Infant Health and Development Program. (1990). Enhancing the outcomes of low-birth-weight, premature infants. *Journal of the American Medical Association*, 263, 3035–3042.

- Kirk, S. A., McCarthy, J. J., & Kirk, W. D. (1968). *Illinois test of psycholinguistic abilities*. Urbana: University of Illinois Press.
- Kopp, C. (1992). Emotional distress and control in young children. *New Directions in Child Development*, 55, 41–56.
- Levenstein, P., Levenstein, S., Shiminski, J. A., & Stolzberg, J. E. (1998). Long-term impact of a verbal interaction program for at-risk toddlers: An exploratory study of high school outcomes in a replication of the Mother-Child Home Program. *Journal of Applied Developmental Psychology*, 19, 267–285.
- Lonigan, C. J. (1993). Somebody read me a story: Evaluation of a shared reading program in low-income daycare. In G. J. Whitehurst (Chair), *Interventions in shared reading for children from low-income families*. Symposium conducted at the Biennial Meeting of the Society for Research in Child Development, New Orleans, LA.
- Lonigan, C. J., & Whitehurst, G. J. (1998). Relative efficacy of parent and teacher involvement in a shared-reading intervention for preschool children from low-income backgrounds. *Early Childhood Research Quarterly*, 13, 263–290.
- McDonald, L., & Pien, D. (1982). Mother conversational behavior as a function of interactional intent. *Journal of Child Language*, 9, 337–358.
- Mathematica Policy Research, Inc. & Administration on Children Youth and Families. (1997). *Early Head Start Parent Interview: For parents of 14-month-old infants*. Princeton, NJ: Mathematica.
- Messer, D. J. (1978). The integration of mothers' referential speech with joint play. *Child Development*, 49, 781–787.
- Moerk, E. L. (1985). Picture-book reading by mothers and young children and its impact upon language development. *Journal of Pragmatics*, 9, 547–566.
- Moerk, E. L. (1976). Processes of language teaching and training in the interactions of mother-child dyads. *Child Development*, 47, 1064–1078.
- Moerk, E. (1974). Changes in verbal child-mother interactions with increasing language skills of the child. *Journal of Psycholinguistic Research*, 3, 101–116.
- Morisset, C. E., Barnard, K. E., Greenberg, M. T., Booth, C. L., & Spieker, S. J. (1990). Environmental influences on early language development: The context of social risk. *Development and Psychopathology*, 2, 127–149.
- Morisset, C. E., Barnard, K. E., & Booth, C. L. (1995). Toddler's language development: Sex differences within social risk. *Developmental Psychology*, 31, 851–865.
- Murphy, C. M. (1978). Pointing in the context of shared activity. *Child Development*, 49, 371–380.
- Nelson, K. (1977). Facilitating children's syntax acquisition. *Developmental Psychology*, 13, 101–107.
- Nelson, K. (1973). Structure and strategy in learning to talk. *Monographs of the Society for Research in Child Development*, 38(1-2, Serial No. 149).
- Newport, E. L., Gleitman, H., & Gleitman, L. R. (1977). Mother, I'd rather do it myself: Some effects and non-effects of maternal speech style. In C. E. Snow & C. A. Ferguson (Eds.), *Talking to children: Language input and acquisition* (pp. 109–149). Cambridge: Cambridge University Press.
- Ninio, A. (1980). Picture-book reading in mother-infant dyads belonging to two subgroups in Israel. *Child Development*, 51, 587–590.
- Ninio, A., & Bruner, J. (1978). The achievements and antecedents of labeling. *Journal of Child Language*, 5, 1–15.
- Pellegrini, A. D., Brody, G. H., & Sigel, I. E. (1985). Parents' book-reading habits with their children. *Journal of Educational Psychology*, 77, 332–340.
- Purvis, K. L., & Tannock, R. (1997). Language abilities in children with attention deficit hyperactivity disorder, reading disabilities, and normal controls. *Journal of Abnormal Psychology*, 25, 133–44.
- Ramey, C. T., & Campbell, F. A. (1984). Preventive education for high-risk children: Cognitive consequences of the Carolina Abecedarian Project. *American Journal of Mental Deficiency*, 88, 515–523.
- Ramey, C. T., & Ramey, S. L. (1998). Prevention of intellectual disabilities: Early interventions to improve cognitive development. *Preventive Medicine*, 27, 224–232.
- Scarborough, H. S., & Dobrich, W. (1994). On the efficacy of reading to preschoolers. *Developmental Review*, 14, 245–302.
- Seattle Office for Long-Range Planning. (1990). *Comprehensive plan framework policies: Population and human needs*. Seattle, WA: Author.

- Snow, C. E., Arlmann-Rupp, A., Hassing, Y., Jobse, J., Joosten, J., & Vorster, J. (1976). Mothers' speech in three social classes. *Journal of Psycholinguistic Research*, 5, 1–20.
- Snow, C. E., Barnes, W. S., Chandler, J., Goodman, I. F., & Hemphill, L. (1991). *Unfulfilled expectations: Home and school influences on literacy*. Cambridge, MA: Harvard University Press.
- Snow, C. E., Perlmann, R., & Nathan, D. (1987). Why routines are different: Toward a multi-factors model of the relation between input and language acquisition. In K. E. Nelson & A. vanKleeck (Eds.), *Children's language* (Vol. 6, pp. 65–97). Hillsdale, NJ: Erlbaum.
- Sokolov, J. L. (1993). A local contingency analysis of the fine-tuning hypothesis. *Developmental Psychology*, 29, 1008–1023.
- Stevenson, J., & Richman, N. (1978). Behavior, language and development in three-year-old children. *Journal of Autism and Childhood Schizophrenia*, 8, 299–313.
- Valdez-Menchaca, M. C., & Whitehurst, G. J. (1992). Accelerating language development through picture book reading: A systematic extension to day-care. *Developmental Psychology*, 28, 1106–1114.
- Washington State Department of Health. (1991). *Vital statistics, 1990: Annual summary report*. Olympia, WA: Author.
- Webster-Stratton, C. (1991). Strategies for helping families with conduct disordered children. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 32, 1047–1062.
- Wells, C. G. (1985). *Language development through the preschool years* (pp. 395–416). Cambridge: Cambridge University Press.
- Wheeler, M. P. (1983). Context-related age changes in mothers' speech: Joint book-reading. *Journal of Child Language*, 10, 259–263.
- Whitehurst, G. J., Arnold, D. S., Epstein, J. N., Angell, A. L., Smith, M., & Fischel, J. E. (1993). A picture book reading intervention in daycare and home for children from low-income families. In G. J. Whitehurst (Chair), *Interventions in shared reading for children from low-income families*. Symposium conducted at the biennial meeting of the Society for Research in Child Development, New Orleans, LA, March 1993.
- Whitehurst, G. J., Epstein, J. N., Angell, A. C., Payne, A. C., Crone, D. A., & Fischel, J. E. (1994). Outcomes of an emergent literacy intervention in Head Start. *Journal of Educational Psychology*, 86, 542–555.
- Whitehurst, G. J., Falco, F. L., Lonigan, C. J., Fischel, J. E., DeBaryshe, B. D., Valdez-Menchaca, M. C., & Caulfield, M. (1988). Accelerating language development through picture book reading. *Developmental Psychology*, 24, 552–559.
- Zeanah, C. T., Boris, N. W., & Larrieu, J. A. (1997). Infant development and developmental risk: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 165–178.