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Intervention to change parent–child reading style: A comparison of instructional methods

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Abstract

Dialogic reading is an evidence-based intervention to promote the language skills of 2- and 3-year-old children. This study examined conditions under which dialogic reading could be implemented in a community setting. Three methods of instruction were compared: (a) in-person with video instruction in small groups, (b) self-instruction by video with telephone follow-up and, (c) self-instruction by video alone. Results showed few parents read with a dialogic style prior to instruction. Instruction yielded more than a 4-fold increase in parents' dialogic reading behaviors and had significant positive effects on children's language use (including number of words and mean length of utterances) during shared reading. When the data were stratified by parents' education and instructional method (in-person vs. self-instruction), there was a significant difference favoring in-person instruction as the more efficacious method of instruction, especially for parents with high school education.
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1. Introduction

Reading to preschoolers is commonly accepted as a way to promote school readiness. In 1985, the National Academy of Education underscored the role of caregivers in reading development: "The single

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most important activity for building the knowledge required for eventual success in reading is reading aloud to children" (National Academy of Education Commission on Reading, 1985, p. 3). Parents have gotten the message. Surveys of home literacy activities find most preschool children are read to routinely. For instance, in 2001, the percentage of children ages 2–3 years read to by a family member every day of the previous week was 49% for children whose mothers had a high school education and 73% for children whose mothers were college graduates (U.S. Department of Education, 2003).

Despite the widespread practice of reading with young children, empirical evidence of its benefits for language or literacy development is relatively recent (Bus, van IJzendoorn, & Pellegrini, 1995; Lonigan, 1994; Scarborough & Dobrich, 1994; Whitehurst & Lonigan, 1998). Research has shown positive effects of shared reading on preschool children's emergent literacy and oral language skills, including increases in vocabulary, knowledge of print (Reese & Cox, 1999) and complexity of conversational language (Morrow, 1988). Labeling novel words during shared reading can increase both expressive and receptive vocabulary (Senechal, 1997; Senechal & LeFevre, 2001), and repeated reading of the same story provides important lessons in narrative structure (Senechal & LeFevre, 2001).

Reading aloud with children is particularly effective when the shared reading is highly interactive. The advantages of an interactive, or "dialogic" style of reading on young children's oral language skills were demonstrated first by Whitehurst and his colleagues in a study of a shared reading program called "Dialogic" or "Hear-and-Say" reading (Whitehurst et al., 1988). The program for 2- and 3-year-old children is based on three principles: (1) the use of evocative techniques that encourage the child's active participation in telling the story, (2) use of feedback to the child in the form of expansions, corrections and praise, and (3) progressive change to stay at or beyond the child's current level of independent functioning (Arnold & Whitehurst, 1994). Typically, instruction takes the form of two sequenced small-group sessions with an experienced trainer and videotaped illustration of the reading techniques.

Multiple studies of the last decade have confirmed and extended Whitehurst's findings that instruction in dialogic reading leads to significant changes in shared reading style and to positive effects on the expressive language skills of 2- and 3-year-old children. Positive results have been found with children from lower- and middle-income homes; in center- and home-based programs; and with typical development and developmental disabilities (Dale, Crain-Thoreson, Notari & Cole, 1996; Huebner, 2000a, 2000b; Lonigan & Whitehurst, 1998; Whitehurst et al., 1988; Valdez-Menchaca & Whitehurst, 1992). Interestingly, the most consistent positive findings are from implementations that include home reading, with or without a concomitant group-based school or daycare dialogic reading component (Lonigan & Whitehurst, 1998; Whitehurst et al., 1994), suggesting the effects of dialogic reading for 2- and 3-year-old children are especially potent when delivered as a one-to-one activity.

Although the evidence in favor of highly interactive, or dialogic, reading is strong, adults do not typically read this way without instruction. In a study of 129 parents and their 2- and 3-year-old children, Huebner (2000a) reported parents' baseline reading style included few dialogic reading behaviors. The most common behavior was to read the text directly without engaging the child in the story. Following instruction in dialogic reading, parents changed their style dramatically. The average number of dialogic reading behaviors increased from 20 to 55 in a 5-min parent–child reading sample.

1.1. The need to translate research to practice

Evidence from dialogic reading programs demonstrates that it is relatively easy to teach parents and early educators how to maximize shared reading to foster language and literacy development in young

children. Interestingly, instruction in dialogic reading has many hallmarks of what is known in the field of public health as "universal preventive intervention." It is effective with a broad range of families, including parents and children who vary in terms of language risk and ability. It is also relatively inexpensive, brief, and easy to carryout. The cost to the adult reader in terms of training time is low and exceeded by substantial gains produced in children's language skills after 6–8 weeks of dialogic reading—gains that are sustained over time (Whitehurst et al., 1988). Furthermore, there appear to be few, if any, adverse consequences associated with dialogic reading.

Widespread dissemination of dialogic reading requires a practical, cost-effective way to teach adults the reading techniques. Almost all implementations of dialogic reading to date have conducted training in-person (with or without additional videotaped explanation and examples). In-person training is effective, but depends on the presence of an experienced trainer. A potential alternative is self-instruction using a videotape training package (Arnold, Lonigan, Whitehurst, & Epstein, 1994). Arnold et al. found that self-instruction by video compared favorably to in-person training without a video. Compared with a control condition in which parents discussed the value of shared reading but did not receive any instruction, both the self-instruction by video and in-person training formats led to significant gains in child language skills. Indeed, Arnold suggests video training may have some advantages over in-person training because it presents instruction in a standardized fashion. However this conclusion must be tempered by the homogeneity of his sample. Study participants were 64 well-educated middle- and upper-income families with strong habits of home reading. Whether less socioeconomically-advantaged parents are equally adept at self-training using a video remains unknown. This information is essential to any implementation of dialogic reading that includes parents with greater educational diversity, especially parents with relatively low levels of education whose children are in greatest need of effective language promotion and pre-literacy experiences. Clearly, both cost-effectiveness and efficacy need to be taken into account in any wide-scale intervention program.

The present study is a step in learning how dialogic reading could be taken to scale as a community-based universal preventive intervention. The study systematically tested three methods of instruction in dialogic reading with an educationally-diverse sample of parents and young children. The three methods of instruction were: (1) in-person instruction with videotaped explanation and examples presented to small groups of parents; (2) self-instruction by videotape with telephone coaching; and, (3) self-instruction by videotape alone. A planned subanalysis tested whether effects of training method (in-person vs. self-instruction) differed for parents of higher vs. lower levels of education.

2. Method

2.1. Community context

The study setting was carefully selected to provide a range in socioeconomic status and education. The site, Jefferson County, is a rural county in the Olympic Peninsula region of Washington State. In 2001, the year this study was planned, the county birth rate was approximately 200 births per year. In terms of socioeconomic status and educational attainment, the county profile was similar to, or more disadvantaged than Washington State as a whole. For instance, in 2001, over one-half of births in Jefferson County were Medicaid funded (vs. 36% for Washington State). Census data of 2000 reported 28% of County residents 25 years and older had completed a 4-year college degree (vs. 33% for

Washington State). Among children ages 5–15 years, the disability rate was 19% in the County, slightly more than for the state overall (Jefferson County Washington, 2003); in the year 2003, over one-third of Jefferson County school children qualified for free or reduced lunch (Washington State Office of Superintendent of Public Instruction, 2004).

Jefferson County has two public libraries, one sponsored by the County, the other by the town and County seat of Port Townsend. Each library has a children's division and a children's librarian. The County Department of Health and Human Services, located in Port Townsend, is a strong supporter of family and child health and oversees multiple federal (i.e., WIC), state and private initiatives for families and young children. The County Department of Health and Human Services and the public libraries were supporters of the present study. For these reasons, the study setting was considered similar to other communities that might be interested in wide-scale dissemination of dialogic reading.

2.2. Recruitment and design

The goal was to recruit a minimum of 120 families with 2- or 3-year-old children. In addition to eligibility by child age, parents were asked to confirm their child's ability to speak using two-word combinations. Study participation was restricted to residents of Jefferson County and parents who could understand and speak some English. The language restriction was necessary because the instructional materials were in English. No parent was excluded from the study because of limited English. Parents' own literacy skill was not a consideration for participation, nor were families excluded if the parent reported the child had a language delay or physical disability. All study procedures were approved by the Human Subjects Review Committee of the University of Washington.

Parents were recruited in three ways. First, names and addresses from birth certificates were used to mail invitations to all county residents who gave birth 2–3 years past. Second, articles were placed in two local newspapers and the study investigator (CEH) appeared on a local cable access television show hosted by the Mayor of Port Townsend. In addition to media announcements, fliers announcing the study, with a local telephone number listed for further information, were posted at multiple public locations. The third method, word-of-mouth, was the most effective method of recruitment. Most families were recruited by research staff who attended the libraries' children's story times, childcare centers, birth-to-three services and children's play groups, and explained the study and invited participation.

Parents indicated their interest in the study by completing a brief informational survey and consent form, and returning the material either in-person or by mail using a self-addressed, postage-paid envelope. A total of 132 parents indicated interest; of these, 128 met the eligibility criteria. Families were deemed ineligible if they lived outside the county or their children were too young.

Group assignment was staged in two phases (see Fig. 1). In the first phase, all recruited and eligible families (95 total) were randomly assigned to one of the three "Instruction" conditions described below. At pre-test, questionnaire data were collected, however, in order to minimize face-to-face contact with parents who would be assigned to one of the self-instruction conditions, parents were not asked to complete a baseline reading sample. Once the randomized sample was established, a second recruitment phase was opened. Families recruited in phase two, the "Baseline" group described below, supplied baseline reading samples before learning of their group assignment (all were assigned to self-instruction with telephone follow-up) as well as post-instruction reading samples. This group allowed for a within-subjects pre- to post-assessment of the intervention, and provided a benchmark for baseline scores that could be used in a between-subjects evaluation of the intervention program.

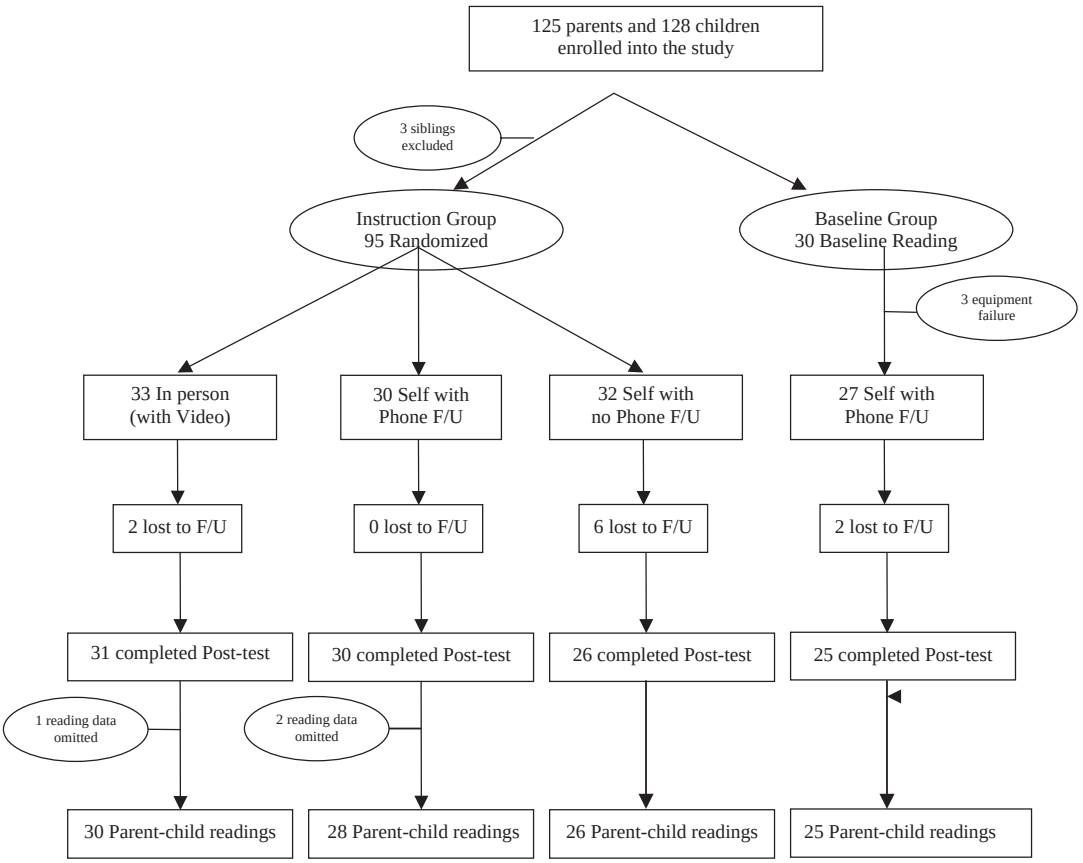

Fig. 1. Study flow diagram.

2.2.1. Instruction group

Upon receipt of the signed consent form, parents were enrolled in the study by assigning them a study identification code. After a block of at least 12 parents were enrolled, they were randomly assigned to one of three instruction conditions. Overall, approximately one-third were assigned to the in-person condition ($n=33$); one-third to self-instruction with telephone follow-up ($n=30$); and, one-third to self-instruction ($n=32$) for a total of 95 parents[1]. Assignments were conveyed to the field staff, who then scheduled parents for in-person instruction. Mailings to parents in the other two instruction groups were sent from the University.

2.2.2. Baseline group

Phase two of recruitment, to obtain baseline reading data, immediately followed the recruitment of the Instruction group. This Baseline group ($n=30$) was audio-recorded while reading with their children as part of the enrollment process. At the time of recruitment and enrollment, parents were informed there

[1] Power analysis revealed that the intended sample size of 30–35 per group was adequate to detect group differences even if the magnitude of difference was less than half that found previously in the (Huebner, 2000a) study.

was a "chance" they would be assigned to any one of the three instructional groups; in fact, all were assigned to the telephone follow-up condition. Of the 30 families recruited, 25 completed all baseline and post-instruction assessments and reading samples.

2.2.3. Parent–child reading intervention

The content of the intervention was based on the program "Dialogic Reading for Two- and Three-Year Olds" as described by Whitehurst and his colleagues (Whitehurst et al., 1988). The instructional video used in the present study was "Hear and Say Reading with Toddlers" (Huebner, 2001), a 16.5-min videotape developed to explain dialogic reading to parents and early childhood educators and encourage daily reading using the dialogic style. The videotape consists of segments that accompany each of two successive training sessions. The video segments associated with Sessions I and II are 8:31 and 7:59 min long, respectively.

Training objectives followed the recommendations of Arnold and Whitehurst (1994) and Huebner (2000a, 2001). Adults were instructed to reduce reading behaviors that minimize or exclude the child's verbal participation, and increase verbal behaviors that invite and maintain the child's active participation in telling the story. Reading behaviors that reduce participation included: reading without the child's participation, asking the child pointing questions, yes/no questions, and criticism. Reading behaviors that increased a child's participation (taught during Session I) included frequent use of: 'what' questions, questions about function and attributes, praise, repetition and imitation of the child's utterances, and following the child's lead. In Session II, adults were shown how to increase two additional reading behaviors, verbal expansions and open-ended questions that help children build more sophisticated sentence-level skills. The instructional videotape introduced and defined each reading technique and then illustrated each technique with brief vignettes of adults and children reading together. When training occurred in-person, after viewing the video, the trainer reviewed the techniques, modeled them, and helped the adults practice them using role-play and corrective feedback.

2.2.3.1. In-person instruction. Parents randomly assigned to the in-person group met with an instructor in small groups of two to six parents. This method of in-person instruction has previously been demonstrated to be effective (Huebner, 2000a). The groups were conducted by a community resident trained by the study investigator (CEH) in dialogic reading and were held at the public libraries. After introductory comments about the value of reading with young children, parents watched the video and practiced dialogic reading by imitating the expert in role-play and receiving corrective feedback. Typically, each training session took approximately 45 min and never more than 1 h. At the conclusion of Session I, parents were given a copy of the video and a children's book to keep. Parents were asked to use the new way of reading with their children daily, 5–10 min per day for four weeks. After four weeks, parent groups met again for Session II to learn new behaviors to add during the next four-week period.

2.2.3.2. Self-instruction with telephone follow-up. Parents assigned to the self-instruction with telephone follow-up group received the instructional video and a children's book by mail along with a letter stating a staff member would telephone them in approximately one week to "see how the new reading style is working out and answer any questions." To parallel the structure of the in-person format (i.e., one contact for each of Sessions I and II), one telephone contact was attempted in each of the two four-week reading periods. A total of three voicemail messages per period were

delivered if voice-to-voice contact was not possible. Telephone calls were placed by a University-based staff member who had no other contact with parents or with study group assignment. The duration of the telephone calls was brief; the longest was 5 min and most were 3 min or less. Few parents asked for help with the reading style. Most parents commented that the dialogic reading techniques felt familiar, they liked the interactive style of reading, or noticed their children were more interested and engaged in story time. At the conclusion of each call, parents were encouraged to "keep reading".

2.2.3.3. Self-instruction only. Parents assigned to self-instruction only (i.e., without telephone follow-up) received the instructional video and a children's book by mail along with a letter instructing them to view Part I of the tape, to try those reading techniques for four weeks, and then view Part II for tips that build on Part I. Like all study participants, these parents had only brief interaction with study staff during recruitment (e.g., to confirm and thank them for their interest in the study, answer any questions about the study procedures and clarify unclear responses to the enrollment questionnaire). Following group assignment, during the eight-week instruction phase, study staff did not initiate contact with any parent assigned to self-instruction. Parents were instructed, as were all parents, to contact the study office by telephone (with 24-h voice mail) with any questions; no one did.

2.3. Measures

Following eight weeks in the intervention period (four weeks each in Session I and Session II), parents were contacted by telephone and scheduled for in-person appointments to assess parent–child reading style. Outcome assessment was completed at a location of the parents' choice, either in families' homes, the libraries, or the health department. The assessors were college-educated community residents trained in the data collection protocol. Assessors were unaware of parents' group assignments. Because all participating families received instructional videos and children's books, these clues of an intervention did not distinguish between the Baseline vs. Instruction groups, nor among the three types of instructional methods.

Parent questionnaires were collected during two periods: enrollment (prior to group assignment) and post-test (within 6 weeks following the 8-week intervention period). All participants were asked to complete an audio-recording of parent–child reading at post-test; and as described above, the Baseline group parents completed one at enrollment as well.

2.3.1. Sociodemographics

To keep the enrollment materials brief (i.e., a consent form and two-page questionnaire), information about the child's age, sex, and whether the child had physical or learning difficulties was collected at enrollment, whereas questions about parents' age and education were asked as part of the post-test questionnaire.

2.3.2. Children's literacy experiences

Included in the parent questionnaires were items that asked about reading frequency and how much the child enjoys being read to. Five questions from a repeating national survey of school readiness (U.S. Department of Education, 1993) were asked about other early literacy activities (i.e., story telling, teaching songs, letters, words or numbers) and library use in the previous month.

2.3.3. Children's vocabulary

The MacArthur Short Form Vocabulary Checklist Level II-Form A (Fenson, Pethick et al., 2000) was included as page two of the enrollment questionnaire. The MacArthur Short Form Vocabulary Checklist is a 100-item parent-report of expressive vocabulary empirically derived from the MacArthur–Bates Communicative Development Inventory: Words and Sentences (Fenson et al., 1993) which has established reliability, validity and published norms for boys and girls ages 18 through 30 months (Feldman et al., 2000; Fenson, Bates et al., 2000; Fenson et al., 1993; Ring & Fenson, 2000). In this study, the Vocabulary Checklist was used to learn the language level of the children to assure equivalence among intervention groups prior to instruction; it was not used as an outcome measure.

2.3.4. Parent–child reading style

Parent–child reading was coded from audio-records collected at pre-test (Baseline group) and at post-test following the eight-week intervention period (Baseline and Instruction groups). The reading sessions were approximately 5 min in length; parents were instructed to read a book with their child. If they completed the book in less than 5 min, they were asked to read a second book or re-read the first. The coding scheme was a time-interval based scheme in which coders listened to 10-s intervals of reading and indicated the frequency of parent and child behaviors that occurred in that period. Coders were kept unaware of families' group assignments and all other assessments. The entire reading session, up to 5 min total, was coded from the pre- and post-test audio-recordings.

Coders were trained on audio-recordings that included multiple examples of children's single and multi-word utterances and of all reading behaviors parents were asked to increase (e.g., what questions, questions about function or attributes, labeling and open-ended questions) and to decrease (e.g., reading without including the child, use of yes/no questions, and pointing questions). Inter-rater reliability between the coder and an "expert" (CEH) was tested on a set of 25 audio files chosen at random from the study data. Intraclass correlations for parents' reading behavior codes ranged from .90 to 1.0. Coefficients for each of the two child behaviors were .99.

One coder, unaware of all other assessments and blind to families' group assignments, transcribed the child's spoken language from the same audio files used for behavior coding. The written transcripts were used to compute a free-speech measure of children's syntactic maturity based on MLU (mean length of utterance). The measure used in analyses reported here was based on words 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.

2.3.4.1. Data reduction and primary outcome measures. The main analysis was a test of differences in parent and child reading behaviors following instruction in dialogic reading. The goal of the instruction was to increase parents' use of dialogic behaviors and decrease their use of other behaviors. To test this, we constructed a single summary score of parents' behavior, "DR Ratio," which was the total number of reading behaviors parents were asked to increase divided by the total number to decrease. Behaviors parents were asked to increase (the numerator of DR ratio) were the use of: labels, what questions, function or attribute questions, open-ended questions, imitations, repetitions, expansions, confirmations, prompts to say more, and questions to connect the story with the child's own experiences. Behaviors to decrease (the denominator) were: reading without including the child, yes/no questions, pointing questions, and negations of the child's comments. DR ratio was chosen as the primary outcome of interest because it is a single measure that captures the goal of the

intervention to shift the balance in parents' reading style by asking them to do more of some types of behaviors ("behaviors to increase") and do less of others ("behaviors to decrease"). Two measures of children's behavior were also examined. The first, "verbosity," was the sum of one-word plus multiple-word phrases. The second was the mean length of the child's longest five utterances in words, a proxy for grammatical maturity. Parent–child reading samples of less than 5 min duration (in a few cases, study children tired in less than 5 min time) were adjusted to yield 5-min averages for all outcome variables reported.

3. Results

3.1. Participant flow and follow-up

Fig. 1 summarizes participant flow from enrollment through post-testing. Of the 128 children enrolled, three siblings were excluded from outcome data collection because of lack of independence between children being read to by the same parent. In addition, ten families (8%) were lost to follow-up between delivery of the intervention and scheduling the post-test. The primary reasons were moving out of the area or disconnected telephone numbers. Baseline readings from three parent–child pairs were missed because of equipment failure. Finally, post-test data for three children were excluded; two because the parent–child reading session occurred in Spanish, and one because the child was uncooperative and a valid observation of shared reading was not possible. Thus outcome reading sessions were available for 109 of 125 parent–child pairs (87.2%) enrolled in the study, including 88% of families within the Instruction group and 83% of the Baseline group.

3.2. Description of the baseline and the instruction group samples

3.2.1. Sociodemographics

Tables 1 and 2 present characteristics of the sample as a whole and separately for the Baseline and the randomized Instruction groups. Tests for differences between the Baseline and Instruction samples showed the groups were very similar with a few exceptions as noted below.

Family sociodemographics and characteristics of the study children are presented in Table 1. Of the 112 study parents who participated in study as "readers" and provided outcome data, 6 were fathers, 105 were mothers, and one was a grandmother with legal guardianship who was included on Table 1 as a "mother." For the remainder of this report, this group of readers is referred to as "parents." The average years of education of mothers and fathers included some college, however, 21.1% of the study mothers and 35.4% of the fathers had no additional schooling beyond high school. Most (89.1%) were living with a spouse or partner. Similar to the ethnic makeup of the county, the majority of the parents were White. Slightly less than 12% had family incomes below US$15,000 per year in 2002 dollars. The federal poverty guideline for a family of three for the calendar year 2002 was US$15,260 (U.S. DHHS, 2003).

3.2.2. Child characteristics and home literacy activities at enrollment

The mean age of the study children at enrollment was 28.21 months (see Table 2); 19.2% were less than 2 years, 80.8% were age 2 years, and 7.5% were age 3. Two children were reported to be bilingual,

Table 1
Parent reader and household characteristics at post-test[a]

	Post-test sample		Baseline group (pre- and post-test)		Instruction group (post-test only)		t or X^2	p
	$n=112$		$n=25$		$n=87$			
	% or M	SD	% or M	SD	% or M	SD		
Parent reader's relation to child								
Mother	94.6%		92.0%		95.4%		0.44	.51
Father (all in residence)	5.4%		8.0%		4.6%			
Parent reader's education (years)	14.71	2.75	14.56	1.83	14.75	2.36	−0.37	.71
High school graduate or less	22.0%		24.0%		21.0%		0.11	.74
One or more years college	78.0%		76.0%		79.0%			
Mother's marital status								
Married or living with partner	89.1%		77.3%		93.0%		4.75	.03
Mother's education (years)	14.80	2.26	14.80	1.87	14.80	2.37	0.005	1.00
High school graduate or less	21.1%		20.0%		21.4%		0.02	.89
One or more years college	78.9%		80.0%		78.6%			
Residential father or partner's education (years)	14.57	2.47	14.20	2.59	14.67	2.44	−0.76	.45
High school graduate or less	35.4%		50.0%		31.6%		2.35	.13
One or more years college	64.6%		50.0%		68.4%			
Annual family income								
Less than US$15,000	11.8%		12.5%		11.6%		0.70	.70
US$15,000–50,000	51.8%		58.3%		50.0%			
Greater than US$50,000	36.4%		29.2%		38.4%			

p-value refers to chi-square and t-tests of significant differences between baseline and instructional study groups.
[a] Information about family sociodemographics was obtained from the outcome questionnaire during post-test with $n=112$; total sample $n=120$.

speaking both English and Spanish. By parent-report, 7.6% of children (9 of 118 who responded to this question) had a physical or learning difficulty, including five children described as delayed in speech.

Home literacy activities were common. By parent-report, most children (85.8%) enjoyed adult–child reading and 70.6% were reported to have been read to by a family member at least once a day the prior week. More than 80% of parents reported their child was told a story, taught songs, music, letters, words or numbers in the previous week and over two-thirds had visited a public library in the previous month (Table 2). At enrollment, 25.8% of children scored at or above age level for single-word vocabulary as indicated by the parent-report CDI /Short Form.

Tests for differences between parents recruited to provide baseline reading data ("Baseline") and those in the Instruction group showed few differences in terms of sociodemographics or home literacy experiences (Tables 1 and 2). Parents in the Instruction group were more likely to be married or living with a partner ($\chi^2(1,108)=4.75$, $p<.03$) and their children were marginally, although not significantly, older than those in the Baseline group, $t(118)=1.80$, $p<.07$. Conversely, the Instruction group was less likely to have visited a library in the previous month ($\chi^2(1,120)=4.63$, $p<.03$) and less likely to have been read to daily in the previous week ($\chi^2(1,119)=6.99$, $p<.008$). Families randomized to the three instructional conditions were similar to each other in terms of family and child characteristics; no group difference was significant.

Table 2
Characteristics of children at enrollment

	Total sample		Baseline group (pre-and post-test)		Instruction group (post-test only)		t or X^2	p
	$n=120$		$n=25$		$n=95$			
	% or M	SD	% or M	SD	% or M	SD		
Age (months)	28.21	5.32	26.52	4.79	28.65	5.39	−1.80	.07
Gender (female)	52.5%		56.0%		51.6%		0.16	.69
Birth order (first born)	46.2%		52.0%		44.4%		0.44	.51
Physical/learning difficulty (yes)	7.6%		12.5%		6.4%		0.95	.33
Bilingual (yes)	2.0%		0.0%		2.0%			
Attends daycare or preschool (yes)	37.8%		41.7%		36.8%		2.05	.36
Literacy experiences at enrollment								
Enjoys child–adult reading ("very much")	85.8%		88.0%		85.3%		0.12	.73
Read to by family member last week (daily)	70.6%		92.8%		64.9%		6.99	.008
In the past week, a family member has...								
Told child a story	83.3%		88.0%		82.1%		0.50	.48
Taught songs or music	84.2%		84.0%		84.2%		0.00	.98
Taught letters, words, or numbers	80.8%		92.0%		77.9%		2.54	.11
In the past month, child visited a library	65.8%		84.0%		61.1%		4.63	.03
Vocabulary at enrollment								
CDI/Short Form vocabulary age[a]								
At or above chronological age level	25.8%		36.0%		23.2%		4.53	.21
Below age level by 1–5 months	20.8%		28.0%		18.9%			
Below age level by 6+ months	31.7%		16.0%		35.8%			
Missing CDI (child too old for CDI)	21.7%		20.0%		22.1%			

p-value refers to chi-square and t-tests of significant differences between baseline and instruction groups.
[a] Based on CDI Short Form age equivalent scores at enrollment to the study: scores for 21.7% of the children were not possible because the child was technically too old for the CDI (>30 months) and had a higher raw score than the CDI Short Form 30-month age equivalent.

3.2.3. Data transformations

Inspection of the dependent measures (i.e., DR ratio, child verbosity and length of longest five utterances) found all were normally distributed with the exception of post-test DR ratio. Post-test DR ratio ranged from 0.03 to 10.20 and was positively skewed. Consequently, analyses of post-test DR ratio were performed using an inverse transformation for normality (Tabachnick & Fidell, 1996) with the three extreme high scores dropped. To ease interpretation and provide raw data, the tabled values are untransformed.

3.3. Analysis of parent–child reading style prior to instruction

Although parents reported that home reading was a common activity (daily reading in the previous week was reported by 70.6% of the sample overall), analyses of parent–child reading sessions collected prior to instruction, from the Baseline group, showed relatively little use of a dialogic reading style (Table 3). The average number of parents' dialogic reading behaviors (the behaviors chosen as targets to

Table 3
Parent–child reading behaviors assessing effects of instruction on shared reading

	Baseline group pre-test reading		Baseline group post-test reading		Baseline pre- vs. Baseline post-test		Instruction group post-test reading		Baseline pre- vs. Instruction post-test	
	M	SD	*M*	SD	*t*	*p*	*M*	SD	*F* or *t*	*p*
Parent DR ratio (number of behaviors to increase: decrease)	0.30	0.23	1.38	1.17	2.92	.01	1.91	1.92	12.31	.0007
Child verbosity (total number of utterances)	17.61	12.97	26.70	14.34	2.40	.02	29.46	15.52	9.04	.003
Child's longest 5 utterances (in words)	2.79	1.46	3.36	1.75	2.26	.03	3.81	1.80	2.24	.13

Adult and child behavior counts were adjusted for 5 min of reading. Tests of means within the Baseline group are paired *t*-tests; tests of the Instruction group compared with the Baseline group are analyses of covariance controlling for differences in parental education (for parent behaviors) or child age (for child reading behaviors). Tests of DR ratio were computed on an inverse transformation of DR ratio (for normality); tests on the untransformed variable were statistically significant also at $p < .001$.

increase) was 18.93 in reading samples of 5 min duration. In contrast, the behaviors parents would be instructed to decrease were very common ($M = 69.16$ per 5 min) and were almost entirely of the category "reads without engaging the child" ($M = 65.56$ per 5 min; data not tabled). Parents' mean DR ratio was 0.30, reflecting 3 dialogic reading behaviors to every 10 behaviors to decrease. Individual differences showed a range in DR ratio at baseline from 0 to 0.87. There were no significant associations between DR ratio at baseline and child's age or parent's education. At baseline, the mean number of child utterances in the 5-min reading session was 17.61 and the longest five sentences were on average 2.79 words.

3.4. Analysis of parent–child reading style after Instruction–Baseline and instruction groups

Two sets of tests were conducted to evaluate parent–child style reading following instruction. The first set compared changes among Baseline families who provided both baseline and post-test reading samples. Paired *t*-tests showed a significant and substantial change in DR ratio. Average DR ratio increased from 0.30 at baseline to 1.38 ($t(24) = 2.92$, $p < .01$) following instruction (by self-instruction with telephone follow-up). An increase in DR ratio was evident for every parent, with increases ranging from 0.09 to 5.56. Following parents' instruction in dialogic reading, children's language during reading episodes changed too. There was a significant increase in the number of child utterances, (from $M = 17.61$ to $M = 26.70$; $t(24) = 2.40$, $p < .02$) and an increase in the length of the child's longest five utterances (from $M = 2.79$ to $M = 3.36$; $t(22) = 2.26$, $p < .03$).

A second set of tests compared the reading style of the Instruction group post-test (following instruction) to the Baseline groups' pre-test scores (Table 3). The results of ANCOVA, controlling for parent's education, was statistically significant for DR ratio. Compared to the Baseline groups' pre-test scores, DR ratio was significantly higher following instruction ($F(1,101) = 12.31$, $p < .0007$). With child's post-test age as a covariate, ANCOVA showed a significant greater number of child utterances following instruction ($F(1,106) = 9.04$, $p < .003$) but no significant difference in the length of the child's longest five utterances. Length of the longest five utterances was highly correlated with child's age, ($r(102) = .54$).

3.5. Differences among instructional methods

Tests of differences in parent and child reading behaviors following instruction within the Instruction group were conducted using ANCOVA to control for possible effects of parental education on parents' DR ratio, or child's age on child verbosity and length of utterances. The test of differences in parent's DR ratio included three levels of instructional method (in-person, self-instruction with phone follow-up and self-instruction without phone follow-up), parental education (as a continuous variable), and the interaction of method and education. The results, controlling for parental education, favored the in-person group ($M=2.67$) over each of the self-instruction groups (self-instruction with telephone follow-up $M=1.55$ and self-instruction alone $M=1.43$), although the F-test of differences among the three instructional methods did not reach conventional levels of significance ($p=.08$; Table 4). The interaction of education and method was not significant.

Analyses for differences among instructional groups for each of the 14 behaviors contained within the DR ratio revealed no significant differences with the exception of "adult reads without including the child," $F(2,81)=3.83$, $p<.03$. For this behavior, group averages favored in-person instruction ($M=24.08$ "reads" per 5 min) over self-instruction without telephone follow-up ($M=35.0$ "reads" per 5 min), $p<.03$, by Scheffe test. Reading without including the child was the most common single behavior overall. Among the behaviors parents were asked to increase, the most common was "labeling," occurring on average 11 times in 5 min of reading; the next most common was asking 'what' questions. As a group, the behaviors parents were asked to increase occurred on average 47 times in 5 min of reading. Instructional method had no significant effect on self-reported reading frequency. Prior to and following instruction, more than two-thirds of parents reported reading with their children on a daily basis; differences among instruction groups were not significant. Eleven parents in the total sample reported reading with their children infrequently (0–2 times in the previous week). Of these, nine reported higher rates of shared reading at post-test, following instruction in dialogic reading.

Table 4
Parent–child reading behaviors following instruction by instructional method

	In-person instruction		Self-instruction with phone follow-up		Self-instruction without phone follow-up		Differences among instructional methods[a]	
	Mean	SD	Mean	SD	Mean	SD	F	p
Parent DR ratio (number of behaviors to increase : decrease)	2.67	2.58	1.55	1.35	1.43	1.22	2.59	.08
Child verbosity (total number of utterances)	30.95	15.53	30.00	18.00	27.16	12.73	0.36	.70
Child's longest 5 utterances (in words)	3.64	1.93	3.89	1.62	3.92	1.92	0.28	.76

Adult and child behavior counts are adjusted for 5 min of reading.

[a] Tests for differences due to instructional method were conducted using analysis of covariance controlling for differences in parental education (for parent behaviors) and for child age (for child reading behaviors) and including interaction terms. The test of DR ratio was computed on an inverse transformation of DR ratio (for normality); the test on the untransformed variable showed a similar result, no significant difference among the groups.

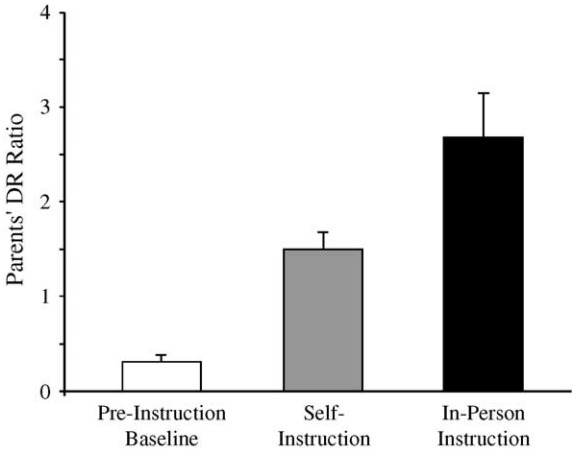

Fig. 2. Mean DR ratio (+SE) for self-instruction with or without telephone follow-up ($n=54$) and in-person instruction ($n=30$) compared to the pre-instruction baseline reference group ($n=25$).

In a final analysis of the effects of instructional method on shared reading style, the two self-instruction groups (with and without telephone follow-up), which had nearly identical DR ratio means, were combined to form one group. The reason was to increase group size for analysis purposes. A 2 (Instruction: in-person vs. self-instruction) × 2 (Education: high school vs. any college) ANOVA of DR ratio yielded a significant effect of method of instruction, $F(1,77)=5.36$, $p<.02$; parents' DR ratio was significantly higher in the in-person condition ($M=2.67$) than in the self-instruction condition ($M=1.49$). The effect of education was not significant. The interaction between education and method of instruction approached significance, $F(1,77)=3.18$, $p<.08$. Inspection of the means showed a larger difference among high school educated parents (in-person $M=2.67$ vs. self-instruction $M=1.39$) than among parents with college education (in-person $M=2.36$ vs. self-instruction $M=1.52$). Fig. 2 displays mean DR ratio of the in-person and combined self-instruction conditions and includes baseline pre-instruction data as a reference.

4. Discussion

This study contributes information of theoretical and practical importance about reading interventions by testing ways to deliver effective instruction in a community setting. Three methods of instruction in dialogic reading were contrasted: (a) traditional in-person instruction, (b) self-instruction by videotape with telephone follow-up, and (c) self-instruction by videotape with no telephone follow-up. In addition to an Instruction group, a second sample of parents ("Baseline") was recruited to provide both baseline and post-instruction reading samples using a within-subjects design. The purpose of the Baseline group was to establish the extent to which parents use a dialogic reading style naturally, prior to our intervention. Data from this group confirmed the previous finding that parents do not intuitively and naturally use a dialogic reading style without explicit instruction (Huebner, 2000a). In fact, in this study, parents' use of dialogic reading behaviors prior to instruction ($M=18.93$ in 5 min time) was very similar to that reported by Huebner (2000a) based on parent–child reading data collected nearly one decade ago

($M = 21.9$ in 5 min time). The amount of reading parents do at home may be increasing but apparently the quality or nature of that reading has not, which invites research and debate about how to inform parents about the relevant evidence on reading style.

Comparison of parent–child reading before and after instruction in dialogic reading showed instruction was associated with large and significant differences in reading style. This was demonstrated in two ways: (1) by using within-subject comparisons of the Baseline parents whose scores changed significantly pre- to post-instruction, and (2) by comparing the Instruction group's post-instruction scores to the Baseline group's pre-instruction scores. Analyses within the randomized Instruction group showed no significant differences in uptake of dialogic reading by instructional method (i.e., in-person instruction, self-instruction with telephone follow-up and self-instruction alone). This finding is informative since one might expect parents who received the instructional video by mail, without any subsequent follow-up, would have found any number of reasons to set the task aside. On the contrary, parents assigned to self-instruction (with or without telephone follow-up) reported they watched the video, and at post-test, their combined mean DR ratio was 1.49, significantly higher than the baseline benchmark of 0.30. Instruction by mailing the video worked, even without telephone follow-up.

4.1. Implications for practice

The results of this study support universal implementation of instruction in dialogic reading. At baseline, few parents were observed to read in this manner. National surveys of home-learning activities with preschoolers indicate that parents are responding to recommendations to read with their young children (e.g., U.S. Department of Education, 2003), however, this does not mean that they are changing the quality or form of their reading. Parents need help maximizing these reading experiences to support the development of their children's oral language and other emergent literacy skills. Dialogic reading is a program that can help parents easily and at relatively low cost.

Consonant with previous findings, self-instruction in dialogic reading with the aid of an instructional video increased specific dialogic reading behaviors (Arnold & Whitehurst, 1994; Huebner, 2001). When dialogic reading behaviors were considered as summary score in the form of the DR ratio, each instruction group's average was significantly higher than the pre-instruction benchmark of 0.30, but in addition it is noteworthy that in-person instruction yielded the highest scores (in-person $M = 2.67$ vs. self-instruction $M = 1.49$). Additional studies are needed to determine if the incremental difference in DR ratio due to self- vs. in-person instruction translates to meaningful differences for children's language and emergent literacy skills and weigh this difference against the cost of training method. The self-instruction method employed in this study (a mailed instructional video) cost approximately US$14 per family. The supports associated with each alternative method (i.e., 2 telephone coaching sessions or 2 in-person training sessions) add to the base cost of the video and mailing. Room rental and on-site child care could be additional expenses for in-person, small-group instruction. The extent to which community-based implementations could rely on trained volunteers or donated space for training sessions (such as the public library as we did) would offset these added costs. Parent instruction provided by child educators or children's librarians as part of regular programming would be another way to reduce costs associated with in-person instruction.

In this study, the advantage of in-person instruction on parents' use of a dialogic reading style was evident within both education groups but somewhat higher among parents with high school education. Additional studies with larger samples sizes of parents with high school education are needed to confirm,

or refute, the relative benefits of self-instruction, especially with parents with the lowest levels of education whose children are in greatest need of supportive language and emergent literacy experiences. Another consideration for future research with high-risk families is the effect of dialogic reading instruction on reading frequency. The results of this study showed no effect on reading frequency, but this was due largely to the sample characteristics. Prior to instruction, 71% of parents reported daily reading. Among parents who read infrequently (0–2 times in the last week), nearly all increased reading frequency following instruction in dialogic reading. Reading frequency remains an outcome worth tracking in future studies because frequent reading is recommended to achieve maximum benefit of dialogic reading for children (Huebner, 2001).

A strength of this study was that participants varied in terms of parental education (ranging less than high school to doctorate degree) and family income (from below the federal poverty line to in excess of US$50,000 per year), however the sample was predominately of White families. Although adding important findings to the literature about outcomes in mixed income, non-urban communities, more studies are needed in communities of color, and with bilingual and non-English speaking parents.

This study is an essential step in testing whether a dialogic reading program can be taken to scale as a universal preventive intervention. Universal, empirically-tested programs like dialogic reading are important because they have the potential to reach parents directly. Knowledgeable parents are essential to children's school readiness. Early preschool programs, including Head Start, can help but their reach is limited. Nationwide in the year 2001, 56% of children ages 3–6 years old, and not yet in kindergarten, attended a center-based childcare or early education program, and only 17% of infants ages 1–2 years old did so (Federal Interagency Forum on Children and Families, 2003).

Parents are essential to children's school readiness, but parents should not carry this responsibility alone. Developmental scientists can conduct research, such as that reported here, that investigates questions of pressing concern to parents, early educators, and policy makers (Gopnik, Meltzoff, & Kuhl, 1999). Developmental scientists can also help translate research-based discoveries about early learning into real-world programs, with the goal of improving the socio-emotional, cognitive, and linguistic experiences of all children and thereby boosting school readiness. Once evidence-based programs are identified and brought to scale, support for school readiness can come from a wide range of institutions including: health departments, pediatric clinics, childcare centers, birth-to-three programs, and philanthropic foundations, and these efforts can be magnified by cooperation with the local media, public libraries, and community centers. As demonstrated in this study, community agencies, such as libraries, can support efforts to reach parents or become training sites themselves. More than four of every five parents in the U.S. report their preschooler is read to at least three times per week (U.S. Department of Education, 2003). Low-cost, empirically-tested programs, such as dialogic reading, can reach all parents and help them maximize their home reading experiences to build a strong foundation for school readiness.

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