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Effects of Reading to Infants and Toddlers on Their Early Language Development

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The effects of reading to infants and toddlers were examined in a meta-analysis of six intervention studies including 408 participants. Results indicated that interventions were effective in promoting the children's expressive and receptive language. The benefits of the interventions increased the earlier the interventions were started and the longer they were implemented. Implications of the findings for research and practice are described.

Findings from studies of reading to older preschoolers show that shared reading interventions have positive effects on the children's early literacy and language abilities (e.g., Lonigan, Shanahan, & Cunningham, 2008). Trivette et al. (2007, 2010), as part of several *CELLreviews* of both intervention and nonintervention studies, found that the ways in which young children are engaged in shared reading influenced the effects of the shared reading practices on early language and literacy development. Most intervention studies, however, have been conducted with preschoolers and not infants and toddlers, which precludes the test of the hypothesis that "it is never too early to start reading to infants and toddlers" (e.g., Kuo, Franke, Regalado, & Halfon, 2004; McMahan, 1996; Miller, 1998).

The purpose of the meta-analysis reported in this *CELLreview* was to investigate the effects of shared reading interventions specifically targeting infants and toddlers and to compare the effects of the interventions with comparison or control group participants. This meta-analysis is one of two *CELLreviews* examining the effects of early-onset shared reading to infants and toddlers. The companion meta-analysis found that both age of onset and frequency of reading to infants and toddlers were correlated with differences in the children's literacy and language outcomes in nonintervention studies (Dunst, Simkus, & Hamby, 2012). The goal of the meta-analysis reported in this *CELLreview* was to ascertain if interventions increasing the frequency and type of reading to infants and toddlers had beneficial effects on the intervention group participants' language outcomes.

Search Strategy

Studies were located using *reading aloud, read-aloud, story reading, book reading, oral reading, storytelling, story-telling, storybook reading, picture-book reading, shared reading, joint reading, joint book reading, picture book AND infant*, infancy, neonat** as search terms. These were combined with more than 20 literacy and language search terms to identify studies with outcomes of interest. Both controlled-vocabulary and natural-language searches were conducted (Lucas & Cutspec, 2007).

Psychological Abstracts (PsycINFO), Education Resource Information Center (ERIC), Medline, Academic Search Premier, Education Research Complete, and CINAHL were searched. These were supplemented by Google Scholar, Scirus, Ingenta, JStor, and Socindex searches, as well as a search of an EndNote Library maintained by our Institute. Hand searches of the reference sections of all retrieved journal articles, book chapters, books, dissertations, and unpublished papers were also examined to locate additional studies. Studies were included if either experimental or quasi-experimental research design was used, the inter-

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ventions were conducted with infant and toddlers less than 36 months of age, and effect sizes could be calculated for the post-test group differences.

Search Results

Five studies were located that included seven samples of intervention and comparison group participants (Fodor, 1968; High, LaGasse, Becker, Ahlgren, & Gardner, 2000; Irwin, 1960; Karrass & Braungart-Ricker, 2005; Whitehurst et al., 1994). The studies included 408 infants and toddlers who were on average 24 months of age at the beginning of the interventions (SD = 11, Range = 4 to 36). Four studies used randomized experimental designs and three studies used quasi-experimental nonrandomized group designs.

Appendix A includes the background characteristics of the study participants and Appendix B includes selected characteristics of the reading interventions, research designs, and outcome measures. Fifty five percent of the children were male and 45% were female. Two studies included typically developing children and five studies included children considered at-risk for poor outcomes mostly due to socio-environmental factors. All but one study included children from diverse ethnic backgrounds.

The interventions all involved some type of shared reading practice with infants and toddlers, but differed considerably in terms of how much experimenter guidance, support, or instruction was provided to the intervenors on how to read to infants and toddlers. Karrass and Braungart-Reiken (2005) compared the effects of non-specified shared reading in households where parents reported reading to their infants with parents who reported not reading to their infants. High et al. (2000) evaluated non-specified anticipatory guidance provided to parents of the children in their study by pediatric providers. In comparison, the interventions in two other studies were considerably more structured where the practitioners or parents were provided more ongoing supports, guidance, and instruction (Irwin, 1960; Whitehurst et al., 1994). Fodor (1968) implemented a structured intervention himself with the children in his study. The reading interventions were implemented in child care centers or preschools (N = 2), the children's homes (N = 4) or a combination of both settings (N = 1). The outcomes included expressive language (N = 7), receptive language (N = 6) or a combined expressive/receptive language (N = 1) measures in the studies.

Cohen's *d* effect sizes for the post-test differences between the intervention vs. nonintervention group participants were used to estimate the effects of reading to infants and toddlers on the study outcomes. The average weighted effect sizes for the post-test between group differences were used to estimate the effects of the reading interventions. The 95% confidence intervals (CI) for the average effect

sizes were used for substantive interpretation of the findings. A 95% CI not including zero indicates that the average effect size differs significantly from zero at the $p < .05$ level (Rosenthal, 1994). An effect size between 0.20 and 0.49 is considered small, an effect size between 0.50 and 0.79 is considered medium, and an effect size equal to or greater than 0.80 is considered large (Dunst & Hamby, 2012; Lipsey & Wilson, 2001).

Synthesis Findings

The weighted average effect size for the intervention vs. nonintervention group comparisons was 0.38 (95% CI = 0.27-0.48) indicating that the shared reading interventions were effective in terms of influencing changes in the infants' and toddlers' language development. The interventions were effective in promoting both the children's expressive, $d = 0.40$ (95% CI = 0.27-0.54) and receptive, $d = 0.29$ (95% CI = 0.11-0.45) language development.

The interventions in the studies differed in terms of both the ages of the children when shared reading began and the length of the interventions. Interventions begun in the first year of life had a $d = 0.51$ (95% CI = 0.37 - 0.65) and interventions begun between 24 and 36 months of age had a $d = 0.22$ (95% CI = 0.63-0.38). Interventions lasting seven or fewer months had a $d = 0.17$ (95% CI = 0.03-0.31) whereas interventions lasting 12 to 17 months had a $d = 0.63$ (95% CI = 0.47-0.78). The interventions with the youngest children tended to be implemented the longest.

The extent to which the effect sizes for the language outcomes differed as a function of when the assessment measures were administered was determined by regressing the effect sizes on the time (number of months) between the completion of the interventions and when the outcomes were measured. The weighted correlation coefficient between the predictor and outcome measures was $r = 0.47$, $p = .004$. Figure 1 shows the regression line for the relationship among the variables for the weighted effect sizes (Hedges,

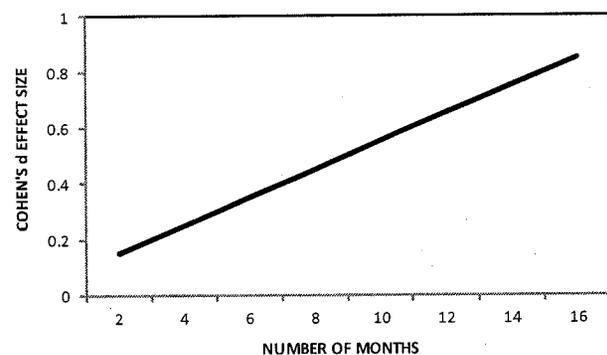


Figure 1. Regression line for the relationship between the number of months after the completion of the interventions and the study outcomes.

1994). The results indicate that the benefits of the interventions became more pronounced the later the outcome measures were obtained. This suggests that the interventions had longer-term benefits as evidenced by the results.

Discussion

Results reported in this *CELLreview* indicated the shared reading interventions were effective in promoting the infants' and toddlers' expressive and receptive language and that the benefits were more positive the earlier the interventions were started and the longer they were implemented. Results also showed the interventions had longer term benefits. The findings showed that the effects of the interventions became larger the later the outcome assessments were conducted. Taken together, the results provide support for the contention that reading to infants and toddlers is warranted as a language intervention strategy (e.g., McMahon, 1996; Miller, 1998; Neuman & Wright, 2007; Parlakian, 2003).

The findings from this meta-analysis and those reported in a companion *CELLreview* (Dunst et al., 2012) both yielded evidence that the earlier infants and toddlers were read to, the more positive were the effects of the interventions. Both research syntheses also yielded evidence that the benefits of early shared reading became more pronounced the later the language measures were administered, indicating that early reading had longer term benefits.

One limitation of the meta-analysis was the fact that we were able to locate only a handful of intervention studies with children 36 months of age or younger. Another limitation was the lack of detailed information about the specific characteristics of the reading interventions in most of the studies. One other limitation was the fact that only two randomized controlled design studies were located. Better designed and implemented studies, and especially studies that include more detailed information about the characteristics of the reading episodes, would help identify the characteristics of and conditions under which reading to infants and toddlers is most effective.

Implications for Practice

Notwithstanding the limited information about the characteristics of reading experiences afforded infants and toddlers, recommendations about how to engage very young children in shared reading abound (e.g., Haas & Haas, 2000; HighReach Learning, 2005; Zeece & Churchill, 2001). The recommendations and suggestions offered by early reading experts tend to emphasize the same kinds of practices: Reading with enthusiasm, responsiveness to children's attempts to engage in looking at and playing with books, reading stories that include rhythms and rhymes, following children's interests, reading children's favorite stories and rhymes over and over, and engaging

length of reading episode
children in reading episodes just long enough to maintain ^{tried to} engagement.
child attention & engagement

The many different *CELL* practice guides (www.earlyliteracylearning.org) for reading to infants and toddlers incorporate these recommendations as well as characteristics identified in other *CELLreviews* as important for early literacy and language development (e.g., Dunst, Jones, Johnson, Raab, & Hamby, 2011; Dunst, Meter, & Hamby, 2011; Trivette et al., 2010). Learning to engage in reading experiences that are pleasurable is made easier when those experiences are fun, enjoyable, and interesting to infants and toddlers, and which actively engage the children in the reading experiences as they become increasingly enthralled by books and stories.

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responsiveness
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Appendix A

Background Characteristics of the Study Participants

Study	Sample Size	Child Age (Months)		Child Gender		Child		Child Condition
		Mean	Range	Male	Female	Ethnicity	Percent	
Fodor (1967)	48	26	21-30	30	18	African American Caucasian	63 37	At-risk
High et al. (2000) (Sample 1)	62	8	5-11	32	30	Latino Caucasian Other	47 18 35	At-risk
High et al. (2000) (Sample 2)	88	8	5-11	48	40	Latino Caucasian Other	47 18 35	At-risk
Irwin (1960)	34	13	13-13	NR	NR	NR	NR	Typical
Karrass & Braungart- Rieker (2005)	87	4	4-4	48	39	Caucasian	97	Typical
Whitehurst et al. (1994) (sample 1)	48	36	26-46	25	23	African American Latino Caucasian	55 23 22	At-risk
Whitehurst et al. (1994) (Sample 2)	41	36	26-46	21	20	African American Latino Caucasian	55 23 22	At-risk

NR = Not Reported.

Appendix B

Type of Research Designs and Comparisons Between the Independent and Dependent Measures

Study	Type of Design	Length of Intervention (Months)	Child Measures	
			Reading Practice	Outcome
Fodor (1967)	Quasi-experimental	3	Illustrated storybook reading	Expressive Language Expressive/Receptive Language
High et al. (2000) (Sample 1)	Experimental	7	Non-specified anticipatory guidance	Expressive Language Receptive Language
High et al. (2000) (Sample 2)	Experimental	13	Non-specified anticipatory guidance	Expressive Language Receptive Language
Irwin (1960)	Quasi-experimental	17	Illustrated storybook reading	Expressive Language
Karrass & Braungart-Riekes (2005)	Quasi-experimental	12	Non-specified shared reading	Expressive Language Receptive Language
Whitehurst et al. (1994) (Sample 1)	Experimental	2	Dialogic reading at school	Expressive Language Receptive Language
Whitehurst et al. (1994) (Sample 2)	Experimental	2	Dialogic reading at school and home	Expressive Language Receptive Language

Appendix C

Cohen's d Effect Sizes for the Relationship Between Reading to Infants and Toddlers and the Study Outcomes

Study	Type of Comparison	Type of Measure	Outcome Measure	Child Age (Months)	Cohen's <i>d</i> Effect Size
Foder (1967)	Between groups	Observational word count (non-standardized)	Total number of words emitted by child during 30 utterances	29	0.44
		Pacific Expressive and Receptive Vocabulary Tests (Meyers et al., 1964)	Child's expressive and receptive vocabulary score	29	1.05
High et al. (2000) (Sample 1)	Between groups	MacArthur Communication and Development Inventories (Fenson et al., 1993)	Child's receptive vocabulary score	15	0.23
			Child's expressive vocabulary score	15	-0.42
High et al. (2000) (Sample 2)	Between groups	MacArthur Communication and Development Inventories (Fenson et al., 1993)	Child's receptive vocabulary score	21	0.63
			Child's expressive vocabulary score	21	0.55
Irwin (1960)	Between groups	Observation of spontaneous speech made by infant across thirty breaths (Non-standardized)	Phoneme frequency scores based on type and number of infant's phonetic sounds	18	0.53
				20	0.80
				22	0.49
				24	0.70
				26	0.94
				28	1.22
Karras & Braungart-Riekes (2005)	Between groups	Bayley Scales of Infant Development (Bayley, 1969)	Expressive language score	12	0.64
			Receptive language score	12	0.35
			Expressive language score	16	0.65
			Receptive language score	16	0.38
Whitehurst et al. (1994) (Sample 1)	Between groups	Expressive One-Word Picture Vocabulary Test (Gardner, 1981)	Child's ability to correctly name items in pictures	38	0.22
			Score on One Word Test	44	0.22