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The Story Behind Parent-child Book-reading Interactions: Specific Relations to Later Language and Reading Outcomes

Özlem Ece Demir, Lauren Applebaum, Susan C. Levine, Katherine Petty, and Susan Goldin-Meadow

The University of Chicago.

Children enter school with wide differences in their language and reading skills. The gap persists over time and has important implications for later achievement. Cunningham and Stanovich (1997) find that differences in reading at 1st grade predict reading 10 years later, at 11th grade. The roots of the differences at the early school years can be traced back to preschool ages. During preschool years, children develop a range of literacy-related skills, referred to as emergent literacy skills, including (but not limited to) knowledge of graphemes (naming letters of the alphabet), and phonological awareness (manipulation of individual syllables or phonemes, e.g., saying bat without /b/) (e.g. Whitehurst & Lonigan, 1998). Emergent literacy also encompasses the oral language skills that children develop during preschool ages (Dickinson & Tabors, 2001; Scarborough, 2001). Our goal in this paper is to explore the roots of the differences children display in their oral language and reading skills in early grades. We look, in particular, at whether parent-child book-reading interactions at child ages 2;2 and 2;6 (yrs;mos) help explain the variation in children's oral language and reading skills during early elementary school.

Despite the wide-spread belief in the importance of early parent-child book-reading interactions for children's later language and reading outcomes, empirical evidence supporting this link is weak. Most studies examining the relation between early parent-child book-reading and later oral language and literacy focus primarily on the frequency of book-reading interactions. Frequency is typically assessed through parental report measures (e.g., parents are asked to indicate the number of hours per week that they spend reading to their children). Some studies report significant relations between the frequency of early book-reading interactions and later oral language and reading outcomes. For example, a meta-analysis by Bus, van IJzendoorn and Pellegrini (1995) reported an overall effect size of $d=0.59$, indicating a medium sized effect, for the relation between early book reading and later oral language and reading measures. Early book-reading interactions were more strongly related to oral language outcomes (which are measured earlier), compared to reading outcomes (which are measured later). More recently, Sénéchal and LeFevre (2001), used scores on children's literature checklist filled out by parents as a measure of book-exposure, and showed that book exposure at Kindergarten was a significant predictor of children's emergent literacy and reading at 1st and 3rd grade. However, other studies have failed to find a significant relation between the frequency of early parent-child book-reading interactions and later outcomes. Another meta-analysis by Scarborough and Dobrich (1994) reported that only 8% of the variation in early literacy-related skills and early reading is

Correspondence concerning this article should be addressed to Özlem Ece Demir, The University of Chicago, Department of Psychology, 5848 South University Ave., Chicago IL 60637, ece@uchicago.edu..

¹Other kinds of utterances parents produced during book-reading that were not included in the analyses consisted of directives ("Sit down"), comments about the child or the book ("You're a good reader"), print-based utterances ("What letter is that?") or generic prompts and responses ("That's right"). These utterances constituted 40% of the overall book-utterances.

accounted for by early book-reading interactions, and when other factors, such as SES, are taken into account, the relation disappeared.

The conflicting findings reported above highlight the need to examine not only the frequency, but also the nature, of parent-child book reading interactions. Few studies examine book-reading interactions in detail, and these studies report great variability in the way parents read books with their children. For example, in addition to reading the text of the book, some parents also label or describe the pictures in the book; some ask children questions about the book content or make plot inferences and predictions; and some tie the book to children's own experiences (e.g. Dickinson & Smith, 1994; Haden, Reese and Fivush, 1996; Heath, 1982; Sénéchal & LeFevre, 2001). A few studies have examined whether such specific aspects of book-reading interaction play different roles in later literacy outcomes. The findings are mixed. Reese and Cox (1999) found that both describer style of reading, which focuses on labeling and describing the pictures, and performance-oriented style, which focuses on discussing story content, plot predictions and inferences benefitted young children's vocabulary and print skills. However, Haden, Reese and Fivush (1996) found that children exposed to performance-oriented style at 2.5 years of age had higher vocabulary and story comprehension scores at 6 years of age than those exposed to a described style earlier.

The studies conducted thus far suggest that examining the nature of early parent-child book-reading interactions might provide a more nuanced picture of the effects that early book-reading has on later outcomes than just examining the frequency of early book-reading interactions (e.g. Deckner, Adamson, & Bakeman, 2006; Haden, Reese, & Fivush, 1996). Our study builds upon the existing literature in a number of ways. First, most of the previous studies focus only on oral language or decoding, with little attention paid to reading comprehension (Fletcher & Reese, 2005). Our study includes all three outcome variables. Second, book-reading interactions are frequently observed in experimental settings—children and parents are provided with a specific book in the lab or in interventions (e.g. Haden, Reese, & Fivush, 1996). Our study examines everyday book-reading interactions in the home. Third, most studies focus on children at later preschool ages. However, parent-child book-reading interactions might play a larger role during the early preschool years when children do not have much information about books or literacy in general (Bus, van IJzendoorn and Pellegrini, 1995; Fletcher & Reese, 2005). Our study focuses on early interactions. Fourth, socio-economic status is generally not controlled for in analyses. (Scarborough & Dobrich, 1994). Our study includes socio-economic status as a factor.

Our study thus asks three questions: (1) How frequent are parent-child book-reading interactions at child age 26-30 months, and what is the nature of these interactions? (2) Do book-reading interactions play a role in later oral language and reading outcomes over and above overall parental talk and education? (3) What is the relation between the nature of book-reading input and children's later oral language and reading outcomes at Kindergarten and 1st grade? We predict that specific types of parental book talk early in development will correlate with later child outcomes. We divide the utterances parents produce during book-reading episodes into three categories: describing the pictures, reading the text, and extending the topic. We hypothesize that *describing pictures* will predict later vocabulary scores and reading comprehension scores; labeling lends itself to vocabulary exposure and also situates those labels in the context of book's content. We hypothesize that *reading the text* will predict later decoding and comprehension; reading the text exposes children to letters and word-forms in the book, and also allows the child to hear a story structure that ideally aids in later comprehension. Finally, we hypothesize that *extending the topic* will predict improved reading comprehension by facilitating a deeper understanding of the

book's content by relating it to the child's experiences and encouraging her to think about what might come next and implications of the story.

2. Methods

2.1. Participants

Participants consisted of 51 parent-child dyads (24 girls, $n = 22$). The children and their primary caregiver were participating in a larger longitudinal study investigating children's language development. Families were recruited through advertisements in a free monthly parenting magazine and through direct mailings to families. English-speaking families representing the demographics of the greater Chicago area in terms of ethnicity and income were included in the sample. 31 children were Caucasian, 8 African-American, 6 Hispanic, and 5 were of mixed racial background; all were monolingual English-speakers. We determined the socioeconomic status (SES) of families by using a measure of parent education. We created a categorical variable for parent education by assigning values to the primary caregiver's level of education (less than high school degree=10 years, high school degree=12 years, some college or associate degree=14 years, college degree=16 years, more than college=18 years). The average education of the current sample is roughly college degree ($M = 15.9$, $SD = 2$). In all but 5 families, the primary caregiver was the mother. In the remaining 5, both the mother and the father were the primary caregivers.

2.2. Procedure and transcription

We visited families every four months between child age 1;2 to 4;6 for 90 minute sessions. The data for the current study is based on the two visits when children were 2;2 and 2;6. During the sessions, families were encouraged to engage in their normal activities, which generally consisted of toy play, book reading, and eating meals or snacks. Parent and child speech was transcribed from the videotapes. The unit of transcription was the utterance, which was identified by a pause, a change in conversational turn, or a change in intonational pattern. A second coder then transcribed 20% of the data to establish reliability. The two coders reached reliability when at least 95% of their transcripts matched. Coded transcripts included all dictionary words, as well as onomatopoeic words (e.g. meow) and evaluative sounds (e.g. whoops, uh-oh).

2.3. Coding and measures

Parent book-reading interaction measures—We focused on the child-directed utterances parents produced during book reading episodes. A book-reading episode began when both the parent and the child attended to a book (magazines, newspapers, and internet-based reading were not included), and concluded when the dyad no longer attended to the book. We analyzed both parents' reading of the book text and their talk surrounding the context of the book. Utterances not related to the content of the book (“Do you want to eat?”) were not included in the analyses.

We focused on 3 types of utterances in the book-reading episodes.¹ (1) *Describing the picture*: labels for and descriptions of pictures in the book. These utterances might refer to the color of a picture, the numbers of items in the picture, or label the object in the picture. Utterances that described the pictures could be statements (“That bird is blue”) or questions (“What color is the bird?”). (2) *Reading the text*: utterances read from the text of a book. (3) *Extending the topic*: utterances that tied the content of the book to the child's own experiences (“Do you remember the last time we went to the zoo?”). Also included were story predictions, evaluations or inferences (“What do you think he's going to do next?”). After dividing utterances into these three categories, we calculated the number of utterances

of each type and divided each number by the total number of book-related utterances a parent produced during the session.

As a measure overall number of utterances produced during the book-reading interaction, the sum of all utterances that constituted these three categories was also calculated, and divided by the total number of utterances produced during the session. We performed arcsine transformations on all proportions before conducting statistical analyses. As a measure of the overall amount of talk children heard, the number of non-book utterances (i.e. utterances produced during the visit that were not part of book-interactions) was also calculated. We performed a logarithmic transformation on this count before conducting statistical analyses. A second coder transcribed 20% of the data to establish reliability. The percent agreement between the coders on identification and categorization of book utterances was 92%.

Child measures—Children’s vocabulary was assessed by the Peabody Picture Vocabulary Test (PPVT) at Kindergarten for all but 3 children who were not administered this measure. The PPVT is a standardized measure of receptive vocabulary. It consists of a series of items on which the experimenter asks the child to point to one of four pictures that corresponds to a particular word. All children were given three subtests from Woodcock-Johnson Tests of Achievement Basic Reading (WJ-III) at the end of 1st grade: the Letter-Word Identification subtest (which measures word identification skills), the Word-Attack subtest (which measures skill in applying phonic and structural analysis skills to the pronunciation of nonwords), and the Passage Comprehension subtest (which measures ability to comprehend short texts). The first two tests constitute the Basic Reading Skills cluster and together measure basic decoding skills. Passage Comprehension is a measure of reading comprehension, which not only relies on reading, but also on vocabulary and reasoning.

3. Results

During the two visits at child age 2;2 and 2;6, only 30 of the 51 parents read books with their children (12 had a book-reading interaction only at the 2;2 visit, 9 at the 2;6 visit, and 9 at both visits). For all analyses, we averaged the values across the two sessions. On average, the subset of parents who read books with their children produced 76.3 utterances ($SD = 74.67$, $Range = 1.5 - 265$) during the book-reading interaction, and 946.76 ($SD = 354.68$, $Range = 267.5 - 1592$) utterances outside the book-reading interactions. The 21 parents who did not engage in a book-reading interaction produced an average of 766.3 utterances during the session ($SD = 331$, $Range = 218 - 1534$). Figure 1 presents the average number of book-reading utterances of each of the three types for the subset of parents who read to their children. Describing the pictures and reading the text were more common than extending the topic. All parents, except three who did not produce any extending the topic utterances, produced utterances from all three categories. To summarize, not all parents read books with their children during our visits, and even if they did read books, book-reading interactions constitute a relatively small proportion of the overall talk children heard. Additionally, there was variability across parents who read to their children both in the number and types of book-reading utterances they produced. We now turn to analysis of the impact these early book-reading episodes have on children’s later language and reading outcomes, focusing on the 30 parents who read with their child during our observations.

We first examined whether variation across parents in the number and types of book-reading utterances they produced was related to their education or their overall amount of talk (as measured by number of non-book utterances). As seen in Table 1, parental education was marginally correlated with the proportion of extending the topic utterances, but not with any

other book-reading interaction measures. No significant correlations were observed between the overall amount of non-book talk parents produced and any of the parent book-reading measures.

Next we examined whether book-reading interactions play a role in later oral language and reading outcomes, over and above parental talk outside of book reading and education. We began by examining first-order correlations between parent education, number of non-book utterances, and later outcomes: vocabulary at Kindergarten (PPVT), and decoding (WJ-III Basic Reading) and reading comprehension (WJ-III Passage Comprehension) at 1st grade. Although there was a significant correlation between education and vocabulary at Kindergarten, other correlations with parent education did not reach significance. The number of non-book utterances parents produced was marginally related to their decoding scores at 1st grade, but was not related to their vocabulary at Kindergarten or with reading comprehension at 1st grade (Table 2).

To determine whether the proportion of parent book-reading utterances related to later child outcomes, we ran three simple regressions (controlling for parental education and overall non-book talk), one for each outcome variable: vocabulary at Kindergarten, decoding at 1st grade, and reading comprehension at 1st grade, with education, number of non-book utterances, and proportion of book-utterances as predictors. The results are presented in Table 3. Proportion of all book-reading utterances was a significant predictor of all three outcome measures. Specifically, a standard deviation of increase in book-reading led to a 0.38 standard deviation increase in PPVT scores, a 0.32 standard deviation increase in WJ-III Basic Reading scores (decoding), and a 0.46 standard deviation increase in WJ-III Passage Comprehension scores. Together with parental education and non-book utterances, the proportion of book-reading utterances explained 18 to 20 percent of the variance in children's outcomes. In sum, these results suggest that, even after controlling for parental education and overall talk children hear, early book-reading experiences predict later child outcomes.

To identify the contribution of each predictor to later oral language and reading outcomes, we conducted three backwards stepwise multiple regressions, one for each dependent variable. In backwards stepwise regression, all predictors are initially included in the model and the contribution of each predictor (significance value of the t-test for each predictor) is compared against a removal criterion (e.g., probability value of a test statistic). If a predictor meets the removal criterion (i.e., if the predictor is not making a significant contribution to how well the model predicts the outcome), it is removed from the model. Predictors are eliminated until further elimination results in significant reduction in the fit of the model to the outcome data (Field, 2005). We performed three backward stepwise regressions with vocabulary at Kindergarten, decoding at 1st grade, and reading comprehension at 1st grade as outcome variables, and with parental education, number of non-book utterances, proportion of describing the picture, proportion of reading the text, and proportion of extending the topic utterances as predictors. Removal level for all backward selection was set at 0.10.

Specific links were observed for different aspects of the parent-child book-reading interaction and later outcomes. Table 4 shows the results of the backwards stepwise regression on vocabulary at Kindergarten. The regression coefficients for the final model indicated that variability in children's vocabulary scores can be best explained by parental education and proportion of describing the picture utterances. A standard deviation of increase in parental education led to a 0.47 standard deviation increase in PPVT scores. Similarly, a standard deviation increase in picture descriptions led to a 0.43 standard deviation increase. Parental non-book utterances and other kinds of book-reading utterances failed to contribute to the overall fit of the model.

Table 5 shows the results of the backwards stepwise regression on decoding at 1st grade. The variability in children's decoding scores was best explained by the number of non-book utterances they heard, and also by the proportion of reading the text utterances. A standard deviation of increase in both non-book utterances and reading the text utterances led to about a third of a standard deviation increase in WJ-III Basic Reading scores (0.39 and 0.34, respectively). None of the other predictor variables were retained in the final model. Parental education and other kinds of book-reading utterances failed to account for additional variance in basic decoding.

Finally, Table 6 presents the results of the backwards stepwise regression on reading comprehension at 1st grade. The regression coefficient in the final model indicates that the only predictor of children's later reading comprehension was the proportion of extending the topic utterances they heard. A standard deviation in extending the topic utterances led to half of a standard deviation increase in WJ-III Passage Comprehension score. All of the other measures failed to account for additional variance in the dependent variable. Overall, these results suggest that, although overall book-reading utterances relate to later child outcomes, there are specific links between different aspects of the book-reading interactions and different child outcomes.

4. Discussion

Our goal was to explore three questions about the impact of early parent-child book-reading interactions on later child language and reading. In answering each of these questions, we also asked whether early book-reading interactions predicted later child outcomes over and above the contribution made by parental education and overall talk.

First, we examined the frequency and the nature of parent-child book-reading interactions in young children ages 2;2 and 2;6 months. We found that not all parents chose to read books with their children. Even for those who did read books, book-reading interactions constituted only a small proportion of the total number of utterances produced by parents. However, there was wide variation across parents in the amount and nature of the talk children heard around books. On average, parents most commonly talked about the pictures in the book, or read the text of the book, confirming previous findings in the literature. Parents less frequently extended the topic of the book by asking children to make inferences or relate the book content to their own experiences; these types of utterance might increase in frequency at later ages (Fletcher & Reese, 2005). Again confirming previous experimental findings in the literature, few parents talked about the print itself, for example, about the letters or letter-sound correspondences (Philips, Norris, & Anderson, 2008).

Second, we asked whether book-reading interactions play a role in three different kinds of child outcomes: oral language and reading decoding, and reading comprehension. Although book-reading utterances constituted only a small proportion of the overall talk children heard, book related utterances did predict children's later oral language and reading outcomes, even after controlling for parental education and parental overall talk. Thus, contrary to arguments in the literature (e.g., Scarborough & Dobrich, 1994), our findings suggest that the relation between early parental book-reading interactions and later child language and reading outcomes cannot be fully accounted for by differences in SES or in the overall amount of talk children hear.

Third, and most importantly, we examined the relation between the types of book-reading utterances children heard and later language and reading. Our findings confirmed our hypotheses and suggested that there are specific links between different aspects of the book-reading interaction and later child outcomes. Talk about the pictures in a book predicted

later vocabulary comprehension at Kindergarten. We argue that describing pictures in a book not only exposes children to words that might be unique to book content, but also grounds the new words in the pictures. Reading the text of the book predicted later decoding performance at the end of 1st grade. Although parents did not provide explicit information about print, attending to written language early on might provide children with an entry point to the world of print. Lastly, and again as we predicted, talk that extends the topic of the book predicted reading comprehension skills at the end of 1st grade. We hypothesize that this kind of talk might facilitate a deeper understanding of the book's content by relating it to the child's experiences and encouraging her to think about what might come next as well as by encouraging her to think about predictions that can be made on the basis of the text. Interestingly, although decoding tends to serve as a bottleneck for early readers (which often means that reading comprehension and decoding will be very highly correlated), reading comprehension and decoding were predicted by different aspects of the book-reading interaction even at this early age.

Overall, our findings confirm the need to analyze the nature of book-reading interactions in detail, rather than merely focus on the quantity of book-reading (e.g. Bus, van IJzendoorn, & Pellegrini, 1995; Scarborough & Dobrich, 1994). To our knowledge, ours is the first study to examine the far-reaching links between naturalistically occurring book-reading interactions and later child outcomes. Moreover, our study suggests that some of the discrepancies in the literature may be able to be resolved by examining not only the speech act of book-reading utterances (e.g., whether they are part of a dialogue), but also their content. Our findings also show that even though parents typically produce book-reading utterances of all three types, they produce them to different extents. Thus, characterizing children's book-reading experience in terms of all three types of utterances seems essential. Finally, our findings show that a relatively rare kind of input, book reading, predicts later child language and reading outcomes even controlling for amount of parent talk and parent education.

Our study has certain limitations. As indicated above, all parents produced the three kinds of utterances we identified, but to differing degrees. However, the three kinds of utterances were correlated with each other to a certain extent—a parent who produced a number of utterances of one kind was also likely to produce utterances of another kind. When interpreting our results, it should be kept in mind that we identify the utterances that mostly strongly predict a specific outcome. We do not, and cannot, argue that other utterances do not also play a role in children's oral language and reading development. Second, we used data from naturally-occurring book-reading interactions. A number of parents chose not to read books with their children during the session and our data do not enable us to make predictions about these children's book-reading experiences. Future studies should combine naturalistic measures of book-reading interactions with parental report measures in order to get a more representative view of children's exposure to books.

Our study raises interesting questions that should be further pursued. Future studies should examine how the kind of parental input that predicts later child outcomes might change as children age and as they start taking a more active role in book-reading interactions. Our findings suggest that specific kinds of book-reading utterances predict different child language and reading outcomes. Certain kinds of books might provide richer opportunities for parents to produce certain types of utterances, a topic for future studies. Finally, future studies should examine the children's own contribution to book-reading interactions. In order to examine the causal role of parent book-reading utterances in later child outcomes and eliminate the role of the child in explaining the current findings, we plan to carry out an experimental study that carefully manipulates the kinds of book reading utterances provided to children.

In conclusion, our findings add to the existing literature on the relations between parent-child book-reading interactions and later child oral language and reading outcomes. Although at child age 2;2 and 2;6 months utterances parents produce during book-reading interactions constitute only a small proportion of the overall talk children hear, these early interactions have important implications for children's later outcomes. Finally, our study highlights the need to further explore the nature of book-reading interactions and how different aspects of the book-reading interactions might be associated with later child outcomes.

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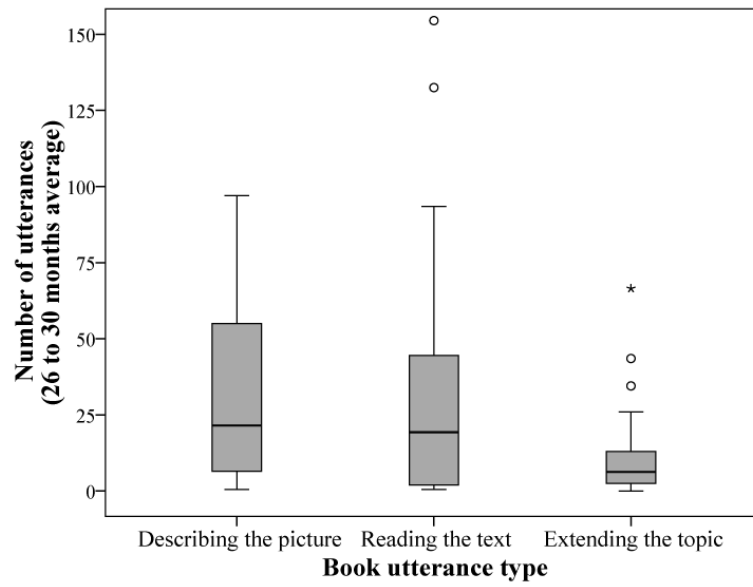


Figure 1.
The number of utterances of each type produced by parents during book-reading episodes

Table 1

First-order Correlations Between Parental Education and Non-book Talk and Parental Book-reading Utterances ($n=30$)

	Parent Book-reading Variables			
	All-book	Describing picture	Reading text	Extending topic
Education	.137	-.057	.251	.333 [~]
Non-book talk	-.136	-.187	-.117	.239

[~] $p < .10$.

Table 2

First-order Correlations Between Parental Education and Child Vocabulary ($n = 27$) and Child Decoding and Reading Comprehension ($n = 30$)

	Child Outcome Variables		
	Vocabulary at K (PPVT)	Decoding at 1 st grade (WJ-III Basic Reading)	Reading Comprehension at 1 st grade (WJ-III Passage Comprehension)
Education	.382*	.294	.14
Non-book talk	.217	.35~	.213

* $p < .05$.

~ $p < .10$.

Table 3

Summary of Hierarchical Regression Analysis for All Parent Book Utterances Predicting Child Vocabulary (PPVT) at Kindergarten ($n = 28$), and Child Decoding and Reading Comprehension at 1st grade ($n = 30$)

Variable	Child Outcome Variables β (Standardized)		
	Vocabulary at K (PPVT)	Decoding at 1 st grade (WJ-III Basic Reading)	Reading Comprehension at 1 st grade (WJ-III Passage Comprehension)
Education	.30	.17	.02
Non-book	.13	.36*	.27
All book	.38*	.32~	.46*
Adjusted R^2	.21	.18	.17

* $p < .05$.

~ $p < .10$.

Table 4

Summary of Backwards Stepwise Regression Analysis for Parent Variables Predicting Child Vocabulary (PPVT) at Kindergarten ($n = 28$)

Variable	<u>Child Vocabulary (PPVT) at K β (Standardized)</u>			
	Model 1	Model 2	Model 3	Model 4
Education	.38	.37	.38~	.47*
Non-book	.40	.05		
Describing picture	.34	.32	.31	.43*
Reading text	-.04			
Extending topic	.18	.17	.19	
Adjusted R^2	.18	.21	.24	.25
F for change in R^2	2.16~	2.82*	3.89*	5.59*

* $p < .05$.

~ $p < .10$.

Table 5

Summary of Backwards Stepwise Regression Analysis for Parent Variables Predicting Child Decoding (WJ-III Basic Reading) at 1st grade (N = 30)

Variable	Child Decoding (WJ-III Basic Reading) at 1 st Grade β (Standardized)			
	Model 1	Model 2	Model 3	Model 4
Education	.19	.17	.14	
Non-book	.39~	.36~	.35~	.39*
Describing picture	.19	.15		
Reading text	.22	.20	.30~	.34*
Extending topic	-.09			
Adjusted R^2	.12	.15	.17	.18
F for change in R^2	1.77	2.26~	2.95*	4.21*

* $p < .05$.

~ $p < .10$.

Table 6

Summary of Backwards Stepwise Regression Analysis for Parent Variables Predicting Child Reading Comprehension (WJ-III Passage Comprehension) at 1st grade ($n = 30$)

Variable	Child Reading Comprehension (WJ-III Passage Comprehension) at 1 st Grade β (Standardized)				
	Model 1	Model 2	Model 3	Model 4	Model 5
Education	0.02				
Non-book talk	0.18	5.89	0.19		
Describing the picture	0.29	22.94	0.27	0.18	
Reading the text	-0.04				
Extending the topic	0.33	44.91	0.32	0.41*	0.51**
Adjusted R^2	0.17	0.20	0.23	0.23	0.23
F for change in R^2	2.17~	2.83*	3.91*	5.33*	9.86**

** $p < .01$,

* $p < .05$,

~ $p < .10$.