

THE RELATIONSHIP BETWEEN TEACHER LANGUAGE USE IN ENHANCED  
MILIEU TEACHING SESSIONS AND CHILD LANGUAGE OUTCOMES

By

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## ABSTRACT

Research indicates that linguistic input from teachers may affect child vocabulary development in preschool and beyond (Dickinson & Tabors, 2001). Currently, there is little research on the relationship between specific teacher language use in individual interactions on child language outcomes for preschool children at risk for academic delays. The purpose of this study was to determine the effects of teacher vocabulary input and use of strategies for supporting vocabulary learning on children's vocabulary outcomes in three measurement contexts (within session, in language samples, on standardized assessments). Secondary analyses explored the relationship between teacher use of complex syntax and African-American Vernacular English (AAVE) and child use of these language features. Thirty-six teachers provided 60 7-10 minute sessions of Enhanced Milieu Teaching (EMT) to one or two target children with low language in their Head Start classrooms. One EMT session for each teacher-child dyad was transcribed and coded for teacher vocabulary and use of strategies to support vocabulary development, child use of vocabulary, teacher use of EMT strategies, and teacher and child use of complex syntax and AAVE. Descriptive data language indicates great variability for both teacher and child language in EMT sessions. Linear mixed models analysis indicated significant relationships between teacher vocabulary use and supports and proximal (within session) and medial (post-test language sample) measures of child vocabulary use. A negative relationship was found between teacher input and child post-test receptive language scores (distal measure).

To my amazing son, Dashiell, who inspires me daily

and

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## CHAPTER I

### LITERATURE REVIEW

Persistent language deficits have been linked to poorer outcomes in later grades. Language skills at kindergarten entry strongly predict math and reading standardized test scores in first through fifth grade (Kurdek & Sinclair, 2000). Conversely, children who are retained, placed in special education, and score low on achievement tests in second grade are likely to have shown low language skills in kindergarten (Pianta & McCoy, 1997). Vocabulary knowledge, a subset of oral language development, in preschool has been linked to later reading comprehension (Snow, Burns, & Griffin, 1998; Biemiller, 2004). Specifically, receptive vocabulary and oral language in kindergarten predict reading comprehension in fourth and seventh grade (Tabors, et al, 2001). Children who enter the primary grades with language skills markedly below the skills of their peers continue to fall behind in language, reading, and literacy-based academic areas. Interventions to increase the language skills and vocabulary knowledge of children at risk for these deficits in preschool may be an important strategy for preventing persistent language and reading problems.

#### **At-Risk Preschoolers**

There are vast differences in language skills among children entering preschool from different socioeconomic groups (Beck, McKeown, & Kucan, 2002). Farkas and



Beron (2004) found that increases in socio-economic status were correlated to increases in standardized scores of receptive vocabulary. Hart and Risley (1995) proposed that differences in child language skills were associated with differences in parental language input. They reported that children from low-income families were exposed to fewer words and received less language input than their middle and professional class peers. For example, in professional class homes, by the age of 3 children were exposed to 35 million words by their parents. In comparison, children from the lower economic class were exposed to only 10 million words, less than one-third of the words heard by their peers. Hart and Risley (1995) found that children in the professional class homes had more than double the vocabulary of their peers from low income homes. They argued that different home experiences, particularly the amount of language directed to children, accounted for differences in child vocabulary at school entry. A follow-up of the children in the Hart and Risley study indicated that SES, as well as early language and IQ, were related to language and academic achievement, including reading, in third grade (Walker, Greenwood, Hart, & Carta, 1994).

The extent of relative differences in language skills, particularly vocabulary, between lower SES and middle SES children has been a topic of concern for both researchers and policy makers. Multiple studies have found that children from low SES homes have consistently lower vocabulary than their more economically advantaged peers (Washington & Craig, 1999; Whitehurst, 1997). The goal of early childhood programs for low income children is to promote school readiness, and one objective of readiness includes language development and providing additional opportunities to learn and use vocabulary (U.S. Department of Health and Human Services, 2003). In addition

to Head Start programs, which typically measure vocabulary development as an outcome, the majority of states now have preschool academically oriented programs for children at-risk based on family income. Nationally, more than half of students enrolled in public preschool programs are from low-income families (Bryant, Clifford, Early, & Little, 2005).

### **Vocabulary Intervention Research**

**Importance of input.** Teacher language directed to children is predictive of child language outcomes in preschool (Turnbull, Anthony, Justice, & Bowles, 2009). For example, child syntactic development is significantly related to the proportion of complex syntax used by teachers (Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002). Teachers who interact with children by asking open ended and inferential questions, have children with better vocabulary outcomes than teachers who provide limited opportunities for discussion and ask primarily recall questions (Dickinson & Smith, 1994). Dickinson and Tabors' (2001) report from the Home-School Study of Language and Literacy Development indicates that children's emergent language and literacy skills were significantly affected by teachers' language use after controlling for children's entry language skills and family demographic characteristics. They found a significant relationship between the percentage of teacher sophisticated words used during conversational interactions with children in free play and children's emergent literacy outcomes. Furthermore, teacher language in preschool was significantly related to child

vocabulary and reading outcomes at the end of fourth grade (Dickinson, McCabe, & Essex, 2006).

Although teacher lexical and grammatical input appears to be important for children's language learning in preschool, observational studies suggest that it is challenging for teachers to provide input that matches children's needs for learning language. Ideally teacher-child interactions would 1) match the child's language level and provide input at that level (Girolometto, Hoaken, Weitzman, & van Lieshout, 2000); 2) include extended conversations in which words are defined in context (Dickinson & Tabors, 2001); and 3) model rich and diverse vocabulary (Whitehurst et al., 1994). However, in mixed ability groupings of students, teachers do not consistently change their language levels when addressing specific children who may need additional support for learning language (Girolometto et al, 2000). There is variability in use of complex speech across preschool teachers (Huttenlocher et al., 2002). Few extended conversations occur during the day between children and adults or peers (Dickinson & Tabors, 2001; Peeyna Rhyner, Lehr & Pudlas, 1990). Complex language interactions occur more often with peers than with adults in the classroom, particularly in free play (Dickinson & Tabors, 2001).

Considerable research has examined the effects of maternal input on child vocabulary development. Positive correlations between mother's use of sophisticated words with their young children and later vocabulary development have been documented (Beals & Tabors 1995; Weizman & Snow, 2001). Weizman and Snow (2001) found that greater amounts of maternal sophisticated vocabulary use at age 5 were linked to children's vocabulary scores in kindergarten and this relationship persisted to

second grade. One additional sophisticated word per 1,000 maternal words was associated with a 1.6 point difference in the child's standard score on the Peabody Picture Vocabulary Test-Revised (PPVT-R; Dunn & Dunn, 1981) in kindergarten and second grade. On average, less than two percent of maternal linguistic input consisted of sophisticated vocabulary, although this varied by interactional context (range across contexts=.25-4.3). In play sessions, mothers generated more sophisticated words than in book reading sessions with their children.

**Vocabulary supports.** In addition to quantity of vocabulary modeled and the more frequent use of sophisticated words, specific supports for vocabulary learning may be important to vocabulary outcomes for children (Beals 1997; Weizman & Snow, 2001). Research on promoting vocabulary learning indicates that acquisition and understanding of words can be supported by social interaction, physical references which include pointing to objects or acting out words, and verbal supports which include referencing the child's previous experience and providing semantic information. Embedding vocabulary in social interaction between adults and children during dialogic book reading (Whitehurst et al, 1994) or social games (Bruner, 1983) appears to support child vocabulary development more effectively than simple exposure to words. Research with school-age children indicates that repeated exposure to vocabulary together with instruction about the meaning of words in context results in greater vocabulary gains than incidental encounters with words (Stahl & Fairbanks, 1986, Anderson & Nagy, 1991). Increased physical supports for vocabulary learning, including visual supports, such as referring to pictures or objects, and multiple exposures to a word during vocabulary instruction also facilitate vocabulary learning (Elley, 1989). In a meta-analysis of

vocabulary instruction for school age children, Stahl and Fairbanks (1986) found that vocabulary interventions which provided contextual and definitional support for learning the meaning of words were more effective than those which just provided definitions. From these studies, there is evidence suggesting that, in addition to the quantity of vocabulary words used by the caregiver and the number of uses of each word, providing support for learning the meaning of words affects child acquisition of vocabulary.

Beals (1997) analyzed family interactions during mealtime for evidence of vocabulary supports and the relationship between number of supports and child vocabulary outcomes. Semantic cues (i.e., giving direct verbal information is given about word meaning), physical cues (i.e., indicating the object named or demonstrating an action), social cues (i.e., indicating social behavior and labeling it) and prior knowledge cues (i.e., referring to previous experiences or common knowledge) were coded. The majority of supports used by the families were semantic supports (61.5%); physical supports were the second most common (18.1%). All cues were considered informative input and exposure to greater amounts of informative input for rare words during meal times when the child was 3, 4, or 5 years old correlated significantly to child PPVT-R scores at ages 5 and 7.

Another aspect of adult linguistic input that may affect child language acquisition of vocabulary is the amount of input that occurs when the adult is following the child's attentional or activity lead. When the adult follows the child's lead, she follows the child's attentional focus and talks about what the child is doing rather than trying to recruit the child's attention to a new task or focus (Yoder, Kaiser, Alpert & Fischer, 1993). Support for modeling vocabulary while following the child's lead comes from the

research on joint attention. Joint attention occurs when the adult and child are focused on the same object or action while communicating with each other. Joint attention episodes provide a predictable context and meaningful referential information that support children's language learning (Bakeman & Adamson, 1984; Tomasello & Farrar, 1986). Among toddlers, the amount of time in joint attention episodes with adults predicts later vocabulary size (Tomasello & Todd, 1983). Measures of adult and child language including number of utterances, mean length of utterance (MLU) and number of different words used by the child are greater during joint attention episodes than outside of such episodes (Tomasello & Farrar, 1986). Additionally, time in joint attention may index efficient or optimal learning opportunities provided to the child. For example, Krcmar, Grela, and Lin (2007) found that toddlers exposed to new vocabulary in joint attention episodes performed better on an object naming task than children who were distracted during vocabulary exposure. Measuring children's exposure to vocabulary during episodes in which the adult is following the child's lead may provide further information about the optimal interactional contexts for vocabulary learning during teacher interactions with individual children.

**Curriculum interventions.** A number of studies have assessed vocabulary outcomes for children who received curriculum interventions focused on literacy skills. For example, studies of interactive book reading interventions implemented by teachers in preschool classrooms have demonstrated positive effects of these interventions on child vocabulary outcomes (Lonigan & Whitehurst, 1998; Whitehurst et al, 1994; Whitehurst et al, 1999). A recent meta-analysis examined studies of the preschool language and literacy curricula to determine their effectiveness in supporting vocabulary

development for children at risk for academic delays (McLeod & Kaiser, 2009). Forty-four studies of preschool primary (10) and supplementary (34) curricula were reviewed to assess the effects of the curricula on children's receptive and productive vocabulary skills. Although there were statistically significant effect sizes for receptive (Hedge's  $g = .11$ ,  $p < .05$ ) and expressive (Hedge's  $g = .21$ ,  $p < .01$ ) vocabulary outcomes for children in the classrooms associated with the implementation of the experimental curricula compared to non-treatment conditions, the practical effects associated with the experimental curricula were quite small. On average, the differences between treatment and control groups were equivalent to two to three standard score points favoring the experimental group on post-test standardized measures. Although most of the curricula did contain provisions for teaching new vocabulary as well as literacy skills, the specific instructional strategies and the content of teacher-child interactions that led to positive vocabulary outcomes were not clearly specified in most studies.

Moderator analyses revealed that some variability on standardized measures of child vocabulary in these studies was due to curriculum implementer. Specifically, researcher-implemented interventions (Hedges'  $g = .39$ ) had a much larger effect size than teacher-implemented interventions (Hedges'  $g = .08$ ). This difference, although large, was not statistically significant ( $Q_{\text{between}} = 2.44$ ,  $p = .11$ ). These implementer effects suggest that either treatment fidelity or other unmeasured characteristics of the teachers (e.g., use of complex language, sophisticated vocabulary) may impact child vocabulary outcomes. Given the importance of vocabulary to children's progress in reading and general academic outcomes, it is important to examine variations in teacher linguistic input that may influence children's vocabulary growth in classroom contexts.

Based on the research on the effects of teacher linguistic input and teaching strategy on child vocabulary, it is hypothesized that there are key features of teacher-child interactions that may affect vocabulary learning. In interactions with children, teachers who use a large number of different words and use words that are relatively more sophisticated than children's everyday vocabulary may facilitate vocabulary development. Additionally, providing supports for learning the meaning of words such as physical referencing, verbal definitions, and referencing social behavior and prior knowledge may enhance vocabulary learning. Finally, modeling vocabulary and providing supports for learning the meaning of words when the adult and child are attending to each other and focused on the same materials or activity could increase children's acquisition of words and their meaning.

### **Beyond Vocabulary**

**Teacher use of complex syntax.** In addition to the effects of teacher vocabulary, teachers' use of complex syntax may constitute important inputs for child oral language outcomes and may potentially change the trajectory of students' academic outcomes. Complex syntax is generally defined as using complex sentences which include a main clause and at least one subordinate clause (Mason, 2009). Subordinate clauses can be embedded in sentences (e.g., The woman *in the coffee shop* waves hello) or joined by conjunctions (e.g., He is going to the store, *because he needs bread*). See Appendix A for examples and definitions of complex syntax.



In preschool children, the use of complex syntax is related to later language development and school achievement. Understanding and using complex syntax are necessary for school success. As children progress through school, they need to communicate and understand language in more complex ways to participate in the increasingly difficult instruction (Craig & Washington, 2006; Jackson & Roberts, 2001). In general, language used in academic instruction involves more sophisticated vocabulary and syntax that is more complex than language used in everyday social discourse. To better support development of complex language skills in children at risk for school failure, we must understand what affects their development of language complex skills during the preschool years.

Children's interactions with adults at home and in preschool affect children's use and development of complex syntax. Jackson and Roberts (2001) reported for children from low socio-economic backgrounds, variation in adult responsiveness and stimulation in the home was related to children's use of complex syntax. In this study, responsiveness and stimulation in the home were measured by the six subscales of the Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley 1984; emotional/verbal responsiveness of the parent, acceptance of the child's behavior, organization of the environment, provision of appropriate play materials, maternal involvement with child, and variety in daily experience). Children's number of complex syntax forms at 4 years was significantly correlated with the HOME total score ( $r=.28$ ,  $p<.05$ ). Huttenlocher et al. (2002) found that preschool children's syntactic understanding was related to their teachers' use of complex sentences. Teacher syntactic input across the preschool day was correlated with child growth in syntactic understanding over the

preschool year. Teacher use of multi-clause sentences was significantly correlated with child syntactic growth ( $r=.42$ ,  $p<.01$ ) and complex sentence use varied greatly across teachers in the study (Huttenlocher et al, 2002). Because children from low income backgrounds may have relatively fewer opportunities to learn complex syntax, it is important to examine the relationship between teacher use of complex syntax and children's immediate and delayed use of complex syntax. Data from such an examination could help to determine the level of modeling of such language needed by teachers to facilitate children's syntactic development.

**Teacher use of AAVE.** African-American vernacular English (AAVE) is a systematic, rule-governed dialectical variation of English spoken by most African-Americans in the United States (Washington & Craig, 1998). AAVE is systematically different than Mainstream Classroom English (MCE) in approximately three dozen features including morphosyntactic features such as variable inclusion of grammatical inflections (e.g., plurals, possessives, prepositions) and variable inclusion of the copula (i.e., forms of *to be*), and specific phonological features such as consonant cluster reductions (e.g., “foun” for found) and syllable deletion (e.g., “came” for became) (Craig & Washington, 2006). Some features of AAVE are comparable to features in MCE (e.g., AAVE feature of multiple negatives in a clause such as “She don’t have no money” equates to MCE such as “She doesn’t have any money”), while some features have no equivalent (e.g., the AAVE feature of the invariant *be* which indicates a habitual action or state “She be rich”) (Craig & Washington, 2006). Features of AAVE are defined further in Appendix B.

AAVE users may be exposed to different early literacy practices prior to school entry. Due to the rich oral history that is evident among African-American families, children in these homes may be exposed to fewer books in the home and fewer experiences reading prior to school entry (Craig & Washington, 2006). Use of AAVE may present barriers for students in classrooms when the child's home language and literacy practices are not taken into account (Green 2002; Charity, Scarborough, & Griffin, 2005; Craig & Washington, 2006). Recent studies suggest that children's overall use of AAVE relates to reading outcomes. Craig, Zhang, Hensel, and Quinn (2009) found that increased child AAVE use was negatively correlated with reading achievement scores in 1<sup>st</sup> through 5<sup>th</sup> grade when controlling for SES and general written and oral language skills. In this study, the authors compared oral production of AAVE and written production, noting that on average, children reduced the number of AAVE features used when completing written tasks, indicating that the children were able to dialect shift to MCE on written tasks. Oral AAVE use was indirectly predictive of reading skills, mediated through more general language skills, but written AAVE use was directly negatively related to reading scores. Children who could effectively change from use of AAVE in oral language to MCE in written language had better outcomes than peers who could not code switch in this manner. This finding, along with previous research, indicates that the ability to successfully code-switch between AAVE and MCE may support greater literacy development (Connor & Craig, 2006; Craig & Washington, 2004).

The relationship between teacher AAVE use and child AAVE use is not well researched. Craig and Washington (2002) analyzed the relationship between maternal and

child use of AAVE and found that adult use of AAVE influenced child use. Language samples of mother-child play sessions were recorded and coded for AAVE use. Seventy-one percent of children whose use of AAVE features placed them in the top quartile also had parents that produced the highest number of AAVE features. Similarly, the children who had the lowest total AAVE production had parents who also produced the fewest AAVE features. The relationship between AAVE and complex syntax is unclear. Craig and Washington (2002) found that children who produced the lowest amount of AAVE also produced the lowest amounts of complex syntax. However, Jackson and Roberts (2001) did not find a significant relationship between children's complex syntax and AAVE.

Understanding the relationship between teacher AAVE use and child language outcomes could be the first step in determining how best to support preschool AAVE users in the classroom. Research indicates that even without formal instruction, children learn to shift between AAVE and MCE once they enter elementary school although little is known about what supports acquisition of code-shifting skills. Code-shifting may occur as children are exposed to MCE in formal schooling (see Craig & Washington, 2006 for a review of this literature). Children who do not learn to code switch in this manner in elementary grades have poorer reading outcomes than their peers who are more sensitive to MCE (Craig & Washington, 2004). It is important to better understand factors that relate to child AAVE use and language development during preschool.

## **Enhanced Milieu Teaching**

Enhanced Milieu Teaching (EMT) is a well-researched individualized intervention that has been implemented by teachers, parents, and clinicians and has been shown to have positive effects on children's language. Milieu teaching has been included in more than 50 studies applied by parents and teachers (Kaiser & Trent, 2007 provide a review). EMT is a hybrid intervention technique that uses principles of environmental arrangement, responsive interaction, language modeling, and incidental teaching to teach language to children with moderate to severe language delays. In everyday conversational interactions with children, adults arrange the environment to provide activities of interest and to promote child engagement and communication. Adults model language targets in a responsive style, following the child's interests, using expansions and semantically related feedback. Milieu teaching episodes are embedded in responsive interactions to prompt child production of target language in functional contexts. Theoretically, EMT is based in both behavioral learning principles applied to instruction (e.g., imitation, reinforcement, shaping, and generalization) and social interactional and developmental principles (e.g., responsiveness, modeling, expansions, semantic feedback, and joint attention) (Hancock & Kaiser, 2005). Development of the EMT model began by adapting Hart and Risley's (1968) model of incidental teaching for low-income preschoolers for use with children with more significant language delays (Hart & Rogers-Warren, 1978). Components of responsive interaction, language modeling and environmental arrangement were added to make the intervention more naturalistic, responsive and linguistically rich (Kaiser, 1993).

Across the studies of milieu teaching, children with significant language delays have demonstrated acquisition and generalization of the targeted language during EMT intervention. When EMT is used in classroom settings, it has been more effective than direct instruction for children with significant language delays (Yoder et al., 1995). EMT has been shown to be effective for children in Head Start who have mild to moderate language delays (Delaney & Kaiser, 2001). In a randomized treatment control study, children with low language skills and behavior problems who participated in a parent plus trainer implementation of EMT showed greater gains on measures of receptive and productive language than children in the control group (Kaiser, Hancock & Milan, 2005). A systematic technology for teaching EMT strategies to parents and teachers has been researched (Hester, Kaiser, Alpert, & Whiteman, 1996; Kaiser, Hancock & Hester, 1998).

Within the classroom, teachers have been taught to use milieu teaching strategies in individualized sessions and across the day. Halle, Baer, and Spradlin (1981) trained teachers to use the time delay procedure across three classroom contexts – free play, snack time and lunch time – which resulted in increased child vocalizations. Yoder and colleagues (1995) trained teachers to implement milieu teaching strategies class-wide with significant pre to post changes in child vocabulary and language outcome measures for children with language delays. McCathren (2000) reported increases in children’s eye contact, vocalizations, and conventional gestures after a teacher was trained in EMT strategies adapted for prelinguistic children (i.e., Prelinguistic Milieu Teaching or PMT). Training teachers to implement language teaching strategies across the day can be effective in increasing child language above what would be expected from maturation (Yoder et al., 1995).

EMT is designed to teach a range of functional language skills to children including vocabulary, early semantic relations, and syntax. Both target words and sentence length typically are specified as teaching targets for individual children in EMT (Kaiser & Grim, 2005). EMT explicitly uses language modeling in response to child communication attempts and prompting production of functional forms in context to teach vocabulary. Implicitly, EMT includes strategies such as establishing joint attention with the child when modeling new forms and increasing the amount of targeted language modeled. Specific supports for vocabulary development (e.g., use of gestural and oral supports, linking words to child experiences, and defining words in context) may occur during EMT interactions, but the use of these strategies is not defined specifically in the model itself.

### **Purpose of the Study**

Teacher-child interactions are ideal contexts for promoting vocabulary and language development in preschool. Examining how the content of these interaction affects children's language development is an important next step in designing optimal strategies for enhancing language learning for children at risk. Specifically, research is needed determine how teacher linguistic input (e.g., amount and type of vocabulary, use of complex syntax, and use of AAVE features) and teacher use of strategies to increase the use or the understanding of vocabulary have on children's language development. From this research, new strategies to promote language learning in children at-risk for later reading and academic delays may emerge.

In the present study, I investigated the relationship between teacher vocabulary use and supports for learning vocabulary in EMT sessions and children's vocabulary outcomes. Teacher vocabulary input, number of different target and sophisticated vocabulary words, and teacher use of specific strategies presumed to support children's learning of new vocabulary were examined in relation to child vocabulary outcomes in three measurement contexts. The three contexts indexed proximal (within session), medial (in language samples with an adult) and distal (standardized assessments of receptive and productive vocabulary) measures of changes in child vocabulary.

Additionally, secondary analyses were conducted to explore the relationship between teacher use of AAVE and complex syntax and child language. Two measures of AAVE and complex syntax were number of different features used and total features used. Proximal (within session) and medial (language samples with an adult) measures of child language were examined as child outcomes.

Four hypotheses guided the analysis of the effects of teacher vocabulary input:

1. Teacher use of specific vocabulary during EMT sessions will be associated with child vocabulary outcomes.
  - a. Teacher use of specific target words will be associated with child use of target words during sessions, child vocabulary during the post-test language sample, and scores on standardized measures
  - b. Teacher use of sophisticated words will be associated with child use of sophisticated words during sessions, child vocabulary during the post-test language sample, and scores on standardized measures



2. Teacher use of specific strategies to support vocabulary learning during the EMT sessions will be associated with child vocabulary outcomes.
3. Teacher use of vocabulary in related contingent turns during EMT sessions will be associated with child vocabulary outcomes
  - a. Teacher use of specific target words will be associated with child use of target words during the session, child vocabulary during the post-test language sample, and scores on standardized measures
  - b. Teacher use of sophisticated words will be associated with child use of sophisticated words during the session, child vocabulary during the post-test language sample, and scores on standardized measures
4. Child vocabulary outcomes will vary by assessment context with the strongest relationship obtained in the most proximal assessment (within EMT sessions) and the weakest relationship obtained from most distal measures (standardized assessments of receptive and productive vocabulary).

Additionally, two hypotheses guided the secondary analyses of teacher linguistic features

1. Teacher AAVE use will relate to child AAVE use in proximal (within EMT session) and medial (language sample) measurement contexts
2. Teacher complex syntax use will relate to child complex syntax use in proximal (within EMT session) and medial (language sample) measurement contexts.

The research questions based on these hypotheses were:

1. What is the relationship between specific features of teacher vocabulary use (i.e., number of target words, number of sophisticated words) in EMT sessions and child vocabulary use in the three measurement contexts?
  - a. Child use of target and sophisticated vocabulary during the EMT session
  - b. Child number of different words in the language sample
  - c. Child raw scores on the Peabody Picture Vocabulary Test, 4<sup>th</sup> edition (PPVT-4; Dunn & Dunn, 2007) and the Early Vocabulary Test, 2<sup>nd</sup> edition (EVT-2; Williams, 2007).
2. What is the relationship between teacher use of specific strategies to support vocabulary development during EMT sessions and child use of vocabulary in the three measurement contexts?
  - a. Child use of target and sophisticated vocabulary during the EMT sessions
  - b. Child number of different words in the language sample
  - c. Child raw scores on the PPVT-4 and EVT-2
3. What is the relationship between teacher's target and sophisticated vocabulary use in related turns during teacher-child EMT sessions and child vocabulary in three measurement contexts?
  - a. Child use of target and sophisticated vocabulary during the EMT sessions
  - b. Child number of different words in the language sample
  - c. Child raw scores on the PPVT-4 and EVT-2
4. What is the relationship between teacher use of AAVE and child use of AAVE during the EMT session and language sample contexts?

5. What is the relationship between teacher use of complex syntax and children's use of complex syntax in during the EMT session and language sample contexts?

## CHAPTER II

### METHODS

The data for this study were collected as part a randomized field trial examining the effects of three variations of early literacy curricula implemented in Head Start classrooms located in an urban city in the southeast United States. In this study, centers were assigned to one of three conditions: *Opening the World of Learning (OWL*; Schickedanz & Dickinson, 2005) an early literacy curriculum, *OWL curriculum* combined with Enhanced Milieu Teaching (EMT; Kaiser, 1993) for low language children, and an enhanced version of *Creative Curriculum (CC*; Dodge, Colker, & Heoman, 2001), the existing literacy program used by the Head Start centers prior to the study. A total of 129 teachers in 52 classrooms and 247 low language and 242 matched typical language children participated in testing at four time points. The average age of children at the beginning of the intervention was 53.45 months. The curriculum intervention was implemented during one school year (approximately 8 months). Data are reported here are from pre and post 1 (end of intervention). For detailed information about the procedures for the randomized study, refer to Appendix C.

#### **Participants**

For the current study, 36 teachers and teacher assistants from 19 classrooms and 53 low language children from their classrooms who were randomly assigned to the

OWL+ EMT condition were selected. This sample in the current study represented 85.7% of the teachers assigned to the OWL+ EMT condition and 73.6% of the low language children assigned to this condition. The teachers and low language children participating in this study were similar to the teachers and low language children participating in the other two conditions of the RCT in terms of demographic characteristics and child language skills. In the current study, all teachers were female and the majority (92%) was African-American. Most teachers (83.8%) had a Child Development Associate's degree or other Associate's degree; less than 15% had a 4 year college degree.

Children included in the current study were primarily African-American (97.2%) and were, on average, 58.8 months old at the beginning of the preschool year. Girls comprised 41.6% of the sample. Children were designated as low language based on having a total score of 75 or lower on the Preschool Language Scale, 3<sup>rd</sup> edition (PLS-3; Zimmerman, Steiner, & Pond, 2002) at the beginning of their 4-year old year in Head Start. The low language and matched typical language child samples from the current study and the RCT are described in Table 1.

### **Implementation of the EMT Intervention**

Participating teachers were trained in large and small group training sessions (approximately 15 hours of training) to implement EMT. In addition, individualized training and feedback were provided to teachers during the 8 month implementation phase of the study. An EMT coach (a graduate student or research team member) visited each teacher approximately once every other week for 30 minutes. The coach reviewed specific EMT strategies and the coach

Table 1  
*Descriptive Data of the Sample*

| Teachers              |                  |      |                       |                  |      |
|-----------------------|------------------|------|-----------------------|------------------|------|
| Current study         |                  |      | RCT                   |                  |      |
| N                     |                  | 36   | N                     |                  | 129  |
| Female (percent)      |                  | 100  | Female (percent)      |                  | 98.4 |
| Years teaching (mean) |                  | 13.5 | Years teaching (mean) |                  | 12.5 |
| Education (percent)   | High school      | 2.7  | Education (percent)   | High school      | 8.5  |
|                       | CDA              | 51.4 |                       | CDA              | 41.1 |
|                       | Associates       | 32.4 |                       | Associates       | 37.2 |
|                       | Bachelor's       | 13.5 |                       | Bachelor's       | 13.2 |
| Ethnicity (percent)   | African-American | 92   | Ethnicity (percent)   | African-American | 91.5 |
|                       | Euro-American    | 8    |                       | Euro-American    | 7.8  |

| Children               |                   |       |                        |                   |                          |                     |                   |     |
|------------------------|-------------------|-------|------------------------|-------------------|--------------------------|---------------------|-------------------|-----|
| Current study          |                   |       | RCT                    |                   | RCT: Low language sample |                     |                   |     |
| N                      |                   | 55    | N                      | 445               | N                        | 176                 |                   |     |
| Age (months)           |                   | 52.8  | Age (months)           | 53.1              | Age (months)             | 53.7                |                   |     |
| Female (percent)       |                   | 41.6  | Female (percent)       | 46.3              | Female (percent)         | 43.3                |                   |     |
| Ethnicity              | African-American  | 97.2  | Ethnicity (percent)    | African-American  | 97.3                     | Ethnicity (percent) | African-American  | 98  |
|                        | Euro-American     | 2.2   |                        | Euro-American     | 2.5                      |                     | Euro-American     | 1.6 |
|                        | Hispanic American | .6    |                        | Hispanic American | .2                       |                     | Hispanic American | .4  |
| Pretest PLS Mean (raw) |                   | 54.84 | Pretest PLS Mean (raw) | 63.79             | Pretest PLS Mean (raw)   | 56.57               |                   |     |

and teacher discussed any concerns with using the EMT strategies. The coach provided verbal feedback on EMT strategy use, use of target vocabulary, and sentence length targets while the teacher completed an EMT session with a target child.

Each teacher or assistant teacher taught two low language children enrolled in her classroom. Teachers worked with the same children throughout the implementation year. EMT sessions were conducted two to three times each week with individual children during centers time or nap time at tables away from other classroom activities. Each session lasted about 10 minutes, and children received 60 individual sessions of language instruction following the principles of the EMT model.

Individual vocabulary and sentence length targets were selected for each child by researchers using information from the language screening before the beginning of the preschool year. The target vocabulary and sentence length were based on a three-tiered model (level 1 = entry level vocabulary and 1-3 word sentences; level 2 = mid level vocabulary and 4 or more word sentences; level 3 = advanced/mid level vocabulary and complex sentences). At the beginning of the school year, all selected children met the criteria for levels 1 and 2 vocabulary and syntax. By the end of the school year, some level 2 children were supported by their teachers to use more complex sentences consistent with level 3. See Appendix D for the list of vocabulary words taught at each level.

Throughout the intervention, thematic play materials that included toys and activities in which the target vocabulary could be used were prepared for each child-teacher pair. Teachers received a large plastic bag each week that included toys, materials for vocabulary probes and a short story book specific to the theme materials and their

target children's language level (level 1 or level 2). During each session, the teacher administered the vocabulary probe, read a short story that indicated how to play with the toys, and then played with the child using the toys. The story books were 6-8 pages in length and provided simple story narrative that illustrated how the materials could be used in thematic play to include the target vocabulary. Teachers read the story to the child while the child looked at the pictures. Examples of toy sets included babies and bath toys, a dollhouse with accessories, play dough with implements, and water play materials. The play materials (four basic sets of materials with accessories that changed each time the materials were used) were provided in bags together with the probe and story books.

The materials also included a vocabulary probe task to determine if the child could produce the target vocabulary by naming pictures representing target words before the EMT session began. Teachers showed the child pictures representing the target vocabulary and asked the child to name each picture. Child responses were recorded on a data sheet. Teachers were instructed to model and prompt the vocabulary words children had not correctly identified on the probe task. At the end of each week, teachers re-administered the probes to determine if the child had learned the vocabulary taught in the EMT sessions. See Appendix D for sample materials and vocabulary lists from the materials.

Teachers were trained to use environmental arrangement, responsive interaction, language modeling and a modified sequence of milieu teaching prompts while playing with children using the thematic toys sets. Environmental arrangement was used to set up opportunities for children to request materials and actions. Responsive interaction strategies included balanced turn taking (i.e., matched turns), responding to every child



communication turn, and limiting instructions and test questions. Language modeling introduced the child's target vocabulary and sentence length while the teacher talked about the play actions. Milieu teaching prompts followed a least-to-most support sequence: time delay, open ended question, choice question, and elicitive model. When children verbally responded to teacher prompts, teachers replied by expanding their utterances and providing functional, positive consequences (i.e., access to requested materials and actions, and positive statements by the teacher). Teachers were instructed to model and prompt children to use their vocabulary targets in target length sentences appropriate for their specific language levels.

### **Data Collection**

Data from 53 EMT sessions including 36 teachers and 53 different children were used in the analysis. All video samples were collected from sessions conducted between January 9<sup>th</sup> and March 31<sup>st</sup> of 2008 and video recorded to examine fidelity of the interventions. Because videotaping for fidelity in the larger study focused on sampling the teachers rather than individual children, most children were included in only one video and only 53 of 62 children assigned to the EMT condition were videotaped. The length of EMT sessions recorded varied based on classroom schedules. To standardize the video samples, the first seven minutes of each video tape that included teacher-child interaction in play were analyzed. Vocabulary probes and book reading at the beginning of the session were not included in sample of teacher-child interaction. Thirty-six samples of teacher-child interaction were seven minutes in length, and 17 samples were

between five and a half and seven minutes. Data were prorated when samples were less than seven minutes.

## **Coding**

All adult and child utterances in the selected teacher-child interaction sessions were transcribed by one of two trained transcribers using the Systematic Analysis of Language Transcripts (SALT; Miller & Iglesias, 2008) protocol. The transcribers completed the 53 samples by watching and listening to videos and transcribing according to SALT transcription rules. Based on the transcriptions, SALT automatically calculated a number of linguistic measures from entered transcripts including each speakers' mean length of utterance in morphemes (MLUm) diversity of language (number of different words; NDW) and number of total words (NTW). Additionally, SALT generated a list of the specific words used by each speaker in a transcript.

After transcription, samples were coded by one of two trained coders. Prior to coding child and adult behavior, the coder verified the sample by listening to and watching the video sample while reading the transcript. Changes were made to the transcript if the verifier noted any discrepancies. Each sample was then coded using the TELL KidTalk Code (Roberts & Kaiser, 2009), as described in Appendix E. Adult utterances were assigned a sequence of codes for the relationship between the teacher's language and the child's language or action (i.e., matched or unmatched turn and related or unrelated to the child's utterance), use of vocabulary (i.e., unique or repeated target or sophisticated vocabulary word), and vocabulary support (i.e., physical or verbal

vocabulary supports). Child utterances were coded to indicate when a vocabulary word was present and for type of vocabulary word (i.e., unique or repeated target or sophisticated vocabulary word) and level of independence in producing the utterance (i.e., independent, imitated, or prompted). The SALT program counted and summarized the code and the printout of each session indicated which codes and how many of each code were present.

Adult utterances were coded for use of support strategies for vocabulary learning. These supports included physical and oral strategies for drawing the child's attention to the word and its referent or for providing additional information about the meaning of a vocabulary word to aid the child's understanding of the word. Physical supports included: a) pointing to an object, b) showing an object, c) giving an object or d) performing an action demonstrating the word while saying the word. Oral supports included: a) defining words (e.g., "A *sprout* is a baby plant", b) providing synonyms or antonyms of words (e.g., "*Filthy* is another word for dirty", or c) referencing an event in the classroom, the child's life or world (e.g., "When you saw the doctor he used a *stethoscope* to check your heart"). These strategies were defined, based on the work of Beck, McKeown, and Kucan (2002) and were similar to the vocabulary teaching supports described in Beals (1997) and Weizman and Snow (2001). For each teacher utterance, any vocabulary word was coded with the appropriate strategies. A teacher utterance could have contained multiple words and, therefore, multiple strategy codes. Within the coding system, multiple strategies were taken into account, so that a vocabulary word could receive a code for oral support, physical support or both. The measure used in analysis was the total number

the child's utterance, maintained the child's meaning, and added additional words. of strategies used by the teacher in the session. For further information on vocabulary learning support strategies, refer to Table 2.

In addition to these supports, the EMT specific vocabulary teaching strategies of expanding child utterances to include additional words and prompting production of specific vocabulary words were coded. Expansions were coded when the adult repeated the child's utterance, maintained the child's meaning, and added additional words. Prompting was coded when the adult used a time delay (e.g., the teacher holds up a choice of desired materials and waits for the child to request using a vocabulary word), a mand (e.g., the teacher asks "What do you want?" with the expectation that the child will request using a vocabulary word) or a model (e.g., the teacher prompts the child to say a target response including a vocabulary word) to prompt the child to use an utterance which contained a target vocabulary word. Both EMT strategies were included in the count of oral supports.

Each teacher utterance that included vocabulary was also coded for relatedness, an indication of following the child's lead through a contingent relationship between the child's communication and the teacher's verbal response. To be scored as a related utterance, the teacher's utterance must have been related to the content to the child's previous utterance and/or to the child's immediately preceding action and the teacher must have been in physical proximity to the child. Proximity was defined as the adult within an arm's length of the child, oriented toward the child and/or oriented to the materials with which she and the child were playing. In sum, adult utterances were considered related when 1) the adult was proximal to the child; 2) shared the child's

Table 2  
Vocabulary Supports

| Category         | Support                               | Definition  | Example  |
|------------------|---------------------------------------|---|--|
| Physical support | Point (P)                             | With clear articulation of the index finger, the parent points to an object or person to share, the point is quick and the adult does not gain possession of the object/person OR Adult extends index finger toward an object to indicate parent's desire for an object, event, help, etc. Point is maintained, persistent, and may include rotating from a point to an open palm up.   | A {points to apple} apple.                           |
|                  | Show (S)                              | A brief presentation of an object, directed to the child's face, with the parent retracting and maintaining possession of the object  | A {shows car} car.                                   |
|                  | Give (V)                              | Adult extends object and maintains the gesture until the child takes possession of the object. The adult shares the object with the child, there is no expected reaction from the child other than to have possession of it OR The adult pushes toward or hands an object to the child as a request/instruction to the child for them to repeat an action or complete a request from the adult. There is a specific outcome expected from the adult. (This is like our nonverbal command) | A {gives baby} baby.                                 |
|                  | Other gesture (G)                     | The adult does another communicative gesture other than the specific point, show or give (e.g., touching the object without using the index finger). This is different than imitating an action. This gesture must indicate communicative intent.   |  |
|                  | Act out action                        | The adult is modeling the action they are saying.   | A {drives car} drive                                 |
| Verbal Support   | Word Association (Synonym or Antonym) | The adult references another word to compare to the child's word or to expand the child's understanding   | C couch.<br>A sofa<br>OR<br>A a couch is a sofa      |
|                  | Connection to child's life            | The adult connects the child's previous utterance with life outside the session:  | C ball.<br>A you play ball with your sister Mary     |
|                  | Definition                            | The adult defines a word the child said or referred to in the preceding utterance.  | C hat.<br>A a hat is something you wear on your head |
|                  | Expansion                             | The adult repeats the child utterance and adds information.   | C Hat<br>A Hat on head                               |
|                  | Prompt                                | Prompt: the adult uses one of the following language prompts to elicit language:<br>(a) Real open question/real mand<br>(b) Real choice question<br>(c) Real yes/no question<br>(d) Model<br>(e) Cloze prompt   | C hat.<br>A say big hat                              |

of attention; and 3) the content of the adult's utterance referred to the child's previous utterance or ongoing action.

## **Measures**

**Teacher measures.** Four teacher vocabulary measures were collected for the analyses: 1) number of teacher uses of target words; 2) number of teacher uses of sophisticated words; 3) total number of teacher uses of vocabulary teaching strategies; and 4) number of vocabulary words used during related turns (i.e., while following the child's lead). Additionally, measures of teacher NDW, MLUm, NTW, number of different target words, and number of different sophisticated words were collected for descriptive purposes. These measures, as well as total number of target words and the total number of sophisticated words used, were taken from SALT output. Target words were those selected for teaching each child at the beginning of the EMT session, based on the probes materials given to teachers (See Appendix D for a list of these words). Sophisticated words were defined, similar to the designation of rare words in the Home-School study (Dickinson & Tabors, 2001), as words not included on the Dale-Chall word list. The Dale-Chall word list is comprised of 3,000 words the average fourth grader understands (Chall & Dale, 2000). The extended list of these words, which includes all forms of the words on the list (e.g., past tense, pluralized, dialectic versions, etc.), was cross-referenced with the SALT printout of the words used in the session to identify the sophisticated words used by the teacher and child. Refer to Appendix F for the extended Dale-Chall word list. Examples of sophisticated words used by teachers in sessions

include *sprout*, *costume*, *dough*, *balcony*, *purpose*, and *splinter*. Each target word and sophisticated word was coded as unique or non-unique to calculate the number of different target and sophisticated words used.

The total number of vocabulary support strategies, the number of different vocabulary support strategies, and teacher use of target and sophisticated words in related utterances were also calculated from the SALT output. The total number of codes that represented vocabulary strategies was summed to determine the teachers' total use of vocabulary supports. All utterances which contained a target or sophisticated word were coded as related or non-related to the child's previous utterance or action. From the SALT printout, the number of utterances with a target or sophisticated word that were also related was counted.

In addition to these measures of teacher use of vocabulary, vocabulary support strategies, and related utterances, measures of complex syntax were collected. Codes for features of complex syntax were adapted from Washington and Craig (1994). Trained coders scored each teacher and child utterance to indicate the presence of all applicable features of complex syntax. Twenty-two different features of complex syntax were possible for each utterance. Multiple codes could be applied to the same utterance. As with the vocabulary coding, SALT printouts provide the summary data for the features and how many of each feature were present in the transcript. Features of complex syntax used by the teacher were summarized in two ways: number of different features used and total features used. See Appendix A for complex syntax features and examples (from Washington & Craig, 1994).

Teacher utterances were also coded for features of AAVE. AAVE codes were adapted from Conner and Craig (2006) and are included in Appendix B. Seventeen different AAVE codes were used and multiple codes could be applied to each utterance. SALT summarized the data and the printouts were used to calculate the number of features used by the teacher in the EMT session.

**Child measures.** For the primary questions related to the influence of teacher vocabulary input on child vocabulary, child vocabulary outcomes in three measurement contexts were used as dependent variables in the vocabulary analyses. These measures included: a) child number of target and sophisticated vocabulary words used during the same EMT session in which teacher data were collected; b) child number of different words in the first 50 utterances selected from a 20 minute language sample administered at the end of the intervention (post 1); and c) raw scores from two standardized measures - PPVT-4 and EVT-2.

Child vocabulary use during the EMT session was calculated in the same manner as teacher vocabulary use. Number of total and number of different target words and sophisticated words were calculated from the SALT printout of child code counts. Target words were compared to the list of target words for the set of materials specific to each session. Sophisticated words were determined by comparing the child's vocabulary list (determined from the SALT output) with the Dale-Chall list. MLUm and NDW, which were used as descriptive measures of child language use in the EMT sessions, were taken directly from the SALT output.

In the medial measurement context, measures were taken from a language sample collected at the end of the intervention. The language sample protocol consisted of two



components: looking at a wordless picture book (Carl Goes to Day Care; Day, 1993), and playing with the adult using a standard set of materials. Each language sample session lasted 20 minutes and was conducted by trained graduate students, following a specific protocol for adult talk and interaction. Each language sample was video-taped. All child utterances were transcribed and analyzed using SALT. Each transcript was verified by a second coder prior to analysis. The first 50 utterances were used for analysis. Measures used in the analysis (NDW, NTW, lists of specific words used, and MLUm) were generated by the SALT summary program. See Appendix C for further information about the collection of the language sample at pre and post-testing time points and Appendix G for the language sample protocol.

The distal measures of child vocabulary use were obtained from standardized receptive and expressive vocabulary assessments collected as part of the larger randomized study at post-testing. The PPVT-4, which assesses the child's receptive vocabulary skills, and the EVT-2, which measures expressive vocabulary skills, were administered to children individually at the beginning and ending of the preschool year. The tests were given by trained graduate students and 20% of the tests were scored simultaneously by a second tester to assess fidelity of testing procedures and reliability of scoring. PPVT-4 and EVT-2 raw scores were used as the outcome measure, because the raw scores show actual change in child vocabulary (number of words understood or used) rather than the change based on a standardization sample (Kerns, Eso, & Thompson, 1999). Refer to Appendix C for further information regarding the collection of pre and post-test standardized measures.

For the analysis of the effects of teacher use of complex syntax, child measures of complex syntax use were also calculated from the EMT sessions and the language samples. As described in the teacher measures above, child use of complex syntax features was coded by marking each child utterance in the transcripts from the EMT sessions and language samples for evidence of the defined syntax features. Two measures of child use were then obtained by counting the data from the SALT output: number of different complex syntax features used and total complex features used.

Similar to the teacher measures of AAVE, measures of child AAVE were also calculated based on the summary of codes from the SALT output for the EMT sessions and the language samples. Each child utterance in the EMT sessions and in the language samples was coded for any features of AAVE. Each child utterance could exhibit multiple features of AAVE and all features present in each utterance were coded. The SALT program summarized the number of different AAVE features and number of total AAVE features used.

**Interobserver agreement.** Two trained graduate students coded the transcripts of the EMT sessions using the TELL KidTalk Code. For the analysis of vocabulary, teacher utterances were coded for use of target words, use of sophisticated words, related turns, and use of vocabulary support strategies. Child utterances were coded for use of target and sophisticated words. Prior to coding the study data, coders coded practice samples until they reached 80% agreement on all codes on three consecutive samples. Then, each coder coded approximately half of the 53 samples independently. Samples were also coded for milieu prompting as part of the milieu fidelity scores. Eleven transcripts (20.7%) were coded by both coders to determine the interobserver agreement (IOA). IOA

was determined by comparing the transcript line by line and code by code, and determining if the coders agreed or disagreed on each code. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements x 100 to yield the percentage of agreement. The mean reliability for teacher vocabulary codes was 91.1% (range =80-97%) and for child vocabulary codes was 90.1% (range=75-100%). The average reliability for coding of teacher use of vocabulary strategies was 84.4% (range=70.73-100%) and the average reliability for coding of vocabulary in related turns was 93.7% (range=84.3-100%). Table 3 contains the IOA data.

For the analyses of complex syntax, coders who were trained initially by an experienced staff member, demonstrated mastery of the code by achieving at least 90% correct on 10 master-coded samples. The coders scored the teacher and child utterances in the EMT samples and the child utterances in the language samples for features of complex syntax by marking each utterance with all complex syntax codes that applied. To calculate IOA, two coders independently coded the same transcript and each utterance was compared across the two transcripts to determine agreement of the coders. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements x 100 to yield the percentage of agreement. Within EMT sessions, the mean IOA for teacher use of complex syntax coding was 98.0% (range=90.5-100%) and the mean IOA for child use of complex syntax was 90.0% (range=80-94%). Across language samples, the IOA for complex syntax coding was 96.5% (range=94-99%). See Table 3 for complete IOA data.

Table 3  
*Interobserver Agreement*

| Measurement context | Code                            | Mean       | Range        | % sampled |
|---------------------|---------------------------------|------------|--------------|-----------|
| EMT session         | Target and sophisticated coding |            |              |           |
|                     | Adult codes                     | 91.06%     | 80-97.10%    | 20.7%     |
|                     | Child codes                     | 90.61%     | 75-100%      | 20.7%     |
|                     | Strategy coding                 | 84.38%     | 70.73-100%   |           |
|                     | Related coding                  | 93.71%     | 84.21-100%   | 20.7%     |
|                     | Milieu coding                   | 87.79%     | 50-100%      | 20.7%     |
|                     | AAVE coding                     |            |              |           |
|                     | Adult codes                     | 96.17%     | 89.86-100%   | 20.7%     |
|                     | Child codes                     | 95.94%     | 92-100%      | 20.7%     |
|                     | Complex syntax coding           |            |              |           |
|                     | Adult codes                     | 90.00%     | 79.71-94.23% | 20.7%     |
| Child codes         | 97.99%                          | 90.47-100% | 20.7%        |           |
| Language sample     | AAVE coding                     | 97.2%      | 95.8-98.4%   | 22.9%     |
|                     | Complex syntax coding           | 96.5%      | 94.0-98.6%   | 20.3%     |

Similar to the complex syntax coding, AAVE was coded by two graduate students who completed a code training and demonstrated mastery of at least 90% correct on ten reliability samples before coding the data for the study. The AAVE coding was completed on EMT sessions for teachers and children and on the child language samples. Coders marked each utterance with any applicable features. Two coders independently coded 20% the language samples and the EMT sessions to assess IOA. To calculate IOA, each utterance was compared and agreement or disagreement between the coders was determined. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements x 100 to yield the percentage of agreement. Within EMT sessions, the mean IOA for teacher AAVE codes was 95.9% (range=90-100%) and the mean IOA for child AAVE codes was 96.2% (range=90-100%). Across language samples, the mean IOA was 97.2% (range=96-98%). See Table 3 for further IOA information.

## **Analysis**

The analyses were completed according to the following model. First, descriptive data were summarized for all key teacher and child variables. Second, measures for other control variables were selected (age, child number of different words on the pretest language sample for session and language sample outcomes, pretest raw score on the PPVT-4 for the post-test PPVT-4, and pretest raw score on the EVT-2 for the post-test EVT-2). Third, analyses were run for each of the six hypotheses in the study.

Random intercept linear mixed models were used for the analysis due to the nested structure of the data. In the original data set for the RTC, children were nested within teachers and assistant teachers, who were nested within classrooms, which were nested within centers, which were nested within clusters, which had been randomly assigned to treatment or control conditions. Therefore, the beginning analysis was a five level model (i.e., Level 1=child, Level 2=teacher, Level 3=classroom, Level 4 = center, Level 5 = cluster). SPSS was used to run all linear mixed model analyses. In each analysis, variable were included to control for child age and pretest scores.

Controlling for the aforementioned variables, the general equation for each analysis was:

Level 1: Child

$$CHILD\ OUTCOME_{hijkl} = \pi_{0ijkl} + \pi_{1ijkl}(age) + \pi_{3ijkl}(pretest) + e_{hijkl}$$

Level 2: Teacher

$$\pi_{0ijkl} = \beta_{00jkl} + \beta_{01jkl}(vocabulary\ support) + r_{ijkl}$$

Level 3: Classroom

$$\beta_{00jkl} = \gamma_{000kl} + u_{jkl}$$

Level 4: Center

$$\gamma_{000kl} = \zeta_{0000l} + u_{kl}$$

Level 5: Cluster

$$\zeta_{0000l} = \kappa_{00000} + u_l$$

See Appendix I for equations along with teacher and child measures for each research question.

## CHAPTER III

### RESULTS

Both the descriptive data and analyses of relationships between teacher use of vocabulary and vocabulary supports in the individualized interactions with children are believed to be important. In this section, descriptive data of teacher language use in the EMT sessions and child language use in EMT sessions, in post-test language samples, and on post-test standardized measures are reported. Tables 5 and 6 display teacher and child descriptive data respectively. Analyses of relationships between teacher vocabulary and language input and child vocabulary and language outcomes are then described. Tables 7-13 display results from the linear mixed models analyses.

#### **Teacher Vocabulary Use**

Descriptive statistics were calculated for teacher vocabulary target and sophisticated vocabulary use. On average, teachers used 518.50 total words ( $SD=161.52$ ; range=236-878) and 132.42 different words ( $SD=27.86$ ; range=65-179) per session. Average teacher MLUm was 6.33 ( $SD=1.02$ ; range=4.77-9.69). The average teacher used 23.38 total target words within a session ( $SD=14.57$ ; range=0-57), although as indicated by the standard deviation and range, there was variability across teachers. Target words comprised an average of 4.7% ( $SD=2.5\%$ ; range=0-14%) of teacher total words. Teachers used an average of six different target words in a session ( $SD=2.73$ ; range=0-

11). Percentage of teacher different words that were targets was 4.7% (SD=3.0%, range=0-14%). See Table 4 for descriptive data of teacher measures.

On average, teachers used a total of 8.81 sophisticated words in each session. Sophisticated words comprised an average of 1.8% (SD=1.5%, range=0-6%) of all words used by teachers in sessions. An average of 3.04 (SD=1.83; range=0-9) different sophisticated words was used in each session. On average, 2.4% (SD 1.4%; range=0-6%) of the number of different teacher words in each session were sophisticated words.

Teacher use of vocabulary supports and use of vocabulary in related contingent turns were variable. Teachers, on average, used 11.67 vocabulary supports in each session (SD=7.87; range = 1-34). Teachers used marginally more physical supports for vocabulary (e.g., pointing to the object when labeling) than verbal supports ( $M= 5.42$  and  $4.88$  respectively). Combinations of verbal and physical supports were not used often ( $M = 1.38$ ). On average, 52.0% (SD = 18.0%) of teacher utterances with a vocabulary word were accompanied by at least one vocabulary support. However, the percentage of words with vocabulary supports ranged from 13% to 100%, indicating great variability across teachers in their use of supports for vocabulary learning.

Teachers' percentage of vocabulary containing utterances that were related and contingent was similar across target and sophisticated vocabulary. On average, teachers used 8.42 different target words (SD=6.36; range=0-23) in related turns; about one-third of their uses of target words occurred in related turns. In terms of all vocabulary use, when teachers had utterances with vocabulary words, these were related turns 38.6% (SD=22.9%; range=0-83%) of the time. Teachers on average used 3.67 sophisticated



Table 4  
*Teacher Language Use*

| Vocabulary Input                         | <i>M</i> | <i>SD</i> | Range     |
|--|----------|-----------|-----------|
| MLUm                                     | 6.33     | 1.02      | 4.77-9.69 |
| NTW                                      | 518.50   | 161.52    | 236-878   |
| NDW                                      | 132.42   | 27.86     | 65-179    |
| Target words: Total                      | 23.38    | 14.57     | 0-57      |
| Target words: Number of different        | 6.00     | 2.73      | 0-11      |
| Sophisticated words: Total               | 8.81     | 7.19      | 0-31      |
| Sophisticated words: Number of different | 3.04     | 1.83      | 0-9       |
| Vocabulary supports                      | 11.67    | 7.87      | 1-34      |
| Target words: Related                    | 8.42     | 6.36      | 0-23      |
| Sophisticated words: Related             | 3.67     | 3.62      | 0-19      |
| Language Input                           | <i>M</i> | <i>SD</i> | Range     |
| Complex syntax: Total                    | 24.55    | 10.30     | 8-49      |
| Complex syntax: Number of different      | 7.09     | 2.08      | 3-12      |
| AAVE: Total                              | 10.93    | 9.88      | 1-41      |
| AAVE: Number of different                | 2.95     | 1.50      | 1-8       |

*Note.* MLUm=mean length of utterance in morphemes; NTW = number of total words; NDW = number of different words

words (SD=3.62; range=0-19) in related turns; about 43.0% (SD=33.2%; range=0-100%) their use of sophisticated vocabulary was in related turns.

### **Teacher Complex Syntax Use**

Teachers' complex syntax use in EMT sessions varied in terms of total features used and number of different features used. On average, teachers used 7.09 (SD=2.08) different complex syntax features, ranging from 3 to 12 features. On average, teachers used 24.55 total features of complex syntax ranging from 8 to 49. Of teachers' total utterances, an average 22.3% contained at least one feature of complex syntax (SD=9.2%; range=8-47%). The distributions of number of different features of complex syntax and total complex syntax features used by teachers approximated normal distributions. The features used most frequently were: a) simple infinitive, which include a verb infinitive and both the main verb and infinitive have the same subject (e.g., "He doesn't to leave the house"); and b) the let's infinitive feature in which let, let's or let me proceed the main clause (e.g., "Let's make a cake"). Simple infinitives were used by 100% of teachers and let's infinitives were used by 85% of teachers.

### **Teacher AAVE Use**

Teachers AAVE use in sessions varied in terms of total use and number of different types of AAVE features. On average, teachers used 2.95 (SD = 1.50) different AAVE features (range=1-8). Each teacher used at least one AAVE feature during her

session. Seventeen teachers produced only 2 different AAVE features, the mode of the distribution, and 75% of teachers used fewer than 4 different features in a session. Teachers used 10.93 (SD=9.88) total AAVE features ranging from 1 to 41. On average, 9% of teachers' total utterances contained an AAVE feature (SD=6.1%; range=1-24%). The most frequent number of total features produced in sessions were 2 and 5 (N=5 each) and 75% of teachers used less than 16 total features. The features used most frequently were zero copula, in which verb forms of *to be* are not used (e.g., "they not done") and subject-verb variation, in which the subject and verb differ in either number or person (e.g., "I knew you was going to be late"). Zero copula was used by 90% of teachers, while subject-verb variation was used by 64% of teachers.

### **Child Language Use**

**Data from EMT sessions.** Within the EMT sessions, children used an average of 48.80 different words (SD=22.26; range=15-97) and had an average MLUm of 3.41 (SD=.80; range=1.65-5.21). Children used fewer vocabulary words than their teachers in the EMT sessions (48.40 vs. 132.42) and had lower MLU's (3.41 vs. 6.33). Children used an average of 4.16 (SD=3.76) total target words per session with a range of 0 to 12.58. Target words comprised an average of 5.3% of child total words (SD=5.3%; range=0-24%). On average, children used 2.71 different target words (range=0-8.17) in the EMT session; an average of 6.5% of their number of different words were different target words (SD=5.8%; range=0-30%). Despite the lower number of words used by children when compared to teachers, their percentages of total and different words that were target

words were similar (5.3% vs. 4.7% for total words; 6.5% vs. 4.7% for number of different words). Table 5 displays the descriptive data for child measures.

Children used an average of 1.17 (SD=1.47) sophisticated words per session ranging from 0 to 7 which was 1.4% of their total number of words (SD=1.7%; range=0-6%). Of the total number of different words, their number of different sophisticated words comprised 2.0% (SD=2.4%; range=0-9%). On average, children used .91 (SD=1.01; range=0-4.00) different sophisticated words per sessions. As with target vocabulary, child percent use of sophisticated vocabulary approximated that of teachers although they used a smaller number of sophisticated words (1.4% vs. 1.8% of total words; 2.0% vs. 2.4% of number of different words).

During the EMT session, average child use of different types of complex syntax features was 1.12 (SD=1.38), ranging from 0 to 6. Average child total use of complex syntax features was 1.77 (SD=2.57), ranging from 0 to 13. The distributions of child total features and number of different features were both positively skewed. Approximately 38% of children did not use any complex syntax in the session. Similar to the teachers, the feature most used by children was simple infinitive (36% of children used this feature). The second most common feature used by children was clauses joined by conjunctions (e.g., I like babies, but I love play dough). This feature was used by 18.9% of children. Of children's total utterances, 3.8% contained at least one feature of complex syntax (SD=5.0%; range=0-22%) compared to 23.4% of teacher total utterances.

Children used fewer AAVE features than their teachers. Average child number of different AAVE features was 1.98 (SD=1.72, range=0-7), and average child total use of

Table 5  
*Child Language Use*

*EMT Session Data*

| Language Measure                         | <i>M</i> | <i>SD</i> | Range   |
|--|----------|-----------|---------|
| MLUm                                     | 3.41     | .79       | 0-5.2   |
| NTW                                      | 97.55    | 56.91     | 18-265  |
| NDW                                      | 48.80    | 22.26     | 15-97   |
| Target words: Total                      | 4.16     | 3.76      | 0-12.58 |
| Target words: Number of different        | 2.71     | 2.15      | 0-8.17  |
| Sophisticated words: Total               | 1.17     | 1.47      | 0-7     |
| Sophisticated words: Number of different | .91      | 1.01      | 0-4     |
| Complex syntax: Total                    | 1.77     | 2.57      | 0-13    |
| Complex syntax: Number of different      | 1.12     | 1.38      | 0-6     |
| AAVE: Total                              | 3.80     | 4.14      | 0-18    |
| AAVE: Number of different                | 1.98     | 1.72      | 0-7     |

*Language Sample Data*

| Language Measure                    | <i>M</i> | <i>SD</i> | Range     |
|-------------------------------------|----------|-----------|-----------|
| MLUm                                | 5.70     | 1.29      | 3.24-9.54 |
| NTW                                 | 862.32   | 353.39    | 69-1728   |
| NDW                                 | 94.94    | 17.99     | 51-137    |
| Complex syntax: Total               | 5.81     | 5.16      | 0-22      |
| Complex syntax: Number of different | 3.08     | 2.12      | 0-10      |
| AAVE: Total                         | 20.10    | 8.76      | 0-41      |
| AAVE: Number of different           | 6.23     | 1.95      | 0-10      |

*Note.* MLUm=mean length of utterance in morphemes; NTW = number of total words; NDW = number of different words

AAVE features was 3.80 (SD=4.14, range=0-18). More than 75% of children used one or no features. Seventy percent of children used the zero copula and 38% used the subject-verb variation. Of children's total utterances, 6.7% contained at least one AAVE feature (SD=5.7%; range=0-28%). Approximately 18% of children did not use any features of AAVE in the session compared to 0% of teachers who did not use any AAVE features.

**Data from language samples.** During the post-test language sample, children used an average of 94.94 different words in 50 utterances (SD=17.99; range=51-137). Their average MLUm was 5.70 (SD=1.29; range=3.24-9.54).

During the language sample, children used an average of 5.81 total features of complex syntax (SD=5.16; range=0-22) and 3.08 different features of complex syntax (SD=2.12; range=0-10). Children used at least one complex syntax feature in 10.54% of their utterances. As with the session data, a positively skewed distribution was evident for both the child total and number of different complex syntax features. Seventy-five percent of children used less than eight total features of complex syntax, and 75% of children used four or less different features of complex syntax in their language samples.

Children used an average of 20.10 total features of AAVE (SD=8.76; range=0-41) and 6.23 different features of AAVE (SD=1.95; range=0-10) during the first 50 utterances selected from their post-test language samples. On average, children used at least one feature of AAVE in 35.46% of their utterances. The distributions of the number of different and total AAVE features used across children were relatively normal.

The correlations among child complex syntax and AAVE measures reveal interesting patterns (see Appendix I). The number of different and total features of complex syntax used in the EMT session correlated significantly with complex syntax

measures from the post-test language sample( $r=.40$ ,  $p<.01$  for number of different features;  $r=.45$ ,  $p<.01$  for total features). Additionally, the number of different and total number of complex syntax features used in the EMT session correlated significantly s) with measures of total and number of different AAVE features used within the session( $r=.39$ ,  $p<.01$  for number of different features;  $r=.45$ ,  $p<.01$  for total feature. The number of different and total number of features of AAVE in the EMT sessions was not significantly correlated with AAVE measures in the language sample. However, the number of different and total number of AAVE features in the EMT session did correlate significantly) with measures of complex syntax in language sample( $r=.41$ ,  $p<.01$  for number of different features;  $r=.29$ ,  $p<.05$  for total features).

**Standardized measures.** The average raw score on the post-test PPVT-4 was 59.17 (SD=13.19) and the range was 29 to 89 indicating wide variability in child performance. The raw scores were lower than expected for children who averaged 62.10 months at the post test. (A standard score of 100 at this age would be a raw score of 84). On average children gained 14.46 (SD=10.14) points from pre to post testing. On the post-test EVT-2, the average raw score was 50.77 (SD=7.88) with a range of 28 to 67. EVT scores were also lower than expected for a typically performing child. (A standard score of 100 at this age would be a raw score of 65). On average children gained 13.90 (SD=8.44) points from pre to post testing.

## **Relationship between Teacher Input and Child Outcomes**

**Teacher vocabulary.** Within the EMT sessions, child use of target vocabulary was significantly related to teacher use of target words when controlling for child age at session and number of different words used on the pretest language sample. The results of the model are summarized in Table 6. For every additional teacher target word used, child target vocabulary increased by .16 words ( $SE = .03, p < .000$ ). The relationship between teacher use of sophisticated words and child use of sophisticated words was marginally significant. For every additional teacher sophisticated word used, child sophisticated word use within the EMT session increased by .05 words ( $SE = .03, p = .07$ ). Table 7 displays results for the analysis of sophisticated vocabulary use.

The relationship between teacher target vocabulary word use and child number of different words during the posttest language sample was not significant ( $SE = .17, p = .17$ ) when controlling for child age at session and number of different words on the pretest language sample. The relationship between teacher sophisticated vocabulary use and child sophisticated vocabulary use approached marginal significance. For every one word increase in teacher sophisticated vocabulary use, child vocabulary use in the language sample increased by .51 words ( $SE = .33, p = .13$ ).

There were no significant relationships between the teacher target or sophisticated vocabulary use and the child raw scores on the posttest EVT-2 ( $p = .46$  for target words;  $p = .81$  for sophisticated words). There was a negative relationship which approached marginal significance between teacher total number of target words and the PPVT-4. For every one word increase in teacher target vocabulary input, there was a decrease in child



Table 6  
*Mixed Linear Models Results: Teacher Target Vocabulary*

| <u>Child outcome</u> | <u>Teacher target vocabulary</u> |     |      | <u>Pretest</u>    |     |      | <u>Child age</u>  |     |     |
|----------------------|----------------------------------|-----|------|-------------------|-----|------|-------------------|-----|-----|
|                      | Estimated $\beta$                | SE  | p    | Estimated $\beta$ | SE  | p    | Estimated $\beta$ | SE  | p   |
| Target vocabulary    | .16****                          | .03 | .000 | .01               | .02 | .81  | -.09              | .13 | .46 |
| LS NDW               | .23                              | .17 | .17  | .46****           | .12 | .001 | -.15              | .68 | .82 |
| PPVT-4               | -.15                             | .09 | .11  | .66****           | .10 | .000 | .44               | .40 | .27 |
| EVT-2                | -.05                             | .07 | .46  | .41****           | .10 | .001 | .40               | .28 | .16 |

*Note.* LS=language sample, NDW=number of different words  
 \*p<.10, \*\*p<.05, \*\*\*p<.01, \*\*\*\*p<.001

Table 7  
*Mixed Linear Models Results: Teacher Sophisticated Vocabulary*

| <u>Child outcome</u> | <u>Sophisticated vocabulary</u> |     |     | <u>Pretest</u>    |     |      | <u>Child age</u>  |     |     |
|----------------------|---------------------------------|-----|-----|-------------------|-----|------|-------------------|-----|-----|
|                      | Estimated $\beta$               | SE  | p   | Estimated $\beta$ | SE  | p    | Estimated $\beta$ | SE  | p   |
| Sophisticated words  | .05*                            | .03 | .07 | -.00              | .01 | .62  | -.04              | .06 | .46 |
| LS NDW               | .51                             | .33 | .13 | .47*****          | .13 | .000 | -.05              | .66 | .94 |
| PPVT-4               | -.30                            | .19 | .12 | .68*****          | .11 | .000 | .28               | .40 | .49 |
| EVT-2                | -.03                            | .13 | .81 | .40****           | .11 | .001 | .37               | .28 | .19 |

*Note.* LS=language sample, NDW=number of different words  
 \*p<.10, \*\*p<.05, \*\*\*p<.01, \*\*\*\*p<.001

PPVT-4 raw score of .15 points ( $SE = .09$ ;  $p=.11$ ). The relationship between teacher sophisticated vocabulary use was also negative and approached marginal significance ( $p=.12$ ), with every one word increase in sophisticated words equating to a .30 point decrease ( $SE=.19$ ) in the PPVT-4 raw score.

Teacher use of vocabulary supports was significantly related to child use of target words within the EMT sessions. See Table 8 for the results of the vocabulary supports analysis. For every additional teacher vocabulary support, child target vocabulary use increased by .25 words ( $SE=.06$ ;  $p<.00$ ). The relationship between teacher use of vocabulary supports and sophisticated vocabulary use by children in the EMT session was nonsignificant. The relationships between vocabulary supports and child NDW in the language sample approached marginal significance. For every additional teacher vocabulary support, child number of different words on the language sample increased by .46 words ( $SE=.29$ ;  $p=.13$ ). The relationship between teacher supports and child EVT-2 was nonsignificant. Teacher vocabulary supports were significantly negatively related to child PPVT-4 raw scores. For every additional teacher vocabulary support, child post test PPVT-4 raw score decreased by .41 ( $SE=.16$ ;  $p<.05$ ).

The number of teacher vocabulary words used in related utterances followed a similar pattern to the teachers' overall use of vocabulary. Tables 9 and 10 list the results for the analyses of target and sophisticated vocabulary use in related turns. For every additional target word used in a related utterance, child target vocabulary use during EMT sessions increased by .39 ( $SE=.07$ ;  $p<.00$ ) which was more than the effect of teacher use of vocabulary in any utterance (.16 words for each additional vocabulary

Table 8  
*Mixed Linear Models Results: Teacher Vocabulary Supports*

| <u>Child outcome</u>     | <u>Vocabulary supports</u> |     |      | <u>Pretest</u>    |     |      | <u>Child Age</u>  |     |     |
|--------------------------|----------------------------|-----|------|-------------------|-----|------|-------------------|-----|-----|
|                          | Estimated $\beta$          | SE  | p    | Estimated $\beta$ | SE  | p    | Estimated $\beta$ | SE  | p   |
| Target vocabulary        | .25****                    | .06 | .000 | -.00              | .02 | .96  | -.03              | .13 | .80 |
| Sophisticated vocabulary | .04                        | .03 | .18  | -.05              | .01 | .72  | -.05              | .06 | .40 |
| LS NDW                   | .46                        | .29 | .13  | .48****           | .13 | .000 | -.11              | .67 | .87 |
| PPVT-4                   | -.41**                     | .16 | .01  | .67****           | .10 | .000 | .39               | .38 | .31 |
| EVT-2                    | -.01                       | .12 | .97  | .38****           | .12 | .002 | .39               | .29 | .18 |

*Note.* LS=language sample, NDW=number of different words  
 \*p<.10, \*\*p<.05, \*\*\*p<.01, \*\*\*\*p<.001

Table 9  
*Mixed Linear Models Results: Teacher Target Vocabulary in Related Utterances*

| <u>Child outcome</u> | <u>Target vocabulary in related turns</u> |     |      | <u>Pretest</u>    |     |      | <u>Child age</u>  |     |     |
|----------------------|---|-----|------|-------------------|-----|------|-------------------|-----|-----|
|                      | Estimated $\beta$                         | SE  | p    | Estimated $\beta$ | SE  | p    | Estimated $\beta$ | SE  | p   |
| Target vocabulary    | .39****                                   | .07 | .000 | .02               | .02 | .43  | -.00              | .12 | .95 |
| LS NDW               | .26                                       | .39 | .52  | .45****           | .13 | .001 | .02               | .67 | .97 |
| PPVT-4               | -.38*                                     | .21 | .07  | .64****           | .10 | .000 | .38               | .39 | .34 |
| EVT-2                | -.03                                      | .16 | .85  | .40****           | .11 | .001 | .36               | .27 | .19 |

*Note.* LS=language sample, NDW=number of different words  
 \*p<.10, \*\*p<.05, \*\*\*p<.01, \*\*\*\*p<.001

Table 10

*Mixed Linear Models Results: Teacher Sophisticated Vocabulary in Related Utterances*

| <u>Child outcome</u>        | <u>Sophisticated</u><br><u>vocabulary in related</u> |     |      | <u>Pretest</u>       |     |      | <u>Child age</u>     |     |     |
|-----------------------------|--|-----|------|----------------------|-----|------|----------------------|-----|-----|
|                             | Estimated<br>$\beta$                                 | SE  | p    | Estimated<br>$\beta$ | SE  | p    | Estimated<br>$\beta$ | SE  | P   |
| Sophisticated<br>vocabulary | .17***   | .05 | .003 | -.00                 | .01 | .66  | -.04                 | .05 | .46 |
| LS NDW                      | 1.06   | .64 | .10  | .47*****             | .12 | .000 | .09                  | .66 | .90 |
| PPVT-4                      | -.71**   | .35 | .05  | .65*****             | .10 | .000 | .26                  | .39 | .50 |
| EVT-2                       | .04  | .27 | .89  | .40                  | .11 | .001 | .36                  | .28 | .20 |

*Note.* LS=language sample, NDW=number of different words

\*p<.10, \*\*p<.05, \*\*\*p<.01, \*\*\*\*p<.001

word;  $SE = .03$ ,  $p < .000$ ). For every additional sophisticated word used by teachers in a related turn, child sophisticated vocabulary increased by  $.17$  ( $SE = .05$ ,  $p < .01$ ) during EMT sessions. Teacher use of target words in related utterances was not significantly related to child outcomes in the language sample. For every additional sophisticated word used by the teacher in a related turn, child number of different words on the post-test language sample was relatively large, an increase of  $1.06$  ( $SE = .64$ ). However, this relationship only approached marginal significance ( $p = .10$ ). There were no significant relationships between target words or sophisticated words in related turns and the EVT-2. As with the general use of vocabulary, the teacher use of target and sophisticated vocabulary in related turns was negatively related to child PPVT-4 scores. For every additional target word used by the teacher in a related turn, child PPVT-4 scores decreased by  $.38$  points ( $SE = .21$ ;  $p = .08$ ). For every additional sophisticated word used by the teacher in a related turn, child PPVT-4 scores decreased by  $.71$  points ( $SE = .35$ ;  $p = .05$ ).

**Complex syntax.** When controlling for age and pretest (complex syntax use on the pretest language sample), there was a significant relationship between teacher use of different complex syntax types and child use of different complex syntax types within the EMT sessions. For every additional teacher different complex syntax feature, child different features in the session increased by  $.22$  ( $SE = .09$ ,  $p < .05$ ). The relationship between teacher total number of complex syntax features and child total number of complex syntax features within the EMT session approached marginal significance. For every additional complex syntax feature used by teachers, child total complex syntax increased by  $.05$  ( $SE = .03$ ;  $p = .13$ ).

There was some indication of relationships between teacher use of complex syntax in the session and child use of complex syntax on the post-test language sample. For every additional different feature of complex syntax used by the teacher in the EMT session, the child use of different features of complex syntax increased by .19 (SE=.12,  $p=.09$ ). The relationship between the total number of teacher uses of complex syntax and child total number of uses of complex syntax on the post test language sample was nonsignificant. See Table 11 for the results of the complex syntax analyses.

**AAVE.** Neither teacher number of different AAVE features nor total number of AAVE features used were related to number of child AAVE uses during the EMT session when controlling for age and pretest (AAVE use on the pretest language sample). Controlling for the same variables, teacher total use of AAVE features during the EMT session was significantly related to child total use of AAVE features on the post-test language sample. For every additional AAVE feature used by teachers in sessions, child total use of AAVE features on the language sample increased by .26 (SE=.12;  $p=.04$ ). The relationship between teacher number of different AAVE features in the EMT session and child number of different AAVE features in the language sample was not significant. See Table 12 for the results of AAVE analyses.

In summary, the findings of this study suggest moderately strong relationships between features of teacher vocabulary and complex syntax and child vocabulary and complex syntax use within teacher-child EMT sessions (proximal measures of child outcomes). Only teacher use of sophisticated words was related to child language measures in the language sample setting. The relationship between teacher vocabulary in related turns and child vocabulary was somewhat stronger than the relationship between more general



teacher vocabulary measures. Similar to the findings for vocabulary, teacher use of complex syntax was related to child use within the EMT sessions. In addition, complex syntax use by teachers in the EMT sessions was related to use of complex syntax by children on the post-test language sample. Teacher use of AAVE and child use of AAVE were not significantly related in the immediate EMT session context, but a relationship existed between teacher use of AAVE in the session and child use of AAVE on the post-test language sample. A negative association between teacher target and sophisticated vocabulary use and child performance on PPVT-4 was found, although no significant relationships were found between teacher vocabulary use in the EMT sessions and EVT-2 scores.

Table 11  
*Mixed Linear Models Results: Teacher Complex Syntax*

| <u>Complex syntax</u><br><u>features</u> | <u>Child outcome</u> | <u>Total Features</u> |     |     | <u>Pretest</u>       |     |      | <u>Child age</u>     |     |     |
|--|----------------------|-----------------------|-----|-----|----------------------|-----|------|----------------------|-----|-----|
|  |                      | Estimated<br>$\beta$  | SE  | p   | Estimated<br>$\beta$ | SE  | p    | Estimated<br>$\beta$ | SE  | P   |
| Total                                    |                      |                       |     |     |                      |     |      |                      |     |     |
|  | Session total        | .05                   | .03 | .13 | .26*                 | .13 | .06  | .09                  | .09 | .30 |
|  | LS total             | .09                   | .07 | .20 | .80***               | .27 | .005 | -.03                 | .18 | .85 |
| Number of<br>different                   |                      |                       |     |     |                      |     |      |                      |     |     |
|  | Session total        | .22**                 | .09 | .02 | .27*                 | .13 | .05  | .00                  | .05 | .92 |
|  | LS total             | .19*                  | .11 | .09 | .86*****             | .17 | .000 | -.02                 | .06 | .71 |

*Note.* LS=language sample  
 \*p<.10, \*\*p<.05, \*\*\*p<.01, \*\*\*\*p<.001

Table 12  
*Mixed Linear Models Results: Teacher AAVE*

| <u>AAVE</u><br><u>features</u> | <u>Child</u><br><u>outcome</u> | <u>Total features</u> |     |     | <u>Pretest</u>    |     |     | <u>Child age</u>  |     |     |
|--------------------------------|--------------------------------|-----------------------|-----|-----|-------------------|-----|-----|-------------------|-----|-----|
|                                |                                | Estimated $\beta$     | SE  | p   | Estimated $\beta$ | SE  | p   | Estimated $\beta$ | SE  | P   |
| Total                          |                                |                       |     |     |                   |     |     |                   |     |     |
|                                | Session total                  | .06                   | .06 | .35 | -.03              | .05 | .54 | -.11              | .15 | .49 |
|                                | LS total                       | .26**                 | .12 | .04 | .20*              | .10 | .06 | -.36              | .33 | .28 |
| Number of different            |                                |                       |     |     |                   |     |     |                   |     |     |
|                                | Session total                  | .17                   | .16 | .30 | .11               | .11 | .33 | -.09              | .07 | .19 |
|                                | LS total                       | -.08                  | .18 | .67 | .07               | .13 | .58 | -.07              | .07 | .33 |

*Note.* LS=language sample  
 \* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$ , \*\*\*\* $p < .001$

## **CHAPTER IV**

### **DISCUSSION**

This study provides descriptive information about teacher language in individual interactions with preschool children with low language skills. The analysis of teacher language revealed considerable variation in teacher linguistic input to children in individualized play sessions. Teachers in this sample typically used few sophisticated words and low numbers of child target vocabulary. They used moderate levels of vocabulary supports, but more than one third of their utterances containing vocabulary were delivered contingent on child interests and activity focus.

Previous research establishing a relationship between teacher language use in individual interactions with children and child language outcomes is supported by several findings of this study. First, a positive relationship between teacher vocabulary input and child immediate vocabulary use was demonstrated. Second, there was less convincing evidence of a positive relationship between teacher vocabulary use and child vocabulary use in the language sampling context. There was evidence of a positive relationship between teacher complex syntax use and child complex syntax use within session and in the language sample context. Teacher use of AAVE features was not related to immediate child use of AAVE. There was some indication that child AAVE use in the language sample context was related to teacher behavior in the EMT sessions. These findings offer further evidence suggesting that teacher linguistic input influences specific aspects of child language use when measured in proximal context and suggests that the influence of

teacher vocabulary and linguistic features extends beyond immediate interaction contexts to language samples. The negative association between teacher vocabulary and child outcomes assessed on the PPVT is difficult to interpret.

The literature on the relationship between teachers' specific vocabulary and child vocabulary is also extended by these findings. Previous research has focused on the relationship between teacher use of rare or sophisticated words and child distal vocabulary outcomes (Dickinson & Tabors, 2001). The relationship which approaches marginal significance between teacher use of sophisticated words and child use of sophisticated words in the language sampling context offers limited support for previous findings. This study also extends previous research on the effects teacher use of target vocabulary and on specific vocabulary use by children within teaching sessions. Previous studies of dialogic reading have demonstrated the positive effects of teacher use of specific target words during book reading interventions with small groups of children on language outcomes including standardized expressive language measures (Lonigan & Whitehurst, 1998). The current study extends the finding of within setting relationships between teacher and child vocabulary to EMT play sessions.

Teachers' use of sophisticated words comprised 0 to 6% of total teacher words. The average teacher used only nine sophisticated words per session compared with approximately 23 target words. Teachers were not taught to use sophisticated word as part of the EMT intervention and a list of sophisticated words was not provided for the teachers. Given that teachers were able to use targeted vocabulary when provided training, appropriate play materials and coaching, it seems likely that such support could be used to increase teacher use of specific sophisticated words. Based on previous

research indicating there is a positive relationship between teacher use of rare or sophisticated words and later child vocabulary and early literacy outcomes (Dickinson & Tabors, 2001), training teachers to use such words should be investigated in future studies.

This study also extends research on teacher vocabulary input by indicating the immediate relationship between teacher use of vocabulary supports and child use of vocabulary. Teachers who used more vocabulary supports to teach or clarify the meanings of target words in EMT sessions had children who used more target vocabulary in sessions. This is the first study with teachers to examine the use of these specific support strategies. Beals (1997) found a significant relationship between family use of vocabulary support strategies at ages 3, 4, and 5 and child vocabulary outcomes at ages 5 and 7. Although the effect of teacher use of vocabulary supports did not extend to PPVT-4 outcomes in the current study, evidence of a relationship between vocabulary supports and child vocabulary outcomes bears further investigation as an intervention strategy.

This study supports the recommendation that teacher's use vocabulary words when following the child's lead. Words modeled in responsive and related teacher utterances were more likely to increase the child's use of these words than the words used in non-related utterances. Over one third of teacher uses of vocabulary were related to the child's previous utterance or action. A relationship between greater use of vocabulary when following the child's lead (related turns) and child vocabulary use in sessions was evident for both target vocabulary and sophisticated vocabulary. Additionally, the relationship between teacher use of sophisticated vocabulary in related turns during EMT sessions and child number of different words on the post-test language sample

approached marginal significance. These findings support previous research which indicates that amount of vocabulary instruction when attending to child interest supports child vocabulary learning (Krcmar, Grela, & Lin, 2007; Valdez-Menchaca & Whitehurst, 1988). Following the child's lead, as measured here by related utterances, is a key premise of EMT and other naturalistic approaches to language intervention (Yoder et al, 1993; Girolametto, 1988) and the current study offers some support for the importance of this approach in intervention.

Despite the demonstration of a relationship between teacher vocabulary and immediate child outcomes, the question remains of how teacher vocabulary use relates to child vocabulary development beyond the direct teacher-child interaction. The marginally significant relationship between the child vocabulary in the naturalistic language sample context and teacher use of vocabulary in individualized sessions suggests there is a relationship to child vocabulary use beyond immediate interaction, but this relationship appears to be weaker than the one observed for within session child vocabulary outcomes. The relationship between teacher input and standardized measures of vocabulary raises concerns about the effectiveness of teacher vocabulary input for effecting changes in these distal measures. The lack of a significant relationship between teacher vocabulary use and supports and child standardized expressive vocabulary outcomes and the negative relationship between teacher input and child standardized receptive vocabulary outcomes indicate that the child vocabulary that is related to the teacher input does not reflect that which is measured in such standardized assessments. Previous research has shown a significant positive relationship between maternal vocabulary input of sophisticated words and age 5 PPVT scores when controlling for

child word production, mother education, and child IQ (Weizman & Snow, 2001). The participants in the Weizman and Snow study mirrored the children in this study and the percentage of maternal sophisticated input was actually less than found in the sessions with teachers (less than 1% across all contexts studied). However, Weizman and Snow did not choose participants who had low language skills as in this study, and the mother-child interactions were studied across five contexts (toy play, magnet play, information book, storybook and mealtime). Additionally, Dickinson and Tabors (2001) reported a significant correlation between teacher number of different sophisticated words and child vocabulary performance on the PPVT ( $r=.28, p<.05$ ). Again the teacher use of sophisticated vocabulary was similar in the two studies (1.3% for free-play in Dickinson & Tabors vs. 1.8% in this study). Although the population in the Dickinson and Tabors study was also primarily low-income children, the children sampled were not identified as having low language skills at the beginning of the study. The positive relationship between adult use of sophisticated vocabulary and standardized receptive vocabulary scores that was found by both Weizman and Snow and Dickinson and Tabors was not replicated in this study. One possible reason is the population sampled in this study was children identified as having low language skills. The minimal amount of sophisticated words presented by the adults and the short sessions sampled in this study may not have provided enough input to support vocabulary learning for these children.

Child vocabulary, as measured by standardized assessments such as the PPVT and EVT, has proven to be a difficult child outcome to effect in preschool classrooms (Farren et al, 2006). The results of a recent meta-analysis analyzing vocabulary outcomes for at-risk children in early childhood are consistent with this finding a large effect size for a



significant, but practically small effect size for interventions effects on standardized child vocabulary outcomes (McLeod & Kaiser, 2010). The results of the meta-analysis indicate an effect size of 1.01 for measures of vocabulary that was taught during the intervention, but effect sizes of only .10 and .21 for receptive and expressive standardized measures respectively. There was a larger effect for measures that were targeted by the intervention, and the large vocabulary effects did not translate to similar differences in standardized testing when comparing the control and intervention groups. Given a similar pattern, but weaker associations in the current study, the question remains how to effectively increase child vocabulary development as measured by standardized assessments through instruction in preschool classrooms.

The descriptive findings about teacher and child use of complex syntax are similar to the results of previous research with low-income African American populations. Craig and Washington (1994) found that simple infinitives were the most common feature used by preschoolers who also use AAVE. The percentage of complex syntax use by children was larger in the Craig and Washington study (8.2%) compared to use of complex syntax by children in this sample (3.8%). Craig and Washington's sample was not limited to children with delayed language skills, as was the population in the current study. The range of complex syntax use by children was similar in the two studies (0-25% in Craig and Washington; 0-22% in this study). Teacher use of multi-clause sentences in the study by Huttenlocher et al. (2002) (M=21%, range=11-32%) was similar to the percent of teacher utterances that contained complex syntax in this study (M=22%, range=8-47%). The population sampled by Huttenlocher et al represented a range of high, middle and

low SES children, although no specific information was given about the teachers' demographic characteristics.

The results of this study indicate that teacher use of complex syntax is related to child use of complex syntax. The relationship between teacher and child complex syntax is evident in proximal measures of child language (within sessions), and in the medial language sample context. Teacher use of different complex syntax features related to child number of different complex syntax features in both the EMT sessions and in the end of the year language sample. There was not a significant relationship between teacher total number of complex syntax features and child total number of features. Huttenlocher et al (2002) also found a relationship between teacher use of complex syntax in the classroom and child complex syntax at the end of the year. However, they analyzed total complex syntax use by teachers as the only variable of interest rather than total use and number of different types, as was done in the current study. While the results from this study and from Huttenlocher et al. (2002) indicate a relationship between teacher syntactic input and child syntax outcomes, based on the results of this study, it appears that the number of different forms rather than total number of uses of complex syntax may be more predictive of child outcomes. Further research is needed to examine the parameters of teacher use of complex syntax that affect child outcomes.

The results related to AAVE use by teachers and children were similar to previous studies on AAVE use. Craig and Washington (1994) found the primary AAVE feature used by adults and children was the zero copula. Unlike Craig and Washington's findings based on caregiver-child interactions, teacher use of AAVE did not relate significantly to child use of AAVE within the EMT sessions. There was evidence of relationship between

teacher total use of AAVE features in the EMT session and child total use of AAVE features in the language sample. The relationship may have not been as apparent in the immediate context because even given 35- 40 sessions which had occurred in this context at the time observation children received much relatively less exposure to teacher language( approximately 6-7 hours) than they received to their parents' language. Children are exposed to parent language from birth, and Craig and Washington's findings could reflect cumulative adult input that children had received for several years. The EMT sample was collected approximately mid-year, but the additional exposures children received by the end of the year may be sufficient to allow detection of the relationship identified on the post-test language sample. .

Additionally, the language sample context was different than the session context on at least two features: 1) quantity of adult input and 2) materials used. Language sample testers were trained to speak minimally and to primarily repeat the child's utterances verbatim to minimize the amount of language input. Theoretically, this gave children more opportunities to speak and sample their language without adult modeling of language. Also, the use of picture cues in the language sample may have influenced the language production differently than the materials used during EMT sessions.

## **Future Research**

The two types of vocabulary explored in this study differ greatly. Target vocabulary teaching focuses on words the child does not already know within the child's vocabulary level, while sophisticated vocabulary teaching supports learning new

vocabulary that is more complex than the most common words used by young children.

The vocabulary selected for teaching is very different in these two approaches.

Additional studies are needed which directly compare these two approaches to selecting vocabulary words for modeling in conversation and for instruction with low language children. Such studies would provide much needed information about how to improve children's vocabulary outcomes which has proven to be challenging in most studies of curriculum and individual interventions.

Future research is also needed to more fully understand how the multiple aspects of teacher linguistic input affect child language outcomes. The analyses in this study indicated a relationship between teacher language input and child outcomes in vocabulary, complex syntax and AAVE. This relationship may be bidirectional, with the child language influencing the teacher language in addition to the teacher influencing the child's language. To explore this possibility, correlations between child pretest measures of language (i.e., NDW on the pretest language sample, PPVT-4 raw score, and EVT-2 raw score) and teacher language use (i.e., target vocabulary, sophisticated vocabulary, and vocabulary supports) and teacher use of language in the EMT sessions were examined. Although, there were no significant correlations between teacher language in the EMT sessions and child pretest scores, this does not rule out a bidirectional relationship between teacher and child language. A directional, causal relationship cannot be determined without conducting randomized trials varying the levels of teacher input to determine effects on child outcome.

## **Limitations**

There are a number of limitations in this study primarily related to the sampling of teacher-child interactions. First, only one sample of the child/teacher interaction was analyzed. One session of the 60 that were completed by the teacher/child dyad may not adequately capture the behavior of either the teacher or the child, and limits the analysis of the relationship between teacher linguistic input and child vocabulary outcomes. Second, there was variability in the sessions sampled. Across the sessions coded for this sample, the use of different play materials and the resulting differences in play schemas may have had specific effects on both teacher and child use of vocabulary. Third, teachers were instructed to teach vocabulary words that the child did not yet know as indicated on the probes. It is unclear the extent to which teachers followed this specific instruction, but it is possible that focusing on target vocabulary may have limited the teachers use of a range of vocabulary words results in a smaller number of different words and less use of sophisticated words. Fourth, teachers were also instructed to use sentences that were similar in length to the child's target language level and to model and prompt target sentences that included vocabulary words. It is possible that teachers may have used shorter sentences, particularly with children with limited language and this may have affected the outcomes in this study. In general, the contributions of child specific targets identified for teaching within the session and play materials are unknown, but may have affected the variability observed in teachers and children.

In addition, although the overall fidelity of EMT was relatively low and child language outcomes were not correlated with teacher fidelity of EMT, teacher attempts to

use EMT strategies may have influenced the findings in the study. Although teachers were not at criterion levels for matched turns and use of expansions, their levels of these behaviors may have been different than levels in typical teacher-child interactions. For example, teachers were highly responsive to children during the EMT sessions (M=99%) and this may have affected the percentage of vocabulary modeled during related turns. Thus, the findings in this study should be considered cautiously because the similarity between these teachers trained in EMT and other samples of teachers of Head Start children is unknown.

The sample of interest in this study was children identified as having low language skills. The relationship between teacher language use and child language outcomes may be different for children with typical language skills enrolled in the same classrooms. As discussed above, teachers may have limited the diversity or complexity of their vocabulary or the complexity of their syntax to match the lower language levels of the children in the study sample. The sample only consisted of low language children who are economically disadvantaged, so the relationship between teacher input and child outcomes may be different for children who have limited language skills due to disabilities and who come from other SES groups.

Another limitation is that individualized play sessions are not the primary interactions experienced by children in early childhood classrooms. This study investigated teacher language use in one context in the preschool classroom, but the majority of interactions in the classroom do not take place in such one-to-one interaction contexts. Children typically are exposed to vocabulary and vocabulary supports across the day in large and small group instruction and in incidental interactions during centers

and other free play contexts. Finally, this sample of teacher-child interaction occurred in the context of implementation of an experimental literacy curriculum concurrent with the EMT sessions. Child language outcomes were influenced by both their individual experiences with teachers and their participation in the curriculum and it is not possible to differentiate fully the contributions of teacher input in these sessions from input in the curriculum intervention.

## **CHAPTER V**

### **CONCLUSION**

The results of this study support previous findings that teacher linguistic input to preschool children influences their immediate and later use of vocabulary, syntax and features of AAVE. The relationship between teacher linguistic input and more distal measures of child language development were not evident in this study. Given the great variability in teacher linguistic input and the unique context that was sampled in this study, additional research is needed to fully understand the process by which teacher linguistic input influences children's learning and use of vocabulary and syntax.

The current finding suggest that training teachers to use targeted vocabulary or rare words may support positive change in child vocabulary use in the classroom and these affects may generalize to measures of child language production in contexts such as languages samples. Additional research is needed to determine if specific changes in teacher vocabulary to include either targeted or sophisticated vocabulary can increase measures child vocabulary on standardized assessments for low language children.

Given these preliminary findings, it is recommended that professionals working with early childhood teachers support teachers in using diverse and complex vocabulary in interactions with young children. Providing lists of vocabulary words, demonstrating strategies for supporting learning the meaning of words, choosing curricula that incorporate vocabulary learning opportunities in multiple classroom activities and training teachers to be responsive in their interactions with children are potential



strategies. Additional research needs to be conducted to better understand how teachers' linguistic input, particularly their vocabulary and syntax use, affects children with low and typical language skills as measured in both proximal and distal contexts.

Appendix A

Complex Syntax Coding

| Definition**  | Example**   | Code   |
|---|---|--|
| Simple infinitive with same subject<br>Utterances containing verb infinitives in which the subject is the same for both the main verb and the infinitive. Those involving early catenatives were not included, for example: <i>gotta, gonna, wanna, hafta, sposta, and fitna</i> , for example: "me and <i>her fitna</i> leave this on".  | "be don't need <b>to stand up</b> "<br>"they was tryin' <b>to get in</b> "  | SI   |
| Simple noninfinitive wh-clause<br>The wh-clause is followed by a subject plus verb, rather than an infinitive verb in the main clause.  | "this <b>where they live at</b> "<br>"I don't know <b>what it called</b> "  | SN   |
| Noun phrase complement<br>Utterances in which a full subject and predicate clause replaces the noun phrase, usually in the object position of the main clause. <i>That</i> may be included or excluded and the main verbs are usually transitive.   | "I told you <b>there's a Whopper</b> "<br>"I think <b>this'll work</b> "  | NP   |
| Let(s)/Lemme and Infinitive<br>Utterances in which let, let's, or lemme introduce the main clause.  | " <b>lemme do it</b> "<br>" <b>lets</b> share these"  | LI   |
| Relative clause<br>Utterances in which a noun or pronoun in the main clause is modified by another clause. These did not include phrase modifications, for example: "the boy <i>in the swimming pool</i> is standing up."   | "that's the noise <b>that</b> I like"<br>"where the ghost <b>you gotta put in?</b> "  | RC   |
| Infinitive with a different subject<br>Utterances containing verb infinitives in which the subject of the infinitive is different from the subject of the   | "the bus driver told the kids <b>to stop</b> "<br>"why you don't want nobody <b>to put</b> it too close to your mouth?"   | ID   |
| Unmarked infinitive<br>Utterances containing infinitive verbs with the <i>to</i> omitted in which the main verb lexically was <i>let, help, make, or watch</i> . Deletions of <i>to</i> judged to be optional omissions and one of the AAE forms were not scored as unmarked infinitives, for example: "he goin' shoppin' ( <i>to</i> ) buy some cameras." Instead, these were scored for the clause structure that would have been assigned if the <i>to</i> had been said.  | "I help ( <b>to</b> ) <b>braid</b> it sometimes"<br>"are you gonna let her ( <b>to</b> ) <b>wear</b> these?"  | UI   |
| Wh-infinitive clause<br>Two clauses linked by a <i>wh-pronoun</i> such as <i>what, when, where, or how</i> , in which an infinitive verb follows the <i>wh-form</i>   | "she know <b>how to do a flip</b> "   | WI   |
| Gerunds and Participles<br>Utterances containing nouns formed from verbs + <i>ing</i> , or adjectives formed from verbs and ending in <i>ed, t, en</i> etc., respectively.  | "they saw <b>splashing</b> "<br>"it get <b>rainy</b> "  | GE, PA   |
| Tag questions<br>Clauses added to the end of the main clause that are all positive or that contrast positive and negative relationships between clauses. These do not include single word tags, such as <i>okay or please</i> .   | "these the french fries, <b>ain't it?</b> "<br>"she got new clothes, <b>don't she?</b> "  | TQ   |
| Clauses joined by conjunctions<br>The combining of clauses using the listed coordinate and subordinate conjunctions to link co-referential nouns in subject or object sentence roles. These did not include phrase or word coordinations, for example: "it's dogs, cat, <i>and</i> another dog" or "me <i>and</i> my Granny do;" nor pragmatic connectives serving as a form to link two turns and appearing in a sentence initial position, for example: "Yeah <i>but</i> don't stick me" in response to an adult question. They did include any clauses with an appropriate subject deletion in one clause when the subject was the same in both clauses, for example: "They sit down <i>and</i> watch people " | <b>and:</b> "this one happy <b>and</b> that one happy"<br><b>but:</b> "I like Michael Jordan <b>but</b> he ain't playin' on the team no more."<br><b>so:</b> "that go right there <b>so</b> it can shoot him"<br><b>if:</b> "nothing can stop me if I got this"<br><b>because:</b> "it ain't gonna come out <b>because</b> it's stuck"<br><b>since:</b> "I'll open the stuff for them <b>since</b> they don't know how to do it"<br><b>before:</b> "put him in there <b>before</b> he comes back out"<br><b>when:</b> " <b>when</b> you done with this you get to play with this one?"<br><b>until:</b> "I didn't know it <b>until</b> my brother said it"<br><b>while:</b> "they could be here <b>while</b> we's fixin' it, can't they?"<br><b>like:</b> " <b>act like</b> we already cook ours" | AND<br>BUT<br>SO<br>IF<br>BECAUSE<br>SINCE<br>BEFORE<br>WHEN<br>UNTIL<br>WHILE<br>LIKE |

Note. Adapted from Washington, J. A., & Craig, H. K. (1994). Dialectal forms during discourse of urban, African American preschoolers living in poverty. *Journal of Speech and Hearing Research, 37*, 816–823.

## Appendix B

### AAVE Coding

| Morphosyntactic AAE feature   | Example  | Code |
|---|--|------|
| Zero copula/auxiliary<br>Copula and auxiliary forms of the verb to be are included variably.                            | I (am) stuck in there.<br>This (is) supposed to be a frog.       | COP  |
| Optional subject–verb agreement<br>Subjects and verbs differ in number marking.   | And then they was splashing the water                            | SVA  |
| Zero past tense<br>Present forms of irregular verbs and marker -ed for regular verbs are used variably.                 | And then he said, he cover(ed) his ears                          | PST  |
| Undifferentiated pronoun case<br>Pronoun case is used interchangeably.  | Yesterday my aunt forgot they lunch                              | UPC  |
| Indefinite article (ART)<br>Regardless of vowel context, a is used instead of an.                                       | He found a(n) elk  | ART  |
| Zero preposition (ZPR)<br>Prepositions are variably included  | He called them out (of) the bushes too.                          | ZPR  |
| Appositive pronoun<br>Two pronouns or the noun and a pronoun are both used.   | The bees they was jumping down                                   | PRO  |
| Zero to<br>The infinitive to is variably included.  | Then he came (to) save him.                                      | ZTO  |
| Existential it<br>It is used in place of there to signify a referent.   | It 'is some rocks, trees, owl, & a a tall tree and a little boy. | EIT  |
| Zero -ing<br>-ing is variably used.   | And they was fall(ing) in the water.                             | ING  |
| Zero plural<br>-s is used variably to mark number.  | So he said, there was the two froggy(ies) that he gotta go in.   | ZPL  |
| Zero possessive<br>-s is variably deleted or case of possessive pronoun is changed; possession is marked by word order. | And he called the frog('s) name                                  | POS  |
| Fitna/sposeta/bouta<br>Used to code imminent action   | And he was bouta fall.   | FSB  |
| Multiple negation<br>Clause may include two or more negatives   | The frog didn't say nothing.                                     | NEG  |
| Invariant be<br>Indicates habitual action or state  | The people be helped by the king                                 | IBE  |
| Ain't<br>Negative auxiliary (e.g., have not)  | That ain't no froggy   | AIN  |
| Regularized reflexive pronoun<br>Variable use of hisself, theyself, theirselves instead of reflexive pronoun            | He told hissself and his dog came here.                          | REF  |

*Note.* Adapted from Connor, C. M., & Craig, H. K. (2006). African American preschoolers' language, emergent literacy skills, and use of African American English: A Complex Relation. *Journal of Speech, Language, and Hearing Research*, 49, 771–792

## Appendix C

### Procedures for the Randomized Control Trial

#### Study Procedures

This larger project involved the comparison of three conditions: *Opening the World of Learning* (OWL; Schickedanz & Dickinson, 2005), OWL curriculum combined with Enhanced Milieu Teaching (EMT; Kaiser, 1993) for low language children, and an enhanced version of *Creative Curriculum* (CC; Dodge, Colker, & Heoman, 2001), the existing literacy program which had been used by the Head Start centers for several years prior to the study. Head Start representatives requested that core elements of the existing curriculum be retained across all conditions; thus, the experimental conditions shared a common classroom schedule, center choices, and certain thematic activities and materials.

Six clusters of Head Start centers including 52 classrooms were randomly assigned to one of the three conditions. Four centers with 17 classrooms participated in the OWL curriculum alone; 4 centers with 19 classrooms participated in OWL + EMT for low language children; and 5 centers with 16 classrooms conducted business as usual and implemented the existing curriculum (CC). After assignment of clusters to condition, 699 children preparing to enter a preschool classroom of three- and four-year-olds within those centers were screened for early expressive and auditory language skills using the Preschool Language Scale 3 (PLS-3; Zimmerman, Steiner & Pond, 1992). In order to be selected for screening, children had to be four years old by September of the upcoming school year. The Head Start agency assigned children to classrooms.

### ***Sample Selection***

***Selection of low language children.*** Following classroom assignments, the research team selected four low language children and four typical language children from each classroom. Based on the PLS-3 total score, children were designated as low language (PLS-3 score  $< 75$ ; more than 1.5 standard deviations below the normative mean) or typical language (PLS-3 score  $> 75$ ). Typical children (PLS-3 scores above 76) were matched to low language children based on gender and age. In the *OWL + EMT* condition some children were moved among classrooms within centers so that four children with low language skills based on the PLS-3 were included in each classroom. All children in every classroom, regardless of their PLS-3 scores, received the treatment in the *OWL* and in the *CC* condition. In the *OWL + EMT* condition, all children received the *OWL* curriculum, but only children with low-language skills received the EMT component.

***RTC sample.*** The original study sample included 491 children for whom pretest information was available from direct assessments of their language and literacy skills or teacher ratings of social skills and behavior. The majority of this sample was African American (97.3%) and from primarily low-income households. This sample consisted of 225 children (129 boys, 96 girls) who were low language (50.2%) and 223 children (111 boys, 112 girls) who were typical language (49.8%). The average age of children at the PLS-3 screening assessment was 53 months.

### **Teacher Training**

Teachers were trained in EMT during large group training sessions conducted before school began in August and during small group sessions during the winter break in January. Each teacher was assigned to an EMT coach (a staff member or graduate student trained in EMT) who observed sessions with individual children conducted in their classrooms an average of 15 times across the school year and provided written and oral feedback after each weekly visit. Teachers reported the number of sessions they completed with each child and received small prizes each time 15 sessions were completed.

### **Videotaping Procedures**

Teachers were video recorded completing EMT sessions with target children a minimum of three times per year.

### **Assessment Procedures**

Speech pathology graduate students were trained to administer all assessments at pre and post testing. Assessors were trained in a two day large group workshop which included PowerPoint presentations, video examples, and opportunities to role play administration of all assessments. Trained speech-language pathologists supervised the administration of assessments and conducted reliability assessments on 20% of all tests.

Appendix D

Sample EMT materials

Book Example

Baby Birthday Party  
Babies Unit 5 Level 1



1

This baby is having a **birthday party!**



2

First, she **colors cards** and then sends them to her **friends**.



3

At the party, the **friends** eat **ice cream** and **blow up balloons**.



4

The **friends** sing the **happy birthday** song.

## Vocabulary Lists for EMT Sessions

| Level 1 Vocabulary |   |  |  |  |   |
|--------------------|---|--|--|--|---|
| <i>Toy Set</i>     | <i>Babies</i>   | <i>Water</i>   | <i>Playdough</i>   | <i>Playhouse</i>   | <i>Transportation</i>   |
| Unit 1             | Baby<br>Eat<br>Drink<br>Bottle<br>Cup<br>Milk<br>Juice<br>Bowl<br>Plate<br>Cereal<br>Cookie<br>Big<br>Little        | Water<br>Bubbles<br>Blow<br>Straw<br>Spoon<br>Soap<br>Shaving Cream<br>Stir<br>Slow<br>Fast<br>Open<br>Pour<br>Spray | Playdough<br>Roll<br>Cookie cutter<br>Knife<br>Push<br>Cut<br>Eyes<br>Tail<br>Animal names<br>Color names                    | House<br>Inside<br>Door<br>Yard<br>Outside<br>Sleep<br>Eat<br>Family<br>Chair<br>Table<br>Stairs<br>Up<br>Down<br>Sit<br>Stand | Put<br>Build<br>Drive<br>Knock down<br>Block<br>Truck<br>Rocks<br>Short<br>Long<br>Blue<br>Red<br>Big<br>Little |
| Unit 2             | Cry<br>Sleep<br>Food<br>Sing<br>Read<br>Mommy<br>Happy<br>Sad<br>Bed<br>Hold<br>blanket                             | Fish<br>Net<br>In<br>Catch<br>Pole<br>On<br>Off<br>Pull<br>In<br>Out<br>Large<br>Small<br>Purple<br>Orange           | Eyes<br>Nose<br>Mouth<br>Hair<br>Black<br>Brown<br>Make<br>Put<br>Boy<br>Girl<br>Head<br>Roll<br>Cut<br>Ears<br>Big<br>Small | Map<br>Truck<br>Bedroom<br>Rug<br>Curtain<br>Kitchen<br>Bathroom<br>Sweep<br>Broom<br>Move                                     | Airplane<br>Fly<br>Train<br>Tracks<br>Ride<br>Drive<br>Go<br>Stop<br>Fast<br>Slow<br>Down<br>Up                 |
| Unit 3             | Wash<br>Dry (verb)<br>More<br>Soap<br>Water<br>Sponge<br>Legs<br>Arms<br>Wet<br>Dry (adj.)<br>Spray<br>Wipe<br>Pour | Picture<br>Rain<br>Spray<br>Squeeze<br>Pour<br>Open<br>Close<br>Paper<br>Tub<br>Wet<br>Dry<br>Markers<br>Paint       | Cake<br>Color words<br>Mix<br>Stir<br>Plate<br>Cut<br>Smell<br>Taste<br>Big<br>Small<br>Roll                                 |  |   |
| Unit 4             | Doctor<br>Sick<br>Medicine<br>Look<br>Band-Aid  | Dirty<br>Clean<br>Blow<br>Soap<br>Splash   | Cut<br>Pizza<br>Inside<br>Outside<br>Cook  |  |   |



|        |  |   |  |  |  |
|--------|--|---|--|--|--|
|        | Shot<br>Hurt<br>Bad<br>Good<br>Head<br>Arm<br>Leg<br>Stomach<br>Listen   | Bathtub<br>Shower<br>Cage<br>Head<br>Body<br>Tail | Cheese<br>Meat<br>Roll<br>Pan<br>Pat<br>Apron<br>Make  |  |  |
| Unit 5 | Mouth<br>Taste<br>Fork<br>Spoon<br>Hungry<br>Thirsty<br>Eat<br>Drink<br>Cookie<br>Smell<br>Milk<br>Juice<br>Cake<br>Nose |   | Snowman<br>Circle<br>Triangle<br>Eyes<br>Hat<br>Buttons<br>Snow<br>Two<br>Three<br>White                   |  |  |
| Unit 6 | Doctor<br>Check<br>Temperature<br>Shot<br>Listen<br>Elbow<br>Knee<br>Heart<br>Sit<br>Stand<br>Lay                        |   | Garden<br>Grass<br>Flower<br>Leaf<br>Worm<br>Dirt<br>Butterfly<br>Dig<br>Water (verb)<br>Grow<br>Flowerpot |  |  |

| Level 2        |  |  |   |  |  |
|----------------|--|--|---|--|--|
| <i>Toy Set</i> | <i>Babies</i>  | <i>Water</i>   | <i>Playdough</i>  | <i>Playhouse</i>   | <i>Transportation</i>  |
| Unit 1         | Hungry<br>Thirsty<br>Feed<br>Fork<br>Spoon<br>Knife<br>Cook<br>Stir<br>Soup<br>Taste<br>Pour<br>Full<br>Empty<br>Vegetables      | Container<br>Inside<br>Outside<br>More<br>Enough<br>Splash<br>Squeeze<br>Washcloth<br>Sponge<br>Wet<br>Dry<br>Clean<br>Dirty | Spots<br>Pat<br>Squeeze<br>Tool<br>Hands<br>Large<br>Small<br>Short<br>Long<br><i>Animal names</i>                            | Kitchen<br>Refrigerator<br>Bathroom<br>Sink<br>Knock<br>Doorbell<br>Dinner<br>Breakfast<br>Groceries<br>Shelf<br>Upstairs<br>High<br>Downstairs<br>Low | Wall<br>Roof<br>Door<br>Window<br>House<br>Construction worker<br>High<br>Low<br>Carry<br>Stack<br>Ax<br>Shovel<br>Dump truck<br>Tow truck |
| Unit 2         | Crying<br>Smiling<br>Tired<br>Hungry<br>Diaper<br>Pajamas<br>Brother<br>Sister<br>Grandma<br>Grandpa<br>Story<br>Music           | First<br>Second<br>Fishing pole<br>Catch<br>Under<br>On top of<br>Swim<br>Sea horse<br>Ray<br>Swordfish<br>Throw             | Face<br>Round<br>Flat<br>Ears<br>Chin<br>Lips<br>Tongue<br>Smile<br>Frown<br>Man<br>Woman<br>Eyes<br>Head<br>Long<br>Short    | Moving van<br>Deliver<br>Directions<br>Address<br>Attic<br>Smaller<br>Bigger<br>Appliances<br>Measure<br>Decorate                                      | Airport<br>Train station<br>Pilot<br>Driver<br>Sky<br>Ground<br>Tunnel<br>Through<br>In front of<br>Next to<br>Two<br>Three                |
| Unit 3         | Body<br>Feet<br>Hands<br>Dirty<br>Clean<br>Bathtub<br>Shower<br>Soft<br>Hard<br>Diaper<br>Pump<br>Wipe<br>Towel<br>Big<br>Little | Rainy<br>Sunny<br>Rain drop<br>Shower<br>Lightning<br>Rainbow<br>Spray bottle<br>Cloud<br>Heavy<br>Light<br>Weather          | Bake<br>Inside<br>Outside<br>Pan<br>Icing<br>Spread<br>Blend<br>Bowl<br><i>Color words</i><br>Large<br>Small<br>Fork<br>Spoon |  |  |
| Unit 4         | Sick<br>Healthy<br>Temperature   | Filthy<br>Spotless<br>Pet owner  | Chop<br>Crust<br>Cheese   |  |  |

|        |   |   |   |  |  |
|--------|---|---|---|--|--|
|        | Hot<br>Cool<br>Hurt<br>Feel<br>Listen<br>Look<br>Shoulder<br>Knee<br>Tissue   | Groomer<br>Scrub<br>Shampoo<br>Soak<br>Rinse<br>Kennel<br>Beak<br>Snout | Sauce<br>Toppings<br>Circle<br>Square<br>Thick<br>Thin<br>Stretch<br>Slice                                      |  |  |
| Unit 5 | Birthday Party<br>Gift<br>Serve<br>Write<br>Draw<br>Fold<br>Card<br>Gingerbread<br>cookies<br>Vanilla<br>Chocolate<br>Fruit Punch<br>Tea<br>Cut                 |   | Bottom<br>Top<br>Middle<br>Tracks<br>Snowball<br>Frozen<br>Melted<br>Scoop<br>Gloves<br>Scarf                   |  |  |
| Unit 6 | Pediatrician<br>Stethoscope<br>Chart<br>Thermometer<br>Blood pressure<br>cuff<br>Soothe<br>Reflex<br>Examine<br>Weight<br>Height<br>Infant<br>Birth certificate |   | Earthworm<br>Plant<br>Soil<br>Watering can<br>Bloom<br>Seeds<br>Bouquet<br>Petal<br>Stem<br>Root<br>Garden hose |  |  |

Appendix E  
**Coding for Vocabulary Supports**

**Child Codes**

[suu] – sophisticated unique word unprompted  
[sui] - sophisticated unique word imitated  
[sup] - sophisticated unique word prompted  
[snu] – sophisticated not-unique word unprompted  
[sni] - sophisticated not-unique word imitated  
[snp] - sophisticated not-unique word prompted  
[tuu] – target unique word unprompted  
[tui] – target unique word imitated  
[tup] - target unique word prompted  
[tnu] – target non-unique word unprompted  
[tni] - target non-unique word imitated  
[tnp] – target non-unique prompted  
[tsuu] – target/sophisticated unique word unprompted  
[tsui] – target/sophisticated unique word imitated  
[tsup] – target/sophisticated unique word prompted  
[tsnu] – target/sophisticated non-unique word unprompted  
[tsni] – target/sophisticated non-unique word imitated  
[tsnp] – target/sophisticated non-unique word prompted

Variables: Child Vocabulary

- a. Number of total target vocab words= [tu] + [tn]
- b. Number of different target vocab words = [tu]
- c. Number of total sophisticated words = [su] + [sn] +[tsn] +[tsu]
- d. Number of different sophisticated words= [su] +[tsu]

Other codes:

[t] – adult action the child imitated  
[n] – no response to an adult prompt  
[x] – unintelligible

**Adult Codes**

Variables: Adult EMT

% of adult turns that are matched  
% of child utterances to which the adult failed to respond  
% of child utterances expanded  
% of episodes with a \_\_\_\_ or higher

**Adult Codes: Vocabulary**

| <i>1<sup>st</sup> Code: Matched turns</i>                 |
|---|
| [mntv]] – matched turn not vocab target                   |
| [mtsu] – matched turn sophisticated unqieue               |
| [mtsn] – matched sophisticated not-unique                 |
| [mttu]- matched target unique                             |
| [mttn]- matched target not-unique                         |
| [utnv] – unmatched turn no vocab target                   |
| [utsu] – unmatched turn sophisticated unqieue             |
| [utsn] – unmatched sophisticated not-unique               |
| [uttu]- unmatched target unique                           |
| [uttn]- unmatched target not-unique                       |
| [mttasu] – matched turn target and sophisticated unique   |
| [mttasn] – matched turn target/sophisticated not-unique   |
| [uttasu] – unmatched turn target/sophisticated unique     |
| [uttasn] – unmatched turn target/sophisticated not unique |

| <i>2<sup>nd</sup> Code: Vocabulary</i>                | <i>3<sup>rd</sup> Code: Support Strategy</i><br>(coded only if used with a sophisticated or target vocabulary word)    |
|---|--|
| [sur] – sophisticated unique word - related           | [phr] Physical support and no other strategy – related   |
| [sun] – sophisticated unique word – not related       | [phn] Physical support and no other strategy – not related   |
| [snr] - sophisticated not-unique word related         | [enr] Expansion no physical - related  |
| [tur] – target unique word - related                  | [enn] Expansion no physical – not related  |
| [tun] – target unique word – no related               | [epr] Expansion physical - related   |
| [tnr] – target non-unique word - related              | [epn] Expansion physical- not related  |
| [tnn] – target non-unique word – not related          | [dnre] Definition contextualized (synonym, antonym, definition, connection to life) no physical – related, expanded    |
| [tasun] – target/sophisticated unique not related     | [dnrn] Definition contextualized (synonym, antonym, definition, connection to life) no physical –elated, not expanded. |
| [tasur] – target/sophisticated unique related         | [dnn] Definition contextualized (synonym, antonym, definition, connection to life) no physical – not related           |
| [tasnn] – target/sophisticated not unique not related | [dpre]Definition contextualized (synonym, antonym, definition, connection to life) physical –related, expanded         |
| [tasnr] – target/sophisticated not unique related     | [dprn]Definition contextualized (synonym, antonym, definition, connection to life) physical –related, not expanded     |
|   | [dpn] Definition contextualized (synonym,  |

|  |  |
|--|--|
|  | antonym, definition, connection to life)<br>physical – not related |
|  | [pnr] Prompt no physical – related                                 |
|  | [pnn] Prompt no physical – not related                             |
|  | [ppr] Prompt physical - related                                    |
|  | [ppn] Prompt physical - not related                                |
|  | [nsr] No strategy but used the word –<br>related                   |
|  | [nsn] No strategy but used the word – not<br>related               |

\* physical support = point, show, given, any gesture that supports the vocabulary word (e.g., acting out the action).

\*\*if the teacher uses the definition contextualized as an expansion, code as definition.

*Example.* C car.  
A a car is something you drive

#### Variables: Adult Vocabulary

- a. Number of total target vocab words= [tu] + [tn]
- b. Number of different target vocab words = [tu]
- c. Number of total sophisticated words = [su] + [sn]
- d. Number of different sophisticated words= [su]
- e. % of matched turns that contain a target or sophisticated word
- f. Number of vocabulary words taught in a matched turn
  - a. different sophisticated words used
  - b. Total sophisticated words used
  - c. Different target words used
  - d. Total target words used
- g. Number of vocabulary words taught in an unmatched turn
  - a. different sophisticated words used
  - b. Total sophisticated words used
  - c. Different target words used
  - d. Total target words used
- h. Number of vocabulary words taught in a related utterance
  - a. different sophisticated words used
  - b. Total sophisticated words used
  - c. Different target words used
  - d. Total target words used
- i. Number of vocabulary taught in an unrelated utterance
  - a. different sophisticated words used
  - b. Total sophisticated words used
  - c. Different target words used
  - Total target words used
- j. % of vocabulary words taught in
  - a. Related vs. not related utterances
  - b. Matched vs. unmatched turns
  - c. Using or not using a vocabulary strategy

- k. Number of each of the strategies used:
  - a. Physical only- total, related, not-related (physical strategy)
  - b. Verbal only – total, related, not-related (verbal strategy)
  - c. Verbal + physical – total, related, not-related
  - d. Labeling - total, related, not-related (verbal strategy)
  - e. Expansions - total, related, not-related (verbal strategy)
  - f. Definition contextualized- total, related, not-related (verbal strategy)
  - g. Prompt- total, related, not-related (verbal strategy)
- l. Within each of these strategies (physical to prompting), the number of
  - a. different sophisticated words used
  - b. Total sophisticated words used
  - c. Different target words used
  - d. Total target words used

*Example:* the teacher used verbal with physical to teach 3 different sophisticated words, 5 total sophisticated words, 4 different target words and 8 total target words.

*Example:* teachers who used
- m. Within each of the targets (different sophisticated, different target, total sophisticated, total target), the types of support strategies used:
  - a. Physical only
  - b. Verbal only
  - c. Verbal + physical
  - d. Labeling
  - e. Expansions
  - f. Definition contextualized
  - g. Prompt

*Example:* the teacher used 3 different support strategies to teach 10 different target vocabulary words.

Other codes:

- [p] – no opportunity for the adult to respond
  - [n] – the adult fails to respond to the child’s previous utterance
  - [x] – unintelligible
  - [i] – mirroring
  - [d] – time delay
- Milieu episode codes

## Appendix F

### Expanded Dale-Chall Word List

|             |            |               |            |              |
|-------------|------------|---------------|------------|--------------|
| a           | advice     | alone         | aping      | atlases      |
| able        | afford     | along         | apiece     | attack       |
| abler       | affords    | alongside     | appear     | attacks      |
| ablest      | afforded   | aloud         | appears    | attacked     |
| aboard      | affording  | alphabet      | appeared   | attacking    |
| about       | afraid     | alphabets     | appearing  | attend       |
| above       | after      | already       | applause   | attends      |
| absent      | afternoon  | also          | apple      | attended     |
| accept      | afternoons | always        | apples     | attending    |
| accepts     | afterward  | am            | April      | attention    |
| accepted    |            | amaze         | apron      | attentions   |
| accepting   | afterwards | amazes        | aprons     | August       |
| accident    | again      | amazed        | are        | aunt         |
| accidents   | against    | amazing       |            | aunts        |
| account     | age        |               | aren't     | author       |
| accounts    | ages       | amazement     | area       | authors      |
| accounted   | aged       | America       | areas      | authored     |
| accounting  | aging      | Americas      |            | authoring    |
| ache        | ago        | American      | arise      | auto         |
| aches       | agree      | Americans     | arises     | autos        |
| ached       | agrees     | among         | arose      | automobile   |
| aching      | agreed     | amount        | arising    | automobiles  |
| acid        | agreeing   | amounts       | arithmetic | autumn       |
| acids       | ahead      | amounted      | arm        | autumns      |
| acorn       | aid        | amounting     | arms       | avenue       |
| acorns      | aids       | an            | armed      | avenues      |
| across      | aided      | and           | arming     | awake        |
| act         | aiding     | angel         | army       | awaken       |
| acts        | aim        | angels        | armies     | awakens      |
| acted       | aims       | anger         | around     | awakened     |
| acting      | aimed      | angers        | arrange    | awakening    |
| action      | aiming     | angry         | arranges   | award        |
| actions     | air        | angrier       | arranged   | awards       |
| add         | airs       | angriest      | arranging  | awarded      |
| adds        | aired      | animal        | arrest     | awarding     |
| added       | airing     | animals       | arrests    | away         |
| adding      |            | ankle         | arrested   | awful        |
| addition    | airy       | ankles        | arresting  | awhile       |
| additions   | airier     | announce      | arrive     | ax           |
| address     | airiest    | announces     | arrives    | axe          |
| addresses   | airline    | announced     | arrived    | axes         |
| addressed   | airlines   | announcing    | arriving   | axed         |
| addressing  | airplane   | announcement  | arrow      | axing        |
| adjust      | airplanes  | announcements | arrows     | baby         |
| adjusts     | airport    | another       | arrowhead  | babies       |
| adjusted    | airports   | answer        | arrowheads | baby sitter  |
| adjusting   | alarm      | answers       | art        | baby sitters |
|             | alarms     | answered      | arts       | back         |
| adjustment  | alarmed    | answering     | artist     | backs        |
| adjustments | alarming   | ant           | artists    | backed       |
| admire      | album      | ants          | as         | backing      |
| admires     | albums     | any           | ash        | backache     |
| admired     | alike      | anybody       | ashes      | backaches    |
| admiring    | alive      | anyhow        | aside      | background   |
| admission   | all        | anyone        | ask        | backgrounds  |
| admissions  | alley      | anything      | asks       | backtrack    |
| adore       | alleys     | anyway        | asked      | backtracks   |
| adores      | alligator  | anywhere      | asking     | backtracked  |
| adored      | alligators | apart         | asleep     | backtracking |
| adoring     | allow      | apartment     | astronaut  | backward     |
| adult       | allows     | apartments    | astronauts |              |
| adults      | allowed    | ape           | at         | backwards    |
| adventure   | allowing   | apes          | ate        | bacon        |
| adventures  | almost     | aped          | atlas      | bad          |



|            |             |            |             |              |
|------------|-------------|------------|-------------|--------------|
| badge      | barrel      | bedroom    | bib         | blessing     |
| badges     | barrels     | bedrooms   | bibs        | blind        |
| bag        | base        | bedspread  | bible       | blinds       |
| bags       | bases       | bedspreads | bibles      | blinded      |
| baggage    | based       | bee        | bicycle     | blinding     |
| bait       | basing      | bees       | bicycles    | blindfold    |
| baits      | baseball    | beef       | big         | blindfolds   |
| baited     | baseballs   | beefsteak  | bigger      | blindfolded  |
| baiting    | basement    | beefsteaks | biggest     | blindfolding |
| bake       | basements   | been       | bigness     | blink        |
| bakes      | basket      | beer       | bill        | blinks       |
| baked      | baskets     | beers      | bills       | blinked      |
| baking     | basketball  | beet       | billed      | blinking     |
| bakery     | basketballs | beets      | billing     | blinker      |
| bakeries   | bat         | before     | billfold    | blinkers     |
| balance    | bats        | beg        | billfolds   | block        |
| balances   | batted      | begs       | billion     | blocks       |
| balanced   | batting     | begged     | billions    | blocked      |
| balancing  | bath        | begging    | bingo       | blocking     |
| ball       | baths       | beggar     | bird        | blond        |
| balls      |             | beggars    | birds       | blonds       |
| balloon    | bathe       | begin      | birth       | blonde       |
| balloons   | bathes      | begins     | births      | blondes      |
| ballooned  | bathed      | began      | birthday    | blood        |
| ballooning | bathing     | beginning  | birthdays   | bloodhound   |
| ballpoint  | bathroom    |            | biscuit     | bloodhounds  |
| banana     | bathrooms   | begun      | biscuits    | bloodstream  |
| bananas    | battle      | behave     | bit         | bloom        |
| band       | battles     | behaves    | bits        | blooms       |
| bands      | battled     | behaved    | bite        | bloomed      |
| banded     | battling    | behaving   | bites       | blooming     |
| banding    | be          | behind     | biting      | blossom      |
| bandage    | being       | belief     | bitter      | blossoms     |
| bandages   | beach       | beliefs    | black       | blossomed    |
| bandaged   | beaches     | believe    | blacks      | blossoming   |
| bandaging  | bead        | believes   | blacker     | blot         |
| bang       | beads       | believed   | blackest    | blots        |
| bangs      | beak        | believing  | blackness   | blotted      |
| banged     | beaks       | bell       | blackboard  | blotting     |
| banging    | beam        | bells      | blackboards | blouse       |
| banjo      | beams       | belly      | blacksmith  | blouses      |
| banjos     | beamed      | bellies    | blacksmiths | blow         |
| banjoes    | beaming     | belong     | blame       | blows        |
| bank       | bean        | belongs    | blames      | blew         |
| banks      | beans       | belonged   | blamed      | blowing      |
| banked     | bear        | belonging  | blaming     | blue         |
| banking    | bears       | belongings | blank       | blues        |
| bar        | bore        | below      | blanks      | bluer        |
| bars       | bearing     | belt       | blanker     | blueberry    |
| barred     | beard       | belts      | blankest    | blueberries  |
| barring    | beards      | belted     | blanket     | blush        |
| barbecue   | beast       | belting    | blankets    | blushes      |
| barbecues  | beasts      | bench      | blanketed   | blushed      |
| barbecued  | beat        | benches    | blanketing  | blushing     |
| barbecuing | beats       | bend       | blast       | board        |
| barber     | beating     | bends      | blasts      | boards       |
| barbers    | beautiful   | bending    | blasted     | boarded      |
| bare       | beauty      | bent       | blasting    | boarding     |
| barer      | beauties    | bent       | blastoff    | boat         |
| barest     | beaver      | beneath    | blaze       | boats        |
| bares      | beavers     | berry      | blazes      | bobwhite     |
| bared      | because     | berries    | blazed      | bobwhites    |
| baring     | become      | beside     | blazing     | body         |
| barefoot   | becomes     | besides    | bleed       | bodies       |
| bark       | became      | best       | bleeds      | bodyguard    |
| barks      | becoming    | bet        | bled        | bodyguards   |
| barked     | bed         | betting    | bleeding    | boil         |
| barking    | beds        | better     | bless       | boils        |
| barn       | bedded      | between    | blesses     | boiled       |
| barns      | bedding     | beyond     | blessed     | boiling      |

|           |            |                |              |           |
|-----------|------------|----------------|--------------|-----------|
| bold      | boxcar     | brightened     | bulletin     | buy       |
| bolder    | boxcars    | brightening    | bulletins    | buys      |
| boldest   | boy        | bring          | bumblebee    | bought    |
| bolt      | boys       | brings         | bumblebees   | buying    |
| bolts     | brace      | brought        | bump         | buzz      |
| bolted    | braces     | bringing       | bumps        | buzzes    |
| bolting   | braced     | broad          | bumped       | buzzed    |
| bomb      | bracing    | broaden        | bumping      | buzzing   |
| bombs     | bracelet   | broadest       | bumpy        | by        |
| bombed    | bracelets  | broadcast      | bumpier      | bye       |
| bombing   | brain      | broadcasts     | bumpiest     | cab       |
| bone      | brains     | broadcasted    | bun          | cabs      |
| bones     | brake      | broadcasting   | buns         | cabbage   |
| bonnet    | brakes     | broken         | bunch        | cabbages  |
| bonnets   | braked     | broken hearted | bunches      | cabin     |
| boo       | braking    | brook          | bunched      | cabins    |
| boos      | bran       | brooks         | bunching     | cage      |
| booed     | branch     | broom          | bundle       | cages     |
| booming   | branches   | brooms         | bundles      | cake      |
| book      | branched   | brother        | bundled      | cakes     |
| books     | branching  | brothers       | bundling     | calendar  |
| boom      | brand      | brown          | bunk         | calendars |
| booms     | brands     | browns         | bunks        | calf      |
| boomed    | branded    | browned        | bunked       | calves    |
| booming   | branding   | browning       | bunking      | call      |
| boot      | brand new  | browner        | bunny        | calls     |
| boots     | brass      | brownest       | bunnies      | called    |
| booted    | brasses    | brownie        | burglar      | calling   |
| booting   | brave      | brownies       | burglars     | calling   |
| born      | braves     | brush          | burn         | camel     |
| borrow    | braved     | brushes        | burns        | camels    |
| borrows   | braving    | brushed        | burned       | camera    |
| borrowed  | braver     | brushing       | burning      | cameras   |
| borrowing | bravest    | bubble         | burnt        | camp      |
| boss      |            | bubbles        | burro        | camped    |
| bosses    | bravery    | bubbled        | burros       | camping   |
| bossed    | bread      | bubbling       | burst        | can       |
| bossing   | break      | bucket         | bursts       | cans      |
| both      | breaks     | buckets        | bursting     | canned    |
| bother    | broke      | buckle         | bury         | canning   |
| bothers   | breaking   | buckles        | buries       | can't     |
| bothered  | breakfast  | buckled        | buried       | canal     |
| bothering | breakfasts | buckling       | burying      | canals    |
| bottle    | breast     | bud            | bus          | canary    |
| bottles   | breasts    | buds           | buses        | canaries  |
| bottled   | breath     | budded         | bush         | candle    |
| bottling  | breaths    | budding        | bushes       | candles   |
| bottom    | breathe    | budge          | bushel       | candy     |
| bottoms   | breathes   | budges         | bushels      | candies   |
| bottomed  | breathed   | budget         | business     | cane      |
| bottoming | breathing  | budging        | businesses   | canes     |
| boulder   | breeze     | buffalo        | busy         | caned     |
| boulders  | breezes    | buffaloes      | busier       | caning    |
| bounce    | breezed    | bug            | busiest      | cannon    |
| bounces   | breezing   | bugs           | but          | cannons   |
| bounced   | brick      | bugged         | butcher      | cannot    |
| bouncing  | bricks     | bugging        | butchers     | canoe     |
| bow       | bricked    | buggy          | butchered    | canoes    |
| bows      | bricking   | buggies        | butchering   | canoed    |
| bowed     | bride      | build          | butter       | canoeing  |
| bowing    | brides     | builds         | butters      | canyon    |
| bowl      | bridge     | built          | battered     | canyons   |
| bowls     | bridges    | building       | buttered     | cap       |
| bowled    | bridged    | buildings      | buttering    | caps      |
| bowling   | bridging   | bulb           | butterfly    | capped    |
| bow wow   | bright     | bulbs          | butterflies  | capping   |
| box       | brighter   | bull           | butterscotch | cape      |
| boxes     | brightest  | bulls          | button       | capes     |
| boxed     | brighten   | bullet         | buttoned     | capital   |
| boxing    | brightens  | bullets        | buttoning    | capitals  |

|              |              |               |            |            |
|--------------|--------------|---------------|------------|------------|
| capsule      | caves        | cheat         | choice     | clicks     |
| capsules     | ceiling      | cheats        | choices    | clicked    |
| captain      | ceilings     | cheated       | choke      | clicking   |
| captains     | celebrate    | cheating      | chokes     | climate    |
| capture      | celebrates   | check         | choked     | climates   |
| captures     | celebrated   | checks        | choking    | climb      |
| captured     | celebrating  | checked       | choose     | climbs     |
| capturing    |              | checking      | chooses    | climbed    |
| car          | celebration  | checkers      | chose      | climbing   |
| cars         | celebrations | checkup       | choosing   | clip       |
| card         | cellar       | checkups      | chop       | clips      |
| cards        | cellars      | cheek         | chops      | clipped    |
| cardboard    | cent         | cheeks        | chopped    | clipping   |
| care         | cents        | cheer         | chopping   | clock      |
| cares        | center       | cheers        | chorus     | clocks     |
| cared        | centers      | cheered       | choruses   | close      |
| caring       | centered     | cheering      | chosen     | closes     |
| careful      | centering    | cheerful      | Christmas  | closed     |
| careless     | cereal       | cheerfully    | church     | closing    |
| carload      | cereals      | cheese        | churches   | closer     |
| carloads     | certain      | cheeses       | churn      | closest    |
| carpenter    | chain        | cheeseburger  | churns     | closet     |
| carpenters   | chains       | cheeseburgers | churned    | closets    |
| carpet       | chained      | cherry        | churning   | cloth      |
| carpets      | chaining     | cherries      | cigarette  | cloths     |
| carpeted     | chair        | chest         | cigarettes | cloud      |
| carpeting    | chairs       | chests        | circle     | clouds     |
| carriage     | chalk        | chestnut      | circles    | clouded    |
| carriages    | chalkboard   | chestnuts     | circled    | clouding   |
| carrot       | chalkboards  | chew          | circling   | cloudy     |
| carrots      | champion     | chews         | circus     | cloudier   |
| carry        | champions    | chewed        | circuses   | cloudiest  |
| carries      | chance       | chewing       | citizen    | clown      |
| carried      | chances      | chick         | citizens   | clowns     |
| carrying     | change       | chicks        | city       | clowned    |
| cart         | changes      | chicken       | cities     | clowning   |
| carts        | changed      | chickens      | clap       | club       |
| carted       | changing     | chief         | claps      | clubs      |
| carting      | channel      | chiefs        | clapped    | clubbed    |
| cartoon      | channels     | child         | clapping   | clubbing   |
| cartoons     | channeled    | children      | class      | clubhouse  |
| carve        | channelled   | childhood     | classes    | clubhouses |
| carves       | channeling   | chili         | classroom  | coach      |
| carved       | channelling  | chilies       | classrooms | coaches    |
| carving      |              | chill         | claw       | coached    |
| case         | chapter      | chills        | claws      | coaching   |
| cases        | chapters     | chilled       | clawed     | coal       |
| cash         | charge       | chilling      | clawing    | coast      |
| cashes       | charges      | chilly        | clay       | coasts     |
| cashied      | charged      | chillier      | clays      | coasted    |
| cashing      | charging     | chilliest     | clean      | coasting   |
| cashier      | charm        | chimney       | cleans     | coat       |
| cashiers     | charms       | chimneys      | cleaned    | coats      |
| castle       | charmed      | chimpanzee    | cleaning   | coated     |
| castles      | charming     | chimpanzees   | cleaner    | coating    |
| cat          | chart        | chin          | cleanest   | cob        |
| cats         | charts       | chins         | cleanser   | cobs       |
| catch        | charted      | china         | cleansers  | cobweb     |
| catches      | charting     | chip          | clear      | cobwebs    |
| caught       | chase        | chips         | clears     | cocktail   |
| catching     | chases       | chipped       | cleared    | cocktails  |
| caterpillar  | chased       | chipping      | clearing   | cocoa      |
| caterpillars | chasing      | chipmunk      | clearer    | coconut    |
| catsup       | chatter      | chipmunks     | clearest   | coconuts   |
| cattle       | chatters     | chirp         | clerk      | coffee     |
| cause        | chattered    | chirps        | clerks     | coffees    |
| causes       | chattering   | chirped       | clever     | coin       |
| caused       | cheap        | chirping      | cleverer   | coins      |
| causing      | cheaper      | chocolate     | cleverest  | cold       |
| cave         | cheapest     | chocolates    | click      | colds      |

|             |             |             |            |                |
|-------------|-------------|-------------|------------|----------------|
| colder      | continued   | covered     | croaked    | curtain        |
| coldest     | continuing  | covering    | croaking   | curtains       |
| collar      | control     | cow         | crook      | curve          |
| collars     | controls    | cows        | crooks     | curves         |
| collect     | controlled  | coward      | crop       | curved         |
| collects    | controlling | cowards     | crops      | curving        |
| collected   | cook        | cowboy      | cropped    | cushion        |
| collecting  | cooks       | cowboys     | cropping   | cushions       |
| collection  | cooked      | cozy        | cross      | cushioned      |
| collections | cooking     | cozier      | crosses    | cushioning     |
| collector   | cookie      | coziest     | crossed    | customer       |
| collectors  | cookies     | crab        | crossing   | customers      |
| college     | cool        | crabs       | crosswalk  | cut            |
| colleges    | cools       | crack       | crosswalks | cuts           |
| color       | cooled      | cracks      | crossway   | cutting        |
| colors      | cooling     | cracked     | crossways  | cute           |
| colored     | cooler      | cracking    | crow       | cuter          |
| coloring    | coolest     | cracker     | crowd      | cutest         |
| colorful    | copy        | crackers    | crowded    | dad            |
| colt        | copies      | cradle      | crowding   | dads           |
| colts       | copied      | cradles     | crowd      | daddy          |
| column      | copying     | cradled     | crowds     | daddies        |
| columns     | cord        | cradling    | crowded    | daddy longlegs |
| comb        | cords       | cranberry   | crowding   | daily          |
| combs       | cork        | cranberries | crowd      | dairy          |
| combed      | corks       | crank       | crowns     | daisy          |
| combing     | corn        | cranks      | crowned    | daisies        |
| come        | corns       | cranked     | crowning   | dam            |
| comes       | corner      | cranking    | cruel      | dams           |
| came        | corners     | crash       | crueler    | dammed         |
| coming      | cornered    | crashes     | cruellest  | damming        |
| comfort     | cornering   | crashed     | crumb      | damage         |
| comforts    | cornmeal    | crashing    | crumbs     | damages        |
| comforted   | correct     | crawl       | crumble    | damaged        |
| comforting  | corrects    | crawls      | crumbles   | damaging       |
|             | corrected   | crawled     | crumbled   | damp           |
| comfortable | correcting  | crawling    | crumbling  | damper         |
| comic       | cost        | crayon      | crush      | dampest        |
| comics      | costs       | crayons     | crushes    | dance          |
| comma       | costing     | crazy       | crushed    | dances         |
| commas      | cottage     | crazier     | crushing   | danced         |
| command     | cottages    | craziest    | crust      | dancing        |
| commands    | cotton      | cream       | crusts     | dandy          |
| commanded   | cottons     | creams      | crutch     | dandies        |
| commanding  | couch       | creamy      | crutches   | danger         |
| commercial  | couches     | creamier    | cry        | dangers        |
| commercials | cough       | creamiest   | cries      | dangerous      |
| company     | coughs      | creature    | cried      | dare           |
| companies   | coughed     | creatures   | crying     | dares          |
| complete    | coughing    | creek       | cub        | dared          |
| completes   | could       | creeks      | cubs       | daring         |
| completed   | couldn't    | creep       | cup        | dark           |
| completing  | count       | creeps      | cups       | darker         |
| computer    | counts      | crept       | cupped     | darkest        |
| computers   | counted     | creeping    | cupping    | darkness       |
| concrete    | counting    | crib        | cupful     | darling        |
| conductor   | counter     | cribs       | cupfuls    | darlings       |
| conductors  | counters    | cricket     | cupboard   | dart           |
| cone        | country     | crickets    | cupboards  | darts          |
| cones       | countries   | crime       | cure       | darted         |
| connect     | course      | crimes      | cures      | darting        |
| connects    | courses     | cripple     | cured      | dash           |
| connected   | court       | cripples    | curing     | dashes         |
| connecting  | courts      | crippled    | curl       | dashed         |
| contest     | courted     | cripping    | curls      | dashing        |
| contests    | courting    | crisp       | curled     | date           |
| contested   | cousin      | crisper     | curling    | dates          |
| contesting  | cousins     | crispest    | curly      | dated          |
| continue    | cover       | croak       | curlier    | dating         |
| continues   | covers      | croaks      | curliest   | daughter       |

|            |              |              |            |            |
|------------|--------------|--------------|------------|------------|
| daughters  | desires      | dipping      | dogs       | drove      |
| dawn       | desired      | direct       | doll       | driving    |
| dawns      | desiring     | directs      | dolls      | driveaway  |
| dawned     | desk         | directed     | dolly      | driveways  |
| dawning    | desks        | directing    | dollies    | drop       |
| day        | destroy      | direction    | dollar     | drops      |
| days       | destroys     | directions   | dollars    | dropped    |
| daylight   | destroyed    | dirt         | done       | dropping   |
| daytime    | destroying   | dirty        | donkey     | drown      |
| dead       | detective    | dirtyies     | donkeys    | drowns     |
| deaf       | detectives   | dirtyed      | don't      | drowned    |
| deal       | detergent    | dirtying     | door       | drowning   |
| deals      | detergents   | dirtyier     | doors      | drowsy     |
| dealt      | devil        | dirtyest     | doorstep   | drowsier   |
| dealing    | devils       | disagree     | doorsteps  | drowsiest  |
| dear       | dew          | disagrees    | dope       | drug       |
| dears      | dial         | disagreed    | dopes      | drugs      |
| dearer     | dials        | disagreeing  | doped      | drugged    |
| dearest    | dialed       | disappear    | doping     | drugging   |
| death      | dialing      | disappears   | dot        | drugstore  |
| deaths     | diamond      | disappeared  | dots       | drugstores |
| December   | diamonds     | disappearing | dotted     | drum       |
| decide     | dice         | discover     | dotting    | drums      |
| decides    | diced        | discovers    | double     | drummed    |
| decided    | dicing       | discovered   | dove       | drumming   |
| deciding   | dictionary   | discovering  | doves      | drunk      |
| deck       | dictionaries | disease      | down       | drunker    |
| decks      | did          | diseases     | downs      | drunkest   |
| decked     | didn't       | diseased     | downstairs | dry        |
| decking    | die          | disgrace     | downtown   | dries      |
| deep       | dies         | disgraces    | downward   | dried      |
| deeper     | died         | disgraced    | downwards  | drying     |
| deepest    | dying        | disgracing   | dozen      | drier      |
| deer       | diet         | disgraceful  | dozens     | driest     |
| defend     | diets        | dish         | drag       | duck       |
| defends    | dieted       | dishes       | drags      | ducks      |
| defended   | dieting      | dished       | dragged    | ducked     |
| defending  | difference   | dishing      | dragging   | ducking    |
| delighted  | differences  | dismiss      | dragon     | duckling   |
| deliver    | different    | dismisses    | dragons    | ducklings  |
| delivers   | difficult    | dismissed    | drain      | due        |
| delivered  | difficulty   | dismissing   | drains     | dues       |
| delivering | difficulties | distance     | drained    | dull       |
| delivery   | dig          | distances    | draining   | duller     |
| deliveries | digs         | distanced    | draw       | dullest    |
| den        | dug          | distancing   | draws      | dumb       |
| dens       | digging      | ditch        | drew       | dumber     |
| dentist    | dim          | ditches      | drawing    | dumbest    |
| dentists   | dims         | dive         | dream      | dump       |
| depend     | dimmed       | dives        | dreams     | dumps      |
| depends    | dimming      | diving       | dreamt     | dumped     |
| depended   | dimmer       | divide       | dreaming   | dumping    |
| depending  | dimpest      | divides      | dress      | during     |
| deposit    | dime         | divided      | dresses    | dust       |
| deposits   | dimes        | dividing     | dressed    | dusts      |
| deposited  | dimple       | do           | dressing   | dusted     |
| depositing | dimples      | doing        | drill      | dusting    |
| describe   | dimpled      | dock         | drills     | dusty      |
| describes  | dined        | docks        | drilled    | dustier    |
| described  | dines        | docked       | drilling   | dustiest   |
| describing | dined        | docking      | drink      | each       |
| desert     | dining       | doctor       | drinks     | eager      |
| deserts    | ding dong    | doctors      | drank      | eagle      |
| deserted   | dinner       | dodge        | drinking   | eagles     |
| deserting  | dinners      | dodges       | drip       | ear        |
| design     | dinosaur     | dodged       | drips      | ears       |
| designs    | dinosaurs    | dodging      | dripped    | earache    |
| designed   | dip          | does         | dripping   | earaches   |
| designing  | dips         | doesn't      | drive      | ear drum   |
| desire     | dipped       | dog          | drives     | ear drums  |

|               |             |               |            |           |
|---------------|-------------|---------------|------------|-----------|
| early         | engineer    | exit          | faints     | favoring  |
| earlier       | engineers   | exits         | fainted    | favorite  |
| earliest      | engineered  | exited        | fainting   | favorites |
| earn          | engineering | exiting       | fainter    | fear      |
| earns         | English     | expect        | faintest   | fears     |
| earned        | enjoy       | expects       | fair       | feared    |
| earning       | enjoys      | expected      | fairs      | fearing   |
| earnings      | enjoyed     | expecting     | fairer     | feast     |
| earth         | enjoying    | experiment    | fairest    | feasts    |
| earthquake    | enjoyment   | experiments   | fairy      | feasted   |
| earthquakes   | enough      | experimented  | fairies    | feasting  |
| east          | enter       | experimenting | fairyland  | feather   |
| eastern       | enters      | explain       | fairylands | feathers  |
| Easter        | entered     | explains      | faith      | February  |
| easy          | entering    | explained     | faiths     | feed      |
| easier        | envelope    | explaining    | fake       | feeds     |
| easiest       | envelopes   | explode       | fakes      | fed       |
| eat           | equal       | explodes      | faked      | feeding   |
| eats          | equator     | exploded      | faking     | feel      |
| eating        | equators    | exploding     | fall       | feels     |
| eaten         | erase       | explore       | falls      | feeling   |
| edge          | erases      | explores      | fell       | fellow    |
| edges         | erased      | explored      | falling    | fellows   |
| egg           | erasing     | exploring     | false      | felt      |
| eggs          | errand      | explosive     | family     | female    |
| eight         | errands     | explosives    | families   | females   |
| eights        | escape      | express       | fan        | fence     |
| eighteen      | escapes     | expresses     | fans       | fences    |
| eighteens     | escaped     | expressed     | fanned     | fenced    |
| eighth        | escaping    | expressing    | fanning    | fencing   |
| eighths       | Eskimo      | expressway    | fancy      | fern      |
| eighty        | Eskimos     | expressways   | far        | ferns     |
| eighties      | evaporate   | extinguisher  | faraway    | festival  |
| either        | evaporates  | extinguishers | fare       | festivals |
| elastic       | evaporated  | extra         | fares      | fever     |
| elastics      | evaporating | extras        | farm       | fevers    |
| elbow         | even        | eye           | farms      | few       |
| elbows        | evens       | eyes          | farmed     | fewer     |
| election      | evened      | eyeball       | farming    | fewest    |
| elections     | evening     | eyeballs      | farmer     | fib       |
| electric      | evenings    | eyebrow       | farmers    | fibs      |
| electricity   | ever        | eyebrows      | far off    | fibbed    |
| elephant      | everlasting | eyeglass      | farther    | fibbing   |
| elephants     | every       | eyeglasses    | fashion    | fiddle    |
| elevator      | everybody   | eyelash       | fashions   | fiddles   |
| elevators     | everyday    | eyelashes     | fashioned  | fiddled   |
| eleven        | everyone    | eyelid        | fashioning | fiddling  |
| elevens       | everything  | eyelids       | fast       | field     |
| elf           | everywhere  | eyesight      | fasts      | fields    |
| elves         | evil        | fable         | fasted     | fielded   |
| elm           | evils       | fables        | fasting    | fielding  |
| elms          | exactly     | face          | faster     | fifteen   |
| else          | example     | faces         | fastest    | fifteens  |
| empty         | examples    | faced         | fasten     | fifth     |
| empties       | excellent   | facing        | fastens    | fifths    |
| emptied       | except      | fact          | fastened   | fifty     |
| emptying      | exchange    | facts         | fastening  | fifties   |
| emptier       | exchanges   | factory       | fat        | fig       |
| emptiest      | exchanged   | factories     | fats       | figs      |
| encyclopedia  | exchanging  | fade          | fatter     | fight     |
| encyclopedias | excited     | fades         | fattest    | figs      |
| end           | exciting    | faded         | father     | figs      |
| ends          | excuse      | fading        | fathers    | fight     |
| ended         | excuses     | fail          | fathered   | figs      |
| ending        | excused     | fails         | fathering  | figs      |
| endless       | excusing    | failed        | fault      | figs      |
| enemy         | exercise    | failing       | faults     | figs      |
| enemies       | exercises   | failure       | favor      | figs      |
| engine        | exercised   | failures      | favours    | figs      |
| engines       | exercising  | faint         | favored    | figs      |

|              |             |            |             |           |
|--------------|-------------|------------|-------------|-----------|
| filing       | flaming     | fog        | fountains   | funniest  |
| fill         | flap        | fogs       | four        | fur       |
| fills        | flaps       | fogged     | fours       | furs      |
| filled       | flapped     | fogging    | fourteen    | furniture |
| filling      | flapping    | foggy      | fourteens   | further   |
| film         | flare       | foggier    | fourth      | gallon    |
| films        | flares      | foggiest   | fourths     | gallons   |
| filmed       | flared      | fold       | fox         | gallop    |
| filming      | flaring     | folders    | foxes       | gallops   |
| final        | flash       | folded     | frame       | galloped  |
| finally      | flashes     | folding    | frames      | galloping |
| find         | flashed     | folks      | framed      | gamble    |
| finds        | flashing    | follow     | framing     | gamble    |
| finding      | flashlight  | follows    | freckles    | gambled   |
| fine         | flashlights | followed   | free        | gambling  |
| finer        | flat        | following  | frees       | game      |
| finest       | flats       | fond       | freed       | games     |
| finger       | flatter     | fonder     | freeing     | gang      |
| fingers      | flattest    | fondest    | freer       | gangs     |
| fingered     | flavor      | food       | freest      | ganged    |
| fingering    | flavors     | foods      | freedom     | ganging   |
| fingernail   | flavored    | fool       | freedoms    | gangster  |
| fingernails  | flavoring   | fools      | freeze      | gangsters |
| fingertip    | flea        | fooled     | freezes     | garage    |
| fingertips   | fleas       | fooling    | froze       | garages   |
| fingerprint  | flesh       | foolish    | freezing    | garbage   |
| fingerprints | flight      | foot       | freight     | garden    |
| finish       | flights     | feet       | fresh       | gardens   |
| finishes     | flip        | football   | fresher     | gardened  |
| finished     | flips       | footballs  | freshest    | gardening |
| finishing    | flipped     | footpath   | Friday      | gargle    |
| fire         | flipping    | footpaths  | Fridays     | gargles   |
| fires        | float       | footprint  | friend      | gargled   |
| fired        | floats      | footprints | friends     | gargling  |
| firing       | floated     | footsteps  | friendship  | gas       |
| fireplace    | floating    | for        | friendships | gases     |
| fireplaces   | flock       | force      | frighten    | gasses    |
| firefly      | flocks      | forces     | frightens   | gasoline  |
| fireflies    | flocked     | forced     | frightened  | gate      |
| fireproof    | flocking    | forcing    | frightening | gates     |
| fireworks    | flood       | forehead   | frog        | gather    |
| first        | floods      | foreheads  | frogs       | gathers   |
| fish         | flooded     | forest     | from        | gathered  |
| fishes       | flooding    | forests    | front       | gathering |
| fished       | floor       | forever    | fronts      | gauge     |
| fishing      | floors      | forget     | frost       | gauges    |
| fist         | flour       | forgets    | frosts      | gauged    |
| fists        | flow        | forgot     | frosted     | gauging   |
| fit          | flows       | forgetting | frosting    | gay       |
| fits         | flowed      | forgetful  | frown       | gays      |
| fitted       | flowing     | forgotten  | frowns      | gayer     |
| fitting      | flower      | fork       | frowned     | gayest    |
| five         | flowers     | forks      | frowning    | general   |
| fives        | flowered    | form       | fruit       | generals  |
| fix          | flowering   | forms      | fruits      | gentle    |
| fixes        | flu         | formed     | fry         | gentler   |
| fixed        | flunk       | forming    | fries       | gentlest  |
| fixing       | flunks      | fort       | fried       | gentlemen |
| fizz         | flunked     | forts      | frying      | geography |
| fizzes       | flunking    | fortune    | fudge       | get       |
| fizzed       | flute       | fortunes   | fuel        | gets      |
| fizzing      | flutes      | forty      | fuels       | got       |
| flag         | fly         | forties    | fueled      | getting   |
| flags        | flies       | forward    | fueling     | ghost     |
| flame        | flew        | forwards   | full        | ghosts    |
| flames       | flying      | found      | fuller      | giant     |
| flamed       | foam        | found      | fullest     | giants    |
|              | foams       | founded    | fun         | gift      |
|              | foamed      | founding   | funny       | gifts     |
|              | foaming     | fountain   | funnier     | giggle    |

|            |                |            |               |            |
|------------|----------------|------------|---------------|------------|
| giggles    | good bye       | grazed     | growth        | hang       |
| giggled    | goodies        | grazing    | guard         | hangs      |
| giggling   | goodness       | grease     | guards        | hanged     |
| gill       | goose          | greases    | guarded       | hanging    |
| gills      | geese          | greased    | guarding      | happen     |
| giraffe    | gotten         | greasing   | guess         | happens    |
| giraffes   | government     | greasy     | guesses       | happened   |
| girl       | governments    | greasier   | guessed       | happening  |
| girls      | governor       | greasiest  | guessing      | happiness  |
| give       | governors      | great      | guest         | happy      |
| gives      | gown           | greater    | guests        | happier    |
| gave       | gowns          | greatest   | guide         | happiest   |
| giving     | grab           | greedy     | guides        | harbor     |
| given      | grabs          | greedier   | guided        | harbors    |
| glad       | grabbed        | greediest  | guiding       | harbored   |
| gladness   | grabbing       | green      | guitar        | harboring  |
| glance     | grace          | greens     | guitars       | hard       |
| glances    | graces         | greener    | gum           | harder     |
| glanced    | graced         | greenest   | gums          | hardest    |
| glancing   | gracing        | greet      | gun           | hardware   |
| glare      | grade          | greet      | guns          | harm       |
| glares     | grades         | greeted    | guy           | harms      |
| glared     | graded         | greeting   | guys          | harmed     |
| glaring    | grading        | greyhound  | gym           | harming    |
| glass      | grain          | greyhounds | gyms          | harmless   |
| glasses    | grains         | grill      | habit         | harmful    |
| glassware  | grand          | grills     | habits        | harness    |
| glasswares | grand          | grilled    | hadn't        | harnesses  |
| glide      | grand          | grilling   | hail          | harnessed  |
| glides     | grandest       | grin       | hails         | harnessing |
| glided     | grandchild     | grins      | hailed        | harp       |
| gliding    | grandchildren  | grinned    | hailing       | harps      |
| globe      | granddaughter  | grinning   | hair          | harvest    |
| globes     | granddaughters | grind      | hairs         | harvests   |
| glory      | grandfather    | grinds     | hairy         | harvested  |
| glories    | grandfathers   | grinding   | hairier       | harvesting |
| glove      | grandma        | grip       | hairiest      | hasn't     |
| gloves     | grandmas       | grips      | half          | hat        |
| glow       | grandmother    | gripped    | halves        | hats       |
| glows      | grandmothers   | gripping   | hall          | hatch      |
| glowed     | grandpa        | grizzly    | halls         | hatches    |
| glowing    | grandpas       | groan      | Halloween     | hatched    |
| glue       | grandson       | groans     | Hallowe'en    | hatching   |
| glues      | grandsons      | groaned    | hallway       | hatchet    |
| glued      | grandstand     | groaning   | hallways      | hatchets   |
| gluing     | grandstands    | grocery    | ham           | hate       |
| go         | grape          | groceries  | hams          | hates      |
| goes       | grapes         | groom      | hamburger     | hated      |
| went       | grapefruit     | grooms     | hamburgers    | hating     |
| going      | grapefruits    | groomed    | hammer        | haul       |
| goal       | grass          | grooming   | hammers       | hauls      |
| goals      | grasses        | ground     | hammered      | hauled     |
| goat       | grasshopper    | grounds    | hammering     | hauling    |
| goats      | grasshoppers   | grounded   | hamster       | have       |
| gobble     | grave          | grounding  | hamsters      | has        |
| gobbles    | graves         | group      | hand          | had        |
| gobbled    | gravel         | groups     | hands         | having     |
| gobbling   | graveyard      | grouped    | handed        | haven't    |
| god        | graveyards     | grouping   | handing       | hawk       |
| gods       | gravy          | grow       | handful       | hawks      |
| godmother  | gravies        | grows      | handfuls      | hay        |
| godmothers | gray           | grew       | handkerchief  | he         |
| gold       | grays          | growing    | handkerchiefs | he'd       |
| golden     | grayer         | grown      | handle        | he's       |
| goldfish   | grayest        | growl      | handles       | head       |
| golf       | grey           | growls     | handled       | heads      |
| gone       | greys          | growled    | handling      | headed     |
| good       | greyer         | growling   | handmade      | heading    |
| goods      | greyest        | grown up   | handsome      | headache   |
| good by    | graze          | grown ups  | handwriting   | headaches  |
|            | grazes         |            |               |            |



|               |              |              |            |             |
|---------------|--------------|--------------|------------|-------------|
| headline      | high school  | homes        | hugged     | imagined    |
| headlines     | high schools | homesick     | hugging    | imagining   |
| headquarters  | highway      | homework     | huge       | important   |
| heal          | highways     | honest       | huger      | impossible  |
| heals         | hike         | honey        | hugest     | improve     |
| healed        | hikes        | honeybee     | hum        | improves    |
| healing       | hiked        | honeybees    | hums       | improved    |
| health        | hiking       | honk         | hummed     | improving   |
| healthy       | hill         | honks        | humming    | in          |
| healthier     | hills        | honked       | human      | inch        |
| healthiest    | hilly        | honking      | humans     | inches      |
| heap          | hillier      | honor        | hump       | inched      |
| heaps         | hilliest     | honors       | humps      | inching     |
| heaped        | him          | honored      | humped     | indeed      |
| heaping       | himself      | honoring     | humping    | Indian      |
| hear          | hint         | hood         | hundred    | Indians     |
| hears         | hints        | hoods        | hundreds   | industry    |
| heard         | hinted       | hoof         | hung       | industries  |
| hearing       | hinting      | hooves       | hunger     | ink         |
| heart         | hip          | hook         | hungers    | inks        |
| hearts        | hips         | hooks        | hungered   | inked       |
| heat          | hippo        | hooked       | hungering  | inking      |
| heats         | hippos       | hooking      | hungry     | inn         |
| heated        | hire         | hoot         | hungrier   | inns        |
| heating       | hires        | hoots        | hungriest  | insect      |
| heaven        | hired        | hooted       | hunk       | insects     |
| heavens       | hiring       | hooting      | hunks      | inside      |
| heavy         | his          | hop          | hunt       | inspection  |
| heavier       | history      | hops         | hunts      | inspections |
| heaviest      | histories    | hopped       | hunted     | instead     |
| heel          | hit          | hopping      | hunting    | intend      |
| heels         | hits         | hope         | hurricane  | intends     |
| height        | hitting      | hopes        | hurricanes | intended    |
| heights       | hitch        | hoped        | hurry      | intending   |
| helicopter    | hitches      | hoping       | hurries    | interest    |
| helicopters   | hitched      | hopscotch    | hurried    | interests   |
| hell          | hitching     | horn         | hurrying   | interested  |
| he'll         | hive         | horns        | hurt       | interesting |
| hello         | hives        | horse        | hurts      | into        |
| helmet        | hobble       | horses       | hurting    | introduce   |
| helmets       | hobbles      | hose         | husband    | introduces  |
| help          | hobbled      | hoses        | husbands   | introduced  |
| helps         | hobbling     | hosed        | hush       | introducing |
| helped        | hobby        | hosing       | hushes     | invent      |
| helping       | hobbies      | hospital     | hushed     | invents     |
| helpful       | hockey       | hospitals    | hushing    | invented    |
| hen           | hoe          | hot          | hut        | inventing   |
| hens          | hoes         | hotter       | huts       | inventor    |
| her           | hoed         | hottest      | hymn       | inventors   |
| hers          | hoeing       | hotel        | hymns      | invite      |
| herd          | hold         | hotels       | I          | invites     |
| herds         | holds        | hound        | ice        | invited     |
| herded        | held         | hounds       | ices       | inviting    |
| herding       | holding      | hounded      | iced       | iron        |
| here          | holdup       | hounding     | icing      | irons       |
| hero          | holdups      | hour         | icy        | ironed      |
| heroes        | hole         | hours        | icier      | ironing     |
| herself       | holes        | house        | iciest     | is          |
| hidden        | holiday      | houses       | iceberg    | isn't       |
| hide          | holidays     | housekeeper  | icebergs   | island      |
| hides         | hollow       | housekeepers | I'd        | islands     |
| hid           | hollows      | housewife    | idea       | it          |
| hiding        | hollowed     | housewives   | if         | its         |
| hide and seek | hollowing    | how          | igloo      | it'll       |
| hideout       | holster      | howl         | igloos     | it's        |
| hideouts      | holsters     | howls        | ill        | I've        |
| hi fi         | holy         | howled       | I'll       | ivory       |
| high          | holier       | howling      | I'm        | ivy         |
| higher        | holiest      | hug          | imagine    | jack        |
| highest       | home         | hugs         | imagines   | jacked      |

|                 |               |          |          |              |
|-----------------|---------------|----------|----------|--------------|
| jacking         | judged        | kneel    | laughs   | letters      |
| jack o lantern  | judging       | kneels   | laughed  | lettuce      |
| jack o lanterns | jug           | kneeled  | laughing | level        |
| jacket          | jugs          | kneeling | laundry  | levels       |
| jackets         | juice         | knife    | law      | levelled     |
| jackpot         | juices        | knives   | laws     | levelling    |
| jackpots        | juiced        | knifed   | lawn     | liar         |
| jacks           | juicing       | knifing  | lawns    | liars        |
| jail            | juicy         | knight   | lawyer   | liberty      |
| jails           | juicier       | knighted | lawyers  | liberties    |
| jailed          | juiciest      | knights  | lay      | librarian    |
| jailing         | July          | knighted | lays     | librarians   |
| jam             | jump          | knitting | laid     | library      |
| jams            | jump          | knit     | laying   | libraries    |
| jams            | jumps         | knits    | lazy     | lick         |
| jammed          | jumped        | knitted  | lazier   | licks        |
| jamming         | jumping       | knitting | laziest  | licked       |
| janitor         | June          | knob     | lead     | licking      |
| janitors        | jungle        | knobs    | leads    | lid          |
| January         | jungles       | knock    | led      | lids         |
| jar             | junks         | knocks   | leading  | lie          |
| jars            | just          | knocked  | leaf     | lies         |
| jarred          | kangaroo      | knocking | leaves   | lied         |
| jarring         | kangaroos     | knot     | leak     | lying        |
| jaw             | keep          | knots    | leaks    | life         |
| jaws            | keeps         | knotted  | leaked   | lives        |
| jawbone         | kept          | knotting | leaking  | lifeboat     |
| jawbones        | keeping       | know     | lean     | lifeboats    |
| jay             | kettle        | knows    | leans    | lifeguard    |
| jays            | kettles       | knew     | leaned   | lifeguards   |
| jaywalker       | key           | knowing  | leaning  | lifeguarding |
| jaywalkers      | keys          | known    | leaner   | lift         |
| jazz            | kick          | lace     | leanest  | lifts        |
| jeans           | kicks         | laces    | leap     | lifted       |
| jeep            | kicked        | laced    | leaps    | lifting      |
| jeeps           | kicking       | lacing   | leapt    | light        |
| jelly           | kid           | lad      | leaping  | lights       |
| jellies         | kids          | lads     | learn    | lit          |
| jerk            | kidded        | ladder   | learns   | lighted      |
| jerks           | kidding       | ladders  | learned  | lighting     |
| jerked          | kidnap        | lady     | learning | lighter      |
| jerking         | kidnaps       | ladies   | leather  | lightest     |
| jet             | kidnapped     | lake     | leathers | lightness    |
| jets            | kidnapping    | lakes    | leave    | lighthouse   |
| jewel           | kill          | lamb     | left     | lighthouses  |
| jewels          | kills         | lamps    | leaving  | lightning    |
| jewelry         | killed        | land     | leg      | like         |
| jig             | killing       | lands    | legs     | likes        |
| jigs            | kind          | landed   | lemon    | liked        |
| job             | kinds         | landing  | lemons   | liking       |
| jobs            | kinder        | lane     | lemonade | lily         |
| join            | kindest       | lanes    | lend     | lilies       |
| joins           | kindness      | language | lends    | limb         |
| joined          | kindergarten  | language | lent     | limbs        |
| joining         | kindergartens | lantern  | lending  | lime         |
| joke            | king          | lanterns | length   | limes        |
| jokes           | kings         | lap      | lengths  | line         |
| joked           | kiss          | laps     | lens     | lines        |
| joking          | kisses        | lapped   | lenses   | lined        |
| jolly           | kissed        | lapping  | leopard  | lining       |
| jollier         | kissing       | large    | leopards | linen        |
| jolliest        | kit           | larger   | less     | linens       |
| journey         | kits          | largest  | lesser   | lion         |
| journeys        | kitchen       | last     | least    | lions        |
| journeys        | kitchens      | lasts    | lesson   | lip          |
| journeying      | kite          | lasted   | lessons  | lips         |
| joy             | kites         | lasting  | let      | lipstick     |
| joys            | kitty         | late     | lets     | liquor       |
| joyful          | kitties       | later    | letting  | liquors      |
| judge           | knee          | latest   | letter   | list         |
| judges          | knees         | laugh    |          |              |

|            |              |            |                 |              |
|------------|--------------|------------|-----------------|--------------|
| lists      | lots         | man        | May             | messezngrs   |
| listed     | lotion       | men        | maybe           | met          |
| listing    | lotions      | mans       | mayor           | metal        |
| listen     | loud         | manned     | mayors          | metals       |
| listens    | louder       | manning    | me              | meter        |
| listened   | loudest      | manage     | meadow          | meters       |
| listening  | loudspeaker  | manages    | meadows         | metered      |
| litterbug  | loudspeakers | managed    | meal            | metering     |
| litterbugs | love         | managing   | meals           | microphone   |
| little     | loved        | manager    | mean            | microphones  |
| littler    | loving       | managers   | means           | middle       |
| littlest   | low          | mane       | meant           | middles      |
| live       | lower        | manes      | meaning         | midget       |
| lived      | lowest       | manners    | meaner          | midgets      |
| living     | luck         | many       | meanest         | midnight     |
| liver      | lucky        | map        | meanings        | midsummer    |
| livers     | luckier      | maps       | measure         | might        |
| lizard     | luckiest     | mapped     | measures        | mighty       |
| lizards    | luggage      | mapping    | measured        | mightier     |
| load       | lullaby      | maple      | measuring       | mightiest    |
| loads      | lullabies    | maples     | meat            | mile         |
| loaded     | lumber       | marble     | meats           | miles        |
| loading    | lumbers      | marbles    | medicine        | milk         |
| loaf       | lumbered     | march      | medicines       | milks        |
| loaves     | lumbering    | marches    | meet            | milked       |
| loan       | lump         | marched    | meets           | milking      |
| loans      | lumps        | marching   | meeting         | milk shake   |
| loaned     | lumped       | mark       | melon           | milk shakes  |
| loaning    | lumping      | marks      | melons          | mill         |
| lobster    | lunch        | marked     | melt            | mills        |
| lobsters   | lunches      | marking    | melts           | milled       |
| lock       | lung         | market     | melted          | milling      |
| locks      | lungs        | markets    | melting         | million      |
| locked     | luxury       | marketed   | member          | millions     |
| locking    | luxuries     | marketing  | members         | millionaire  |
| log        | ma           | marriage   | memorize        | millionaires |
| logs       | macaroni     | marriages  | memorizes       | mind         |
| logged     | machine      | marry      | memorized       | minds        |
| logging    | machines     | marries    | memorizing      | minded       |
| lollipop   | mad          | married    | memory          | mindng       |
| lollipops  | madder       | marrying   | memories        | mine         |
| London     | maddest      | marvelous  | mend            | mines        |
| lone       | magazine     | mash       | mends           | mined        |
| lonesome   | magazines    | mashes     | mended          | mining       |
| long       | magic        | mashed     | mending         | miner        |
| longs      | magnet       | mashing    | mention         | miners       |
| longed     | magnets      | mask       | mentions        | minister     |
| longing    | maid         | masks      | mentioned       | ministers    |
| longer     | maids        | masked     | mentioning      | mink         |
| longest    | mail         | masking    | menu            | minks        |
| look       | mails        | master     | meow            | minnow       |
| looks      | mailed       | masters    | meows           | minnows      |
| looked     | mailing      | mastered   | meowed          | mint         |
| looking    | mailman      | mastering  | meowing         | mints        |
| loop       | mailmen      | mat        | merchant        | minted       |
| loops      | major        | mats       | merchants       | mintng       |
| looped     | major        | match      | mermaid         | minute       |
| looping    | major        | matches    | mermaids        | minutes      |
| loose      | major        | matched    | merry           | miracle      |
| looser     | majorette    | matching   | merrier         | miracles     |
| loosest    | majorettes   | mate       | merriest        | mirror       |
| lord       | make         | mated      | merry go round  | mirrors      |
| lords      | makes        | mated      | merry go rounds | mirrored     |
| lose       | made         | mating     | mess            | mirroring    |
| loses      | making       | matter     | messes          | misery       |
| losing     | make believe | matters    | messed          | miseries     |
| loss       | male         | mattered   | messng          | mislay       |
| losses     | males        | matterng   | message         | mislays      |
| lost       | mama         | mattress   | messages        | mislaid      |
| lot        | mamas        | mattresses | messenger       | mislayng     |

|             |                |             |             |           |
|-------------|----------------|-------------|-------------|-----------|
| misplace    | mooed          | mushroom    | needles     | noisy     |
| misplaces   | mooring        | mushrooms   | Negro       | noisier   |
| misplaced   | moon           | mushroomed  | Negroes     | noisiest  |
| misplacing  | moons          | mushrooming | neighbor    | none      |
| misprint    | moonlight      | music       | neighbors   | noodle    |
| misprints   | moose          | musical     | neighbored  | noodles   |
| misprinted  | mop            | musicals    | neighboring | noon      |
| misprinting | mops           | musician    | neither     | normal    |
| miss        | mopped         | musicians   | nerve       | north     |
| misses      | mopping        | must        | nerves      | northern  |
| missed      | more           | mustn't     | nest        | noses     |
| missing     | morning        | mustard     | nests       | not       |
| missile     | mornings       | mustards    | nested      | note      |
| missiles    | most           | my          | nesting     | notes     |
| misspell    | motel          | myself      | net         | noted     |
| misspells   | motels         | nail        | nets        | noting    |
| misspelled  | moth           | nails       | netted      | nothing   |
| misspelling | moths          | nailed      | netting     | notice    |
| mist        | mother         | nailing     | never       | notices   |
| mists       | mothers        | name        | new         | noticed   |
| misted      | mothered       | names       | newer       | noticing  |
| misting     | mothering      | named       | newest      | November  |
| misty       | motion         | naming      | newborn     | now       |
| mistier     | motions        | nap         | newborns    | nowhere   |
| mistiest    | motioned       | naps        | newcomer    | number    |
| mistake     | motioning      | napped      | newcomers   | numbers   |
| mistakes    | motor          | napping     | news        | numbered  |
| mistook     | motors         | napkin      | newscast    | numbering |
| mistaking   | motored        | napkins     | newscasts   | nurse     |
| mister      | motoring       | narrow      | newscasting | nurses    |
| mitt        | motorcycle     | narrows     | newspaper   | nursed    |
| mitts       | motorcycles    | narrowed    | newspapers  | nursing   |
| mitten      | mountain       | narrowing   | next        | nursery   |
| mittens     | mountains      | narrower    | nibble      | nurseries |
| mix         | mouse          | nasty       | nibbles     | nut       |
| mixes       | mice           | nastier     | nibbled     | nuts      |
| mixed       | mouth          | nastiest    | nibbling    | oak       |
| mixing      | mouths         | nation      | nice        | oaks      |
| mixture     | mouthed        | nations     | nicer       | oar       |
| mixtures    | mouthing       | nature      | nicest      | oars      |
| mob         | movable        | natures     | nickel      | oatmeal   |
| mobs        | move           | naughty     | nickels     | oats      |
| mobbed      | moves          | naughtier   | nickname    | obey      |
| mobbing     | moved          | naughtiest  | nicknames   | obeys     |
| model       | moving         | navy        | night       | obeyed    |
| models      | movie          | navies      | nights      | obeying   |
| modeled     | movies         | near        | nightfall   | ocean     |
| modelled    | mow            | nears       | nightfalls  | oceans    |
| modeling    | mows           | neared      | nightmare   | o'clock   |
| modelling   | mowed          | nearing     | nightmares  | October   |
| modern      | mowing         | nearer      | nighttime   | octopus   |
| moist       | much           | nearest     | nighttimes  | octopuses |
| moisture    | mud            | nearby      | nine        | odd       |
| mom         | muffin         | neat        | nines       | odder     |
| momms       | muffins        | neater      | nineteen    | oddest    |
| moment      | mule           | neatest     | ninteens    | of        |
| moments     | mules          | neatness    | ninety      | off       |
| Monday      | multiply       | necessary   | nineties    | offer     |
| Mondays     | multiplies     | neck        | ninths      | offers    |
| money       | multiplied     | necks       | ninths      | offered   |
| monkey      | multiplying    | necklace    | nipple      | offering  |
| monkeys     | multiplication | necklaces   | nipples     | office    |
| monkeyed    | mumps          | necktie     | no          | offices   |
| monkeying   | murder         | neckties    | nobody      | often     |
| monster     | murders        | need        | nod         | oil       |
| monsters    | murdered       | needs       | nods        | oils      |
| month       | murdering      | needed      | nodded      | oiled     |
| months      | museum         | needing     | nodding     | oiling    |
| moo         | museums        | needn't     | noise       | okay      |
| moos        | mush           | needle      | noises      | old       |

|            |             |              |             |               |
|------------|-------------|--------------|-------------|---------------|
| older      | overdo      | pancake      | paid        | permits       |
| oldest     | overdoes    | pancakes     | paying      | permitted     |
| on         | overdone    | panda        | payment     | permitting    |
| once       | overdoing   | pandas       | payments    | person        |
| one        | overeat     | pants        | pea         | persons       |
| ones       | overeats    | papa         | peas        | personal      |
| one fourth | overate     | papas        | peace       | pest          |
| oneself    | overeating  | paper        | peaceful    | pests         |
| one way    | overflow    | papers       | peach       | pet           |
| onion      | overflows   | parade       | peaches     | pets          |
| onions     | overflowed  | parades      | peacock     | petted        |
| only       | overflowing | paraded      | peacocks    | petting       |
| onward     | overhead    | parading     | peak        | phone         |
| onwards    | overnight   | pardon       | peaks       | phones        |
| open       | overseas    | pardons      | peaked      | phonograph    |
| opens      | overtime    | pardoned     | peaking     | phonographs   |
| opened     | overweight  | pardoning    | peanut      | photo         |
| opening    | owe         | parent       | peanuts     | photos        |
| operator   | owes        | parents      | pear        | photograph    |
| operators  | owed        | park         | pears       | photographs   |
| opossum    | owing       | parks        | pearl       | photographed  |
| opossums   | owl         | parked       | pearls      | photographing |
| or         | owls        | parking      | pecan       | piano         |
| orange     | own         | parrot       | pecans      | pianos        |
| oranges    | owns        | parrots      | peck        | pick          |
| orbit      | owned       | part         | pecks       | picks         |
| orbits     | owning      | parts        | pecked      | picked        |
| orbited    | pa          | parted       | pecking     | picking       |
| orbiting   | pack        | parting      | peek        | pickle        |
| orchard    | packs       | partner      | peeks       | pickles       |
| orchards   | packed      | partners     | peeked      | pickled       |
| order      | packing     | partnership  | peeking     | pickling      |
| orders     | package     | partnerships | peel        | picnic        |
| ordered    | packages    | party        | peels       | picnics       |
| ordering   | packaged    | parties      | peeled      | picnicked     |
| ordinary   | packaging   | pass         | peeling     | picnicking    |
| organ      | pad         | passes       | peep        | picture       |
| organs     | pads        | passed       | peeps       | pictures      |
| orphan     | padded      | passing      | peeped      | pictured      |
| orphans    | padding     | passenger    | peeping     | picturing     |
| ostrich    | page        | passengers   | peg         | pie           |
| ostriches  | pages       | password     | pegs        | pies          |
| other      | paged       | passwords    | pegged      | piece         |
| others     | paging      | past         | pegging     | pieces        |
| ouch       | pail        | paste        | pen         | pieced        |
| ought      | pails       | pastes       | pens        | piecing       |
| ounce      | pain        | pasted       | penned      | pig           |
| ounces     | pains       | pasting      | penning     | pigs          |
| our        | painful     | pasture      | pencil      | pigeon        |
| ours       | paint       | pastures     | pencils     | pigeons       |
| ourselves  | paints      | pat          | penguin     | pile          |
| out        | painted     | pats         | penguins    | piles         |
| outer      | painting    | patted       | penny       | piled         |
| outdoors   | pair        | patting      | pennies     | piling        |
| outlaw     | pairs       | patch        | people      | Pilgrim       |
| outlaws    | paired      | patches      | peoples     | Pilgrims      |
| outlawed   | pairing     | patched      | pep         | pill          |
| outlawing  | pajamas     | patching     | peppy       | pill          |
| outline    | pal         | path         | peppier     | pillow        |
| outlines   | pals        | paths        | peppiest    | pillows       |
| outlined   | palace      | pave         | pepper      | pilot         |
| outlining  | palaces     | paves        | peppers     | pilots        |
| outside    | pale        | paved        | peppermint  | piloted       |
| oven       | pales       | paving       | peppermints | piloting      |
| ovens      | paled       | paw          | perfume     | pimple        |
| over       | paling      | paws         | perfumes    | pimples       |
| overalls   | paler       | pawed        | perhaps     | pin           |
| overboard  | palest      | pawing       | period      | pins          |
| overcoat   | pan         | pay          | periods     | pinned        |
| overcoats  | pans        | pays         | permit      | pinning       |

|            |             |             |             |              |
|------------|-------------|-------------|-------------|--------------|
| pin        | playgrounds | popping     | presidents  | puff         |
| pine       | playhouse   | popcorn     | press       | puffs        |
| pineapple  | playhouses  | poppy       | presses     | puffed       |
| pineapples | playmate    | poppies     | pressed     | puffing      |
| ping pong  | playmates   | porch       | pressing    | pull         |
| pink       | plaything   | porches     | pretend     | pulls        |
| pinkish    | playthings  | pork        | pretends    | pulled       |
| pinkish    | pleasant    | pose        | pretended   | pulling      |
| pinkish    | please      | poses       | pretending  | pump         |
| pinkish    | pleases     | posed       | pretty      | pumps        |
| pinkish    | pleased     | posing      | prettier    | pumped       |
| pinkish    | pleasing    | possible    | prettiest   | pumping      |
| pinkish    | pleasure    | post        | prevent     | pumpkin      |
| pinkish    | pleasures   | posts       | prevents    | pumpkins     |
| pinkish    | plenty      | posted      | prevented   | punch        |
| pinkish    | plow        | posting     | preventing  | punches      |
| pinkish    | plows       | postage     | price       | punched      |
| pinkish    | plowed      | postman     | prices      | punching     |
| pinkish    | plowing     | postmen     | priced      | punish       |
| pinkish    | plug        | postmark    | pricing     | punishes     |
| pinkish    | plugs       | postmarks   | primary     | punished     |
| pinkish    | plugged     | postmarked  | prince      | punishing    |
| pinkish    | plugging    | postmarking | princes     | pup          |
| pinkish    | plum        | postpone    | princess    | pups         |
| pinkish    | plums       | postpones   | princesses  | puppy        |
| pinkish    | plumber     | postponed   | print       | puppies      |
| pinkish    | plumbers    | postponing  | prints      | pupil        |
| pinkish    | plus        | pot         | printed     | pupils       |
| pinkish    | pocket      | pots        | printing    | puppet       |
| pinkish    | pockets     | potted      | prison      | puppets      |
| pinkish    | pocketed    | potting     | prisons     | pure         |
| pinkish    | pocketing   | potato      | private     | purer        |
| pinkish    | pocketbook  | potatoes    | privates    | purest       |
| pinkish    | pocketbooks | pottery     | prize       | purple       |
| pinkish    | poem        | pound       | prizes      | purples      |
| pinkish    | poems       | pounds      | prized      | purse        |
| pinkish    | point       | pounded     | prizing     | purses       |
| pinkish    | points      | pounding    | problem     | push         |
| pinkish    | pointed     | pour        | problems    | pushes       |
| pinkish    | pointing    | pours       | program     | pushed       |
| pinkish    | poison      | poured      | programs    | pushing      |
| pinkish    | poisons     | pouring     | programmed  | puss         |
| pinkish    | poisoned    | powder      | programming | pussy        |
| pinkish    | poisoning   | powders     | promise     | pussies      |
| pinkish    | poke        | power       | promises    | put          |
| pinkish    | pokes       | powers      | promised    | puts         |
| pinkish    | poked       | powerful    | promising   | putting      |
| pinkish    | poking      | prairie     | promote     | puzzle       |
| pinkish    | pole        | prairies    | promotes    | puzzles      |
| pinkish    | poles       | praise      | promoted    | puzzled      |
| pinkish    | police      | praises     | promoting   | puzzling     |
| pinkish    | policeman   | praised     | proof       | quack        |
| pinkish    | policemen   | praising    | property    | quacks       |
| pinkish    | polite      | pray        | properties  | quacked      |
| pinkish    | pond        | prays       | protect     | quacking     |
| pinkish    | ponds       | prayed      | protects    | quarrel      |
| pinkish    | pony        | praying     | protected   | quarrels     |
| pinkish    | ponies      | prayer      | protecting  | quarreled    |
| pinkish    | poodle      | prayers     | proud       | quarrelled   |
| pinkish    | poodles     | prepare     | prouder     | quarreling   |
| pinkish    | pool        | prepares    | proudest    | quarreling   |
| pinkish    | pools       | prepared    | prove       | quart        |
| pinkish    | pooled      | preparing   | proves      | quarts       |
| pinkish    | pooling     | present     | proved      | quarter      |
| pinkish    | poor        | presents    | proving     | quarters     |
| pinkish    | poorer      | presented   | prune       | quartered    |
| pinkish    | poorest     | presenting  | prunes      | quartering   |
| pinkish    | pop         | preserver   | public      | quarterback  |
| pinkish    | pops        | preservers  | puddle      | quarterbacks |
| pinkish    | popped      | President   | puddles     | queen        |

|             |              |               |             |           |
|-------------|--------------|---------------|-------------|-----------|
| queens      | rammed       | redder        | reported    | roads     |
| queer       | ramming      | reddest       | reporting   | roar      |
| queerer     | ranch        | redbird       | respect     | roars     |
| queerest    | ranches      | redbirds      | respects    | roared    |
| question    | range        | redbreast     | respected   | roaring   |
| questions   | ranges       | redbreasts    | respecting  | roast     |
| questioned  | ranged       | reflect       | rest        | roasts    |
| questioning | ranging      | reflects      | rests       | roasted   |
| quick       | rap          | reflected     | rested      | roasting  |
| quicker     | raps         | reflecting    | resting     | rob       |
| quickest    | rapped       | refresh       | restaurant  | robs      |
| quiet       | rapping      | refreshes     | restaurants | robbed    |
| quiets      | rascal       | refreshed     | retire      | robbing   |
| quieted     | rascals      | refreshing    | retires     | robbery   |
| quieting    | rat          | refreshment   | retired     | robberies |
| quieter     | rats         | refreshments  | retiring    | robe      |
| quietest    | rate         | refrigerator  | return      | robes     |
| quilt       | rates        | refrigerators | returns     | robin     |
| quilts      | rated        | refuse        | returned    | robins    |
| quilted     | rating       | refuses       | returning   | rock      |
| quilting    | rather       | refused       | review      | rocks     |
| quit        | rattle       | refusing      | reviews     | rocked    |
| quits       | rattles      | register      | reviewed    | rocking   |
| quitting    | rattled      | registers     | reviewing   | rocky     |
| quite       | rattling     | reindeer      | reward      | rockier   |
| rabbit      | rattlesnake  | rejoice       | rewards     | rockiest  |
| rabbits     | rattlesnakes | rejoices      | rewarded    | rocket    |
| raccoon     | raw          | rejoiced      | rewarding   | rockets   |
| raccoons    | ray          | rejoicing     | rhyme       | rocketed  |
| race        | rays         | rejoin        | rhymes      | rocketing |
| paces       | rayon        | rejoins       | rhymed      | roll      |
| raced       | rayons       | rejoined      | rhyming     | rolls     |
| racing      | razor        | rejoining     | rib         | rolled    |
| rack        | razors       | related       | ribs        | rolling   |
| racks       | reach        | religion      | ribbon      | roller    |
| racked      | reaches      | religions     | ribbons     | romance   |
| racking     | reached      | remain        | rice        | romances  |
| radio       | reaching     | remains       | rich        | roof      |
| radios      | read         | remained      | richer      | roofs     |
| radish      | reads        | remaining     | richest     | roofed    |
| radishes    | reading      | remember      | rid         | roofing   |
| rag         | ready        | remembers     | rids        | room      |
| rags        | readies      | remembered    | ridding     | rooms     |
| rail        | readied      | remembering   | riddle      | roomed    |
| rails       | readying     | remind        | riddles     | rooming   |
| railroad    | real         | reminds       | ride        | rooster   |
| railroads   | really       | reminded      | rides       | roosters  |
| rain        | rear         | reminding     | rode        | root      |
| rains       | rears        | remove        | riding      | roots     |
| rained      | reared       | removes       | right       | rooted    |
| raining     | rearing      | removed       | rights      | rooting   |
| rainy       | reason       | removing      | rim         | rope      |
| rainier     | reasons      | rent          | rims        | ropes     |
| rainiest    | reasoned     | rents         | ring        | roped     |
| rainbow     | reasoning    | rented        | rings       | roping    |
| rainbows    | rebuild      | renting       | rang        | rot       |
| raindrop    | rebuilds     | repair        | ringing     | rots      |
| raindrops   | rebuilt      | repairs       | rip         | rotted    |
| raise       | rebuilding   | repaired      | rips        | rotting   |
| raises      | receive      | repairing     | ripped      | rotten    |
| raised      | receives     | repay         | ripping     | rough     |
| raising     | received     | repays        | ripe        | rougher   |
| raisin      | receiving    | repaid        | riper       | roughest  |
| raisins     | recess       | repaying      | ripest      | round     |
| rake        | record       | repeat        | rise        | rounds    |
| rakes       | records      | repeats       | rises       | rounder   |
| raked       | recorded     | repeated      | rising      | roundest  |
| raking      | recording    | repeating     | river       | route     |
| ram         | red          | report        | rivers      | routes    |
| rams        | reds         | reports       | road        | row       |

|           |              |            |            |             |
|-----------|--------------|------------|------------|-------------|
| rows      | sanded       | scoop      | seeding    | shadows     |
| rowed     | sanding      | scoops     | seem       | shadowed    |
| rowing    | sandy        | scooped    | seems      | shadowing   |
| rowboat   | sandier      | scooping   | seemed     | shake       |
| rowboats  | sandiest     | scooter    | seeming    | shakes      |
| royal     | sandwich     | scooters   | seen       | shook       |
| rub       | sandwiches   | score      | seesaw     | shaking     |
| rubs      | sap          | scores     | seesaws    | shall       |
| rubbed    | saps         | scored     | selection  | shame       |
| rubbing   | satisfactory | scoring    | selections | shames      |
| rubber    | Saturday     | scout      | self       | shamed      |
| rug       | Saturdays    | scouts     | selfs      | shaming     |
| rugs      | sauce        | scouted    | selfish    | shampoo     |
| rule      | saucers      | scouting   | sell       | shampoos    |
| rules     | saucer       | scrap      | sells      | shampooed   |
| ruled     | saucers      | scraps     | sold       | shampooing  |
| ruling    | sausages     | scrapped   | selling    | shape       |
| run       | sausages     | scrapping  | send       | shapes      |
| runs      | save         | scratch    | sends      | shaped      |
| ran       | saves        | scratches  | sent       | shaping     |
| running   | saved        | scratched  | sending    | share       |
| rung      | saving       | scratching | sense      | shares      |
| rungs     | savings      | scream     | senses     | shared      |
| rush      | saw          | screams    | sensed     | sharing     |
| rushes    | saws         | screamed   | sensing    | sharp       |
| rushed    | sawed        | screaming  | sensible   | sharper     |
| rushing   | sawing       | screen     | sentence   | sharpest    |
| rust      | sawdust      | screens    | sentences  | shave       |
| rusts     | say          | screened   | sentenced  | shaves      |
| rusted    | says         | screening  | sentencing | shaved      |
| rusting   | said         | screw      | separate   | shaving     |
| rusty     | saying       | screws     | separates  | she         |
| rustier   | scab         | screwed    | separated  | she'd       |
| rustiest  | scabs        | screwing   | separating | she'll      |
| sack      | scale        | scrub      | September  | she's       |
| sacks     | scales       | scrubs     | servant    | sheep       |
| sad       | scalp        | scrubbed   | servants   | sheet       |
| sadder    | scalps       | scrubbing  | serve      | sheets      |
| saddest   | scalped      | sea        | serves     | shelf       |
| sadness   | scalping     | seas       | served     | shelves     |
| saddle    | scamper      | seal       | serving    | shell       |
| saddles   | scampers     | seals      | service    | shells      |
| safe      | scampered    | sealed     | services   | shelled     |
| safes     | scampering   | sealing    | serviced   | shelling    |
| safer     | scare        | seam       | servicing  | shepherd    |
| safest    | scares       | seams      | set        | shepherds   |
| safety    | scared       | search     | sets       | shepherded  |
| sail      | scaring      | searches   | setting    | shepherding |
| sails     | scary        | searched   | settle     | shine       |
| sailed    | scarier      | searching  | settles    | shines      |
| sailing   | scariest     | seashore   | settled    | shined      |
| sailor    | scarecrow    | seashores  | settling   | shining     |
| sailors   | scarecrows   | season     | seven      | shone       |
| sailboat  | scarf        | seasons    | sevens     | shiny       |
| sailboats | scarves      | seasoned   | seventeen  | shinier     |
| saint     | scatter      | seasoning  | seventeens | shiniest    |
| saints    | scatters     | seat       | seventh    | ship        |
| salad     | scattered    | seats      | sevenths   | ships       |
| salads    | scattering   | seated     | seventy    | shipped     |
| sale      | school       | seating    | seventies  | shipping    |
| sales     | schools      | second     | several    | shipment    |
| salt      | schooled     | seconds    | sew        | shipments   |
| salts     | schooling    | secret     | sews       | shirt       |
| same      | schoolboy    | secrets    | sewed      | shirts      |
| sample    | schoolboys   | see        | sewing     | shock       |
| samples   | schoolgirl   | sees       | shade      | shocks      |
| sampled   | schoolgirls  | seeing     | shady      | shocked     |
| sampling  | science      | seed       | shadier    | shocking    |
| sand      | sciences     | seeds      | shadiest   | shoe        |
| sands     | scissors     | seeded     | shadow     | shoes       |



|            |           |             |           |            |
|------------|-----------|-------------|-----------|------------|
| shoemaker  | sighs     | ski         | sloshing  | snowiest   |
| shoemakers | sighed    | skis        | slow      | snowball   |
| shoot      | sighing   | skied       | slows     | snowballs  |
| shoots     | sight     | skiing      | slowed    | snowflake  |
| shooting   | sights    | skin        | slowing   | snowflakes |
| shop       | sighted   | skins       | slower    | snug       |
| shops      | sighting  | skinned     | slowest   | so         |
| shopped    | sign      | skinning    | sly       | soak       |
| shopping   | signs     | skip        | slyer     | soaks      |
| shore      | signed    | skips       | slyest    | soaked     |
| shores     | signing   | skipped     | small     | soaking    |
| short      | silence   | skipping    | smaller   | soap       |
| shorts     | silences  | skirt       | smallest  | social     |
| shorted    | silenced  | skirts      | smart     | sock       |
| shorting   | silencing | skirted     | smarter   | socks      |
| shorter    | silent    | skirting    | smartest  | soda       |
| shortest   | silk      | skunk       | smash     | sodas      |
| shortness  | silks     | skunks      | smashes   | sofa       |
| shot       | sill      | sky         | smashed   | sofas      |
| shots      | sills     | skies       | smashing  | soft       |
| should     | silly     | skyscraper  | smell     | softer     |
| shouldn't  | sillier   | skyscrapers | smells    | softest    |
| shoulder   | silliest  | slam        | smelled   | softball   |
| shoulders  | silver    | slams       | smelling  | softballs  |
| shout      | silvers   | slammed     | smile     | soil       |
| shouts     | simple    | slamming    | smiles    | soils      |
| shouted    | simpler   | slap        | smiled    | soiled     |
| shouting   | simplest  | slaps       | smiling   | soiling    |
| shove      | sin       | slapped     | smog      | soldier    |
| shoves     | sins      | slapping    | smoke     | soldiers   |
| shoved     | sinned    | slave       | smokes    | solid      |
| shoving    | sinning   | slaves      | smoked    | solids     |
| shovel     | since     | slaved      | smoking   | solve      |
| shovels    | sing      | slaving     | smoky     | solves     |
| shoveled   | sings     | sled        | smokier   | solved     |
| shovelled  | sang      | sleds       | smokiest  | solving    |
| shoveling  | singing   | sledded     | smooth    | some       |
| shovelling | single    | sledding    | smooths   | somebody   |
| show       | sink      | sleep       | smoothed  | someone    |
| shows      | sinks     | sleeps      | smoothing | something  |
| showed     | sank      | slept       | smoother  | sometime   |
| showing    | sinking   | sleeping    | smoothest | sometimes  |
| shown      | sip       | sleepy      | snack     | somewhere  |
| shower     | sips      | sleepier    | snacks    | son        |
| showers    | sipped    | sleepiest   | snacked   | sons       |
| showered   | sipping   | sleeve      | snacking  | song       |
| showering  | sir       | sleeves     | snail     | songs      |
| shut       | sis       | sleigh      | snails    | soon       |
| shuts      | sister    | sleighs     | snake     | sooner     |
| shutting   | sisters   | slice       | snakes    | soonest    |
| shutter    | sit       | slices      | snaked    | sore       |
| shutters   | sits      | sliced      | snaking   | sores      |
| shy        | sat       | slicing     | snap      | rorer      |
| shies      | sitting   | slide       | snaps     | sorest     |
| shied      | six       | slides      | snapped   | sorrow     |
| shying     | sixes     | slid        | snapping  | sorrows    |
| shier      | sixteen   | sliding     | sneeze    | sorry      |
| shiest     | sixteens  | slim        | sneezes   | sorrier    |
| sick       | sixth     | slimmer     | sneezed   | sorriest   |
| sicker     | sixths    | slimmest    | sneezing  | sort       |
| sickest    | sixty     | slip        | sniff     | sorts      |
| sickness   | sixties   | slips       | sniffs    | sorted     |
| sicknesses | size      | slipped     | sniffed   | sorting    |
| side       | sizes     | slipping    | sniffing  | soul       |
| sides      | sized     | slipper     | snow      | souls      |
| sided      | sizing    | slippers    | snows     | sound      |
| siding     | skate     | slippery    | snowed    | sounds     |
| sidewalk   | skates    | slosh       | snowing   | sounded    |
| sidewalks  | skated    | sloshes     | snowy     | sounding   |
| sigh       | skating   | sloshed     | snowier   | sounder    |

|              |            |            |             |               |
|--------------|------------|------------|-------------|---------------|
| soundest     | spitting   | squeaked   | stay        | stocked       |
| soup         | splash     | squeaking  | stays       | stocking      |
| soups        | splashes   | squeaky    | stayed      | stockings     |
| sour         | splashed   | squeakier  | staying     | stolen        |
| south        | splashing  | squeakiest | steak       | stomach       |
| southern     | split      | squeal     | steaks      | stomachs      |
| space        | splits     | squeals    | steal       | stone         |
| spaces       | splitting  | squealed   | steals      | stones        |
| spaced       | spoil      | squealing  | stole       | stool         |
| spacing      | spoils     | squeeze    | stealing    | stools        |
| spaceship    | spoiled    | squeezes   | steam       | stoop         |
| spaceships   | spoiling   | squeezed   | steams      | stoops        |
| spade        | spoke      | squeezing  | steamed     | stooped       |
| spades       | spokes     | squirrel   | steaming    | stooping      |
| spaghetti    | sponge     | squirrels  | steel       | stop          |
| spank        | sponges    | stab       | steep       | stops         |
| spanks       | sponged    | stabs      | steeper     | stopped       |
| spanked      | sponging   | stabbed    | steepest    | stopping      |
| spanking     | spook      | stabbing   | steeple     | stoplight     |
| spark        | spooks     | stable     | steeples    | stoplights    |
| sparks       | spooked    | stables    | steer       | store         |
| sparked      | spooking   | stack      | steers      | stores        |
| parking      | spooky     | stacks     | steered     | stored        |
| sparrow      | spookier   | stacked    | steering    | storing       |
| sparrows     | spookiest  | stacking   | step        | storeroom     |
| speak        | spool      | stage      | steps       | storerooms    |
| speaks       | spools     | stages     | stepped     | stork         |
| speaking     | spoon      | staged     | stepping    | storks        |
| spear        | spoons     | staging    | stepfather  | storm         |
| spears       | spooned    | stair      | stepfathers | storms        |
| speared      | spooning   | stairs     | stepmother  | stormed       |
| spearing     | sport      | stale      | stepmothers | storming      |
| special      | sports     | stalk      | stereo      | stormy        |
| speck        | spot       | stalks     | stereos     | stormier      |
| specks       | spots      | stalked    | stew        | stormiest     |
| speech       | spotted    | stalking   | stews       | story         |
| speeches     | spotting   | stamp      | stewed      | stories       |
| speed        | sprain     | stamps     | stewing     | storyteller   |
| speeds       | sprains    | stamped    | stick       | storytellers  |
| ped          | sprained   | stamping   | sticks      | stove         |
| speeding     | spraying   | stand      | stuck       | stoves        |
| speedometer  | spray      | stands     | sticking    | straight      |
| speedometers | sprays     | stood      | sticky      | straighter    |
| spell        | sprayed    | standing   | stickier    | straightest   |
| spells       | spraying   | star       | stickiest   | straighten    |
| spelled      | spread     | stars      | stiff       | straightens   |
| spelling     | spreads    | starred    | stiffer     | straightened  |
| spend        | spreading  | starring   | stiffest    | straightening |
| spends       | spring     | starch     | still       | strange       |
| spent        | springs    | starches   | stiller     | stranger      |
| spending     | sprang     | stare      | stillest    | strangest     |
| spice        | springing  | stares     | sting       | strap         |
| spices       | sprinkle   | stared     | stings      | straps        |
| spiced       | sprinkles  | staring    | stung       | strapped      |
| spicing      | sprinkled  | start      | stinging    | strapping     |
| spider       | sprinkling | starts     | stink       | straw         |
| spiders      | spy        | started    | stinks      | straws        |
| spill        | spies      | starting   | stank       | strawberry    |
| spills       | spied      | starve     | stunk       | strawberries  |
| spilled      | spying     | starves    | stinking    | stream        |
| spilling     | square     | starved    | stir        | streams       |
| spin         | squares    | starving   | stirs       | streamed      |
| spins        | squared    | state      | stirred     | streaming     |
| spun         | squaring   | states     | stirring    | street        |
| spinning     | squash     | stated     | stitch      | streets       |
| spirit       | squashes   | stating    | stitches    | strength      |
| spirits      | squashed   | station    | stitched    | strengths     |
| spit         | squashing  | stations   | stitching   | stretch       |
| spits        | squeak     | statue     | stock       | stretches     |
| spat         | squeaks    | statues    | stocks      | stretched     |

|              |              |             |             |              |
|--------------|--------------|-------------|-------------|--------------|
| stretching   | suns         | sweaters    | talked      | teasing      |
| strike       | sunny        | sweep       | talking     | teaspoon     |
| strikes      | sunnier      | sweeps      | tall        | teaspoons    |
| struck       | sunniest     | swept       | taller      | telegram     |
| striking     | sunbeam      | sweeping    | tallest     | telegrams    |
| string       | sunbeams     | sweepstakes | tame        | telephone    |
| strings      | sunburn      | sweet       | tames       | telephones   |
| strung       | sunburns     | sweets      | tamed       | telephoned   |
| stringing    | sunburned    | sweeter     | taming      | telephoning  |
| strip        | sunburning   | sweetest    | tamer       | telescope    |
| strips       | Sunday       | sweeten     | tamest      | telescopes   |
| stripped     | Sundays      | sweetens    | tan         | telescoped   |
| stripping    | sundown      | sweetened   | tanner      | telescoping  |
| stripe       | sundowns     | sweetening  | tannest     | television   |
| stripes      | sunflower    | sweetness   | tangle      | televisions  |
| strong       | sunflowers   | sweetheart  | tangles     | tell         |
| stronger     | sung         | swehearts   | tangled     | tells        |
| strongest    | sunk         | swell       | tangling    | told         |
| student      | sunken       | swells      | tank        | telling      |
| students     | sunlight     | swelled     | tanks       | temper       |
| studio       | sunrise      | swelling    | tap         | tempers      |
| studios      | sunrises     | swift       | taps        | tempered     |
| study        | sunset       | swifter     | tapped      | tempering    |
| studies      | sunsets      | swiftest    | tapping     | temperature  |
| studied      | sunshine     | swim        | tape        | temperatures |
| studying     | supper       | swims       | tapes       | ten          |
| stuff        | suppers      | swam        | taped       | tens         |
| stuffs       | suppose      | swum        | taping      | tend         |
| stuffed      | supposes     | swimming    | tar         | tends        |
| stuffing     | supposed     | swing       | taste       | tended       |
| stumble      | supposed     | swing       | tastes      | tending      |
| stumbles     | supposing    | swings      | tasted      | tender       |
| stumbled     | sure         | swung       | tasting     | tenders      |
| stumbling    | surer        | swinging    | tattle      | tennis       |
| stunt        | surest       | switch      | tattles     | tent         |
| stunts       | surface      | switches    | tattled     | tents        |
| style        | surfaces     | switched    | tattling    | tenth        |
| styles       | surfaced     | switching   | tattling    | tenths       |
| styled       | surfacing    | sword       | tattletale  | term         |
| styling      | surfboard    | swords      | tattletales | terms        |
| subject      | surfboards   | syllable    | tattoo      | terrible     |
| subjects     | surgeon      | syllables   | tattoos     | test         |
| submarine    | surgeons     | table       | tattooed    | tests        |
| submarines   | surprise     | tables      | tattooing   | tested       |
| subtract     | surprises    | tablespoon  | tax         | testing      |
| subtracts    | surprised    | tablespoons | taxes       | than         |
| subtracted   | surprising   | tablet      | taxed       | thank        |
| subtracting  | surroundings | tablets     | taxing      | thanks       |
| subtraction  | swallow      | tack        | taxpayer    | thanked      |
| subtractions | swallows     | tacks       | taxpayers   | thanking     |
| such         | swallowed    | tacked      | tea         | thankful     |
| suck         | swallowing   | tacking     | teas        | Thanksgiving |
| sucks        | suspect      | taffy       | teach       | that         |
| sucked       | suspects     | tag         | teaches     | that's       |
| sucking      | suspected    | tags        | taught      | the          |
| sudden       | suspecting   | tagged      | teaching    | theater      |
| suffer       | swamp        | tagging     | teacher     | theaters     |
| suffers      | swamps       | tail        | teachers    | their        |
| suffered     | swamped      | tails       | team        | theirs       |
| suffering    | swamping     | tailor      | teamed      | them         |
| sugar        | swan         | tailors     | teaming     | then         |
| suit         | swans        | tailored    | teapot      | there        |
| suits        | swear        | tailoring   | teapots     | there's      |
| suited       | swears       | take        | tear        | thermometer  |
| suiting      | swore        | takes       | tears       | thermometers |
| sum          | swearing     | took        | tore        | these        |
| sums         | sweat        | taking      | tearing     | they         |
| summer       | sweats       | tale        | tease       | they'd       |
| summers      | sweated      | tales       | teases      | they'll      |
| sun          | sweating     | talk        | teased      | they're      |
|              | sweater      | talks       |             |              |

|            |             |              |             |             |
|------------|-------------|--------------|-------------|-------------|
| they've    | tickles     | too          | traps       | try         |
| thick      | tickled     | tool         | trapped     | tries       |
| thicker    | tickling    | tools        | trapping    | tried       |
| thickest   | tiddlywinks | tooth        | trash       | trying      |
| thief      | tie         | teeth        | trashes     | tub         |
| thieves    | ties        | toothbrush   | trashed     | tubs        |
| thin       | tied        | toothbrushes | trashing    | tube        |
| thinner    | tying       | toothpaste   | travel      | tubes       |
| thinnest   | tiger       | top          | travels     | Tuesday     |
| thing      | tigers      | tops         | traveled    | Tuesdays    |
| things     | tight       | topped       | travelled   | tug         |
| think      | tighter     | topping      | traveling   | tugs        |
| thinks     | tightest    | torn         | travelling  | tugged      |
| thinking   | till        | tornado      | tray        | tugging     |
| third      | timber      | tornados     | trays       | tulip       |
| thirds     | timbers     | tornadoes    | treasure    | tulips      |
| thirst     | time        | torpedo      | treasures   | tumble      |
| thirsts    | times       | torpedoes    | treasured   | tumbles     |
| thirsted   | timed       | torpedoed    | treasuring  | tumbled     |
| thirsting  | timing      | torpedoing   | tree        | tumbling    |
| thirsty    | tin         | tortoise     | trees       | tune        |
| thirstier  | tins        | tortoises    | trespass    | tunes       |
| thirstiest | tinkle      | toss         | trespasses  | tuned       |
| thirteen   | tinkles     | tosses       | trespassed  | tuning      |
| thirteens  | tinkled     | tossed       | trespassing | tunnel      |
| thirty     | tinkling    | tossing      | trick       | tunnels     |
| thirties   | tiny        | total        | tricks      | tunneled    |
| this       | tinier      | totals       | tricked     | tunnelled   |
| thorn      | tiniest     | totalled     | tricking    | tunneling   |
| thorns     | tip         | totalling    | tricycle    | tunnelling  |
| those      | tips        | touch        | tricycles   | turkey      |
| thought    | tipped      | touches      | trim        | turkeys     |
| thoughts   | tipping     | touched      | trims       | turn        |
| thoughtful | tiptoe      | touching     | trimmed     | turns       |
| thousand   | tiptoes     | toward       | trimming    | turned      |
| thousands  | tiptoed     | towards      | trip        | turning     |
| thread     | tiptoeing   | towel        | trips       | turnip      |
| threads    | tire        | towels       | tripped     | turnips     |
| threaded   | tires       | town         | tripping    | turtle      |
| threading  | tired       | towns        | trombone    | turtles     |
| three      | tiring      | toy          | trombones   | twelve      |
| threes     | tissue      | toys         | troop       | twelves     |
| throat     | tissues     | trace        | troops      | twenty      |
| throats    | title       | traces       | trophy      | twenties    |
| throne     | titles      | traced       | trophies    | twice       |
| thrones    | to          | tracing      | trouble     | twig        |
| through    | toad        | track        | troubles    | twigs       |
| throw      | toads       | tracks       | troubled    | twin        |
| throws     | toast       | tracked      | troubling   | twins       |
| threw      | toasts      | tracking     | truck       | twist       |
| throwing   | toasted     | tractor      | trucks      | twists      |
| thrown     | toasting    | tractors     | trucked     | twisted     |
| thumb      | tobacco     | trade        | trucking    | twisting    |
| thumbs     | tobaccos    | trades       | true        | two         |
| thunder    | today       | traded       | truer       | twos        |
| thunders   | together    | trading      | truest      | type        |
| thundered  | toilet      | traffic      | truly       | types       |
| thundering | toilets     | trail        | trumpet     | typed       |
| Thursday   | tomato      | trails       | trumpets    | typing      |
| Thursdays  | tomatoes    | trailed      | trumpeted   | typewriter  |
| tick       | tomorrow    | trailing     | trumpeting  | typewriters |
| ticks      | ton         | train        | trunk       | ugly        |
| ticked     | tons        | trains       | trunks      | uglier      |
| ticking    | tone        | trained      | trust       | ugliest     |
| tick tock  | tones       | training     | trusts      | umbrella    |
| ticket     | toned       | tramp        | trusted     | umbrellas   |
| tickets    | toning      | tramps       | trusting    | umpire      |
| ticketed   | tongue      | tramped      | truth       | umpires     |
| ticketing  | tongues     | tramping     | truths      | uncle       |
| tickle     | tonight     | trap         | truthful    | uncles      |

|               |                 |           |             |              |
|---------------|-----------------|-----------|-------------|--------------|
| under         | ushering        | wagged    | watches     | wept         |
| underline     | vacant          | wagging   | watched     | weeping      |
| underlines    | vacation        | wagon     | watching    | weigh        |
| underlined    | vacations       | wagons    | watchdog    | weighs       |
| underlining   | vacationed      | waist     | watchdogs   | weighed      |
| understand    | vacationing     | waists    | water       | weighing     |
| understands   | Valentine       | wait      | waters      | weight       |
| understood    | Valentines      | waits     | watered     | weights      |
| understanding | Valentine's     | waited    | watering    | weighted     |
| undershirt    | valley          | waiting   | waterfall   | welcome      |
| undershirts   | valleys         | waiter    | waterfalls  | welcomes     |
| underwear     | actice          | waiters   | watermelon  | welcomed     |
| undress       | valuables       | wake      | watermelons | welcoming    |
| undresses     | value           | wakes     | waterproof  | well         |
| undressed     | values          | woke      | wave        | wells        |
| undressing    | vanish          | waking    | waves       | were         |
| uneducated    | vanishes        | waken     | waved       | weren't      |
| unemployed    | vanished        | wakens    | waving      | west         |
| unfair        | vanishing       | wakened   | wax         | western      |
| unfasten      | varnish         | wakening  | waxes       | westerns     |
| unfastens     | varnishes       | walk      | waxed       | wet          |
| unfastened    | varnished       | walks     | waxing      | wets         |
| unfastening   | varnishing      | walked    | way         | wetting      |
| unfinished    | vase            | walking   | ways        | wetter       |
| unfold        | vases           | wall      | we          | wettest      |
| unfolds       | vegetable       | walls     | we'll       | whale        |
| unfolded      | vegetables      | wallet    | we're       | whales       |
| unfolding     | velvet          | wallets   | weak        | whaling      |
| unfurnished   | velvets         | walnut    | weaker      | what         |
| unhappy       | verse           | walnuts   | weakest     | wheat        |
| unhappier     | verses          | wander    | weaken      | wheel        |
| unhappiest    | very            | wanders   | weakens     | wheels       |
| uniform       | vessel          | wandered  | weakened    | wheeled      |
| uniforms      | vessels         | wandering | weakening   | wheeling     |
| united        | vest            | want      | weakness    | wheelbarrow  |
| unkind        | vests           | wants     | weaknesses  | wheelbarrows |
| unknown       | vice president  | wanted    | wealth      | when         |
| unknowns      | vice presidents | wanting   | weapon      | where        |
| unnecessary   | view            | war       | weapons     | where's      |
| unsafe        | views           | wars      | wear        | which        |
| untie         | viewed          | warm      | wears       | while        |
| unties        | viewing         | warms     | wore        | whip         |
| untied        | village         | warmed    | wearing     | whips        |
| untying       | villages        | warming   | weather     | whipped      |
| untrue        | vine            | warmer    | weathers    | whipping     |
| unwilling     | vines           | warmest   | weathered   | whirl        |
| unwise        | violet          | warmth    | weathering  | whirls       |
| unwrap        | violets         | warn      | weave       | whirled      |
| unwraps       | violin          | warns     | weaves      | whirling     |
| unwrapped     | violins         | warned    | wove        | whirlpool    |
| unwrapping    | visit           | warning   | weaving     | whirlpools   |
| up            | visits          | wart      | web         | whirlwind    |
| upon          | visited         | warts     | webs        | whirlwinds   |
| upper         | visiting        | was       | wedding     | whisker      |
| upset         | visitor         | wasn't    | weddings    | whiskers     |
| upsets        | visitors        | wash      | Wednesday   | whisper      |
| upsetting     | vitamin         | washes    | Wednesdays  | whispers     |
| upstairs      | vitamins        | washed    | wee         | whispered    |
| uptown        | voice           | washing   | weed        | whispering   |
| upward        | voices          | washer    | weeds       | whistle      |
| upwards       | volleyball      | washers   | weeded      | whistles     |
| us            | volleyballs     | washroom  | weeding     | whistled     |
| use           | vote            | washrooms | week        | whistling    |
| uses          | votes           | wasp      | weeks       | white        |
| used          | voted           | wasps     | weekday     | whites       |
| using         | voting          | waste     | weekdays    | whiter       |
| useful        | waffle          | wastes    | weekend     | whitest      |
| usher         | waffles         | wasted    | weekends    | whiteness    |
| ushers        | wag             | wasting   | weep        | who          |
| ushered       | wags            | watch     | weeps       | whole        |

|            |             |             |          |            |
|------------|-------------|-------------|----------|------------|
| whom       | windows     | wondered    | wounds   | yelling    |
| whooping   | windowpane  | wondering   | wounded  | yellow     |
| whose      | windowpanes | wonderful   | wounding | yellowish  |
| why        | wine        | won't       | wrap     | yellowest  |
| wicked     | wines       | wood        | wraps    | yellowish  |
| wide       | wing        | woods       | wrapped  | yes        |
| wider      | wings       | wooden      | wrapping | yesterday  |
| widest     | wink        | woodchuck   | wreck    | yolk       |
| wide awake | winks       | woodchucks  | wrecks   | yolks      |
| wife       | winked      | woodpecker  | wrecked  | yonder     |
| wives      | winking     | woodpeckers | wrecking |            |
| wigwam     | winter      | woof        | wren     | you        |
| wigwams    | winters     | wool        | wrens    | you'd      |
| wild       | wipe        | wools       | wrist    | you'll     |
| wilder     | wipes       | woolen      | wrists   | young      |
| wildest    | wiped       | word        | writes   | younger    |
| wildcat    | wiping      | words       | wrote    | youngest   |
| wildcats   | wire        | worded      | writing  | youngster  |
| wildlife   | wires       | wording     | written  | youngsters |
| will       | wired       | work        | wrong    | your       |
| wills      | wiring      | works       | X ray    | yours      |
| willed     | wise        | worked      | X rays   | yourself   |
| willing    | wiser       | working     | X rayed  | yourselves |
| willow     | wisest      | workman     | X raying | youth      |
| willows    | wish        | workmen     | yard     | youths     |
| win        | wishes      | world       | yards    | zebra      |
| wins       | wished      | worlds      | yarn     | zebras     |
| won        | wishing     | worm        | yarns    | zero       |
| winning    | witch       | worms       | yawn     | zeroes     |
| wind       | witches     | worry       | yawns    | zone       |
| winds      | with        | worries     | yawned   | zones      |
| wound      | without     | worried     | yawning  | zoned      |
| winding    | wolf        | worrying    | year     | zoning     |
| windy      | wolves      | worse       | years    | zoo        |
| windier    | woman       | worst       | yell     | zoos       |
|            | women       | worth       | yells    |            |
| windiest   | wonder      | would       | yelled   |            |
| window     | wonders     | wouldn't    |          |            |

## Appendix G

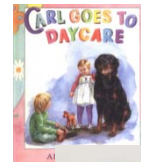
### Language Sample Guidelines

#### Goals for the Tester:

- To obtain a 21-minute language sample.
- To accurately capture the child's initiated language that has not been prompted by the adult.
- To avoid language-rich verbs and labels that may not occur spontaneously in the child's language repertoire.
- To promote child talk by being responsive, fun and engaging.

#### Materials:

1. Carl Goes to Daycare book
2. Little People Preschool, Toy set (including people)
3. 1 Rottweiler puppy and 2 additional plastic dogs



#### Part I: Carl Goes to Daycare book

1. Show the child the Carl Goes to Daycare book and say:  
“*Now here’s another book.*”
2. Immediately turn to the first pair of pages following the text and say:  
“*Tell me about this book.*”
3. **Wait** 5 seconds after the child stops talking:
  - (a) If the child has said **5 or more utterances** turn to the next pair of pages.
  - (b) If the child has said **less than 5 utterances**, give a non-verbal cue (e.g. pointing, making facial expressions, making sounds like, “uh-oh,” or “oops”)  
★ ★ Give up to **5 non-verbal cues per pair of pages** or until the child has said **5** utterances.
4. If the child does not respond after 10 non-verbal cues across 2 pairs of pages, give the verbal prompt, “*Tell me more.*” OR “*Tell me what you see.*” (maximum of 6 verbal prompts)
5. Go through the entire book with non-verbal and verbal cues as described above.
6. Only repeat what the child says (changing the intonation pattern) or use non-verbal cues to elicit language, do not use any additional language.
7. If the child asks a question, answer the question non-verbally, repeat the question using rising intonation (as if asking the child the question), or if a verbal response is required, use a little language as possible to answer the question.

8. If the child asks to turn the page before he or she has said 5 utterances, acknowledge the request, but redirect to the current set of pages using as little language as possible (e.g. “after you tell me more about this page).
9. If the child exhibits challenging behaviors, redirect using nonverbal cues or with verbal cue (using limited language). If redirection is unsuccessful after 2 attempts, tester should use the toys to continue the sample (see below).
10. The goal is to get a 21-minute language sample. Use the book for as long as the child is engaged and talking.

\*NOTE: Toys are kept out of sight until the tester has finished with Carl Goes to Daycare.

**Part II:** Play based language sample using Little People toys

1. Introduce the toys by saying, “*Now let’s play with this dog, I wonder what he will do in this school.*”
2. Put the school on the table and give the Rottweiler dog to the child (keep the easel, slide, swing and people out of reach but in sight).
3. Actively engage in play using exclamations and non-verbal actions.
4. Promote language by making sounds, being silly, setting up situations in which the child needs something from the adult & violating the child’s expectations (e.g. doing the wrong thing with the toy).
5. Only repeat the child’s utterances and pause before repeating, do not introduce new language.
6. If the tester has tried several (more than 3) non-verbal methods (e.g. making noises, modeling play) and more than one minute has elapsed between child utterances, the tester may use an occasional general, open-ended question (e.g. “*What should I do?*”, “*What can the dog do?*”, “*What else?*”, “*What now?*”). No more than 6 questions should be used during the entire play-based language sample.
7. Do not ask “yes/no” questions as they are not likely to elicit more than a single word response.
8. It is essential that the tester’s behavior be the same during the book and play-based language sample with regard to the number of verbal prompts used, and type and frequency of non-verbal prompts.
9. If the child is not talking after 10 minutes or is exhibiting disrupting behaviors request the help of your supervisor.



## Appendix H

### Research Questions, Measures, and Equations

| Research Question  | Teacher Measures  | Child Measure (context)  | Equation   |
|--|---|--|--|
| What is the relationship between specific features of teacher vocabulary use (i.e., number of target words, number of sophisticated words) in EMT sessions and child vocabulary use in the three measurement contexts? | <ol style="list-style-type: none"> <li>1. Total target words in session</li> <li>2. Total sophisticated words in session</li> </ol> | <ol style="list-style-type: none"> <li>1. Total target words (proximal)</li> <li>2. Total sophisticated words (proximal)</li> <li>3. NDW on language sample (medial)</li> <li>4. PPVT-4 raw score (distal)</li> <li>5. EVT-2 raw score (distal)</li> </ol> | <p>Level 1: Child<br/> <math>CHILD\ VOCABULARY\ OUTCOME_{hijkl} = \pi_{0ijkl} + \pi_{1ijkl}(age) + \pi_{3ijkl}(pretest) + e_{hijkl}</math></p> <p>Level 2: Teacher<br/> <math>\pi_{0ijkl} = \beta_{00jkl} + \beta_{01jkl}(vocabulary\ input) + r_{ijkl}</math></p> <p>Level 3: Classroom<br/> <math>\beta_{00jkl} = \gamma_{000kl} + u_{jkl}</math></p> <p>Level 4: Center<br/> <math>\gamma_{000kl} = \zeta_{0000l} + u_{kl}</math></p> <p>Level 5: Cluster<br/> <math>\zeta_{0000l} = \kappa_{00000} + u_l</math></p>    |
| What is the relationship between teacher use of specific strategies to support vocabulary development during EMT sessions and child use of vocabulary in the three measurement contexts?                               | Total number of vocabulary supports   | <ol style="list-style-type: none"> <li>1. Total target words (proximal)</li> <li>2. Total sophisticated words (proximal)</li> <li>3. NDW on language sample (medial)</li> <li>4. PPVT-4 raw score (distal)</li> <li>5. EVT-2 raw score (distal)</li> </ol> | <p>Level 1: Child<br/> <math>CHILD\ VOCABULARY\ OUTCOME_{hijkl} = \pi_{0ijkl} + \pi_{1ijkl}(age) + \pi_{3ijkl}(pretest) + e_{hijkl}</math></p> <p>Level 2: Teacher<br/> <math>\pi_{0ijkl} = \beta_{00jkl} + \beta_{01jkl}(number\ of\ supports) + r_{ijkl}</math></p> <p>Level 3: Classroom<br/> <math>\beta_{00jkl} = \gamma_{000kl} + u_{jkl}</math></p> <p>Level 4: Center<br/> <math>\gamma_{000kl} = \zeta_{0000l} + u_{kl}</math></p> <p>Level 5: Cluster<br/> <math>\zeta_{0000l} = \kappa_{00000} + u_l</math></p> |

| Research Question   | Teacher Measures  | Child Measure (context)  | Equation  |
|---|---|--|---|
| What is the relationship between teacher's target and sophisticated vocabulary in related turns during teacher-child EMT sessions and child vocabulary in three measurement contexts? | <ol style="list-style-type: none"> <li>1. Total target words in related utterances</li> <li>2. Total sophisticated words in related utterances</li> </ol> | <ol style="list-style-type: none"> <li>1. Total target words (proximal)</li> <li>2. Total sophisticated words (proximal)</li> <li>3. NDW on language sample (medial)</li> <li>4. PPVT-4 raw score (distal)</li> <li>5. EVT-2 raw score (distal)</li> </ol>   | <p>Level 1: Child</p> $CHILD\ VOCABULARY\ OUTCOME_{hijkl} = \pi_{0ijkl} + \pi_{1ijkl}(age) + \pi_{3ijkl}(pretest) + e_{hijkl}$ <p>Level 2: Teacher</p> $\pi_{0ijkl} = \beta_{00jkl} + \beta_{01jkl}(vocabulary\ in\ related\ utterances) + r_{ijkl}$ <p>Level 3: Classroom</p> $\beta_{00jkl} = \gamma_{000kl} + u_{jkl}$ <p>Level 4: Center</p> $\gamma_{000kl} = \zeta_{0000l} + u_{kl}$ <p>Level 5: Cluster</p> $\zeta_{0000l} = \kappa_{00000} + u_l$ |
| What is the relationship between teacher use of AAVE and child use of AAVE during the EMT session and language sample contexts?   | <ol style="list-style-type: none"> <li>1. Total number of AAVE features</li> <li>2. Number of different AAVE features</li> </ol>                          | <ol style="list-style-type: none"> <li>1. Total number of AAVE features in session (proximal)</li> <li>2. Number of different AAVE features in session (proximal)</li> <li>3. Total number of AAVE features in language sample (medial)</li> <li>4. Number of different AAVE features in language sample (medial)</li> </ol>   | <p>Level 1: Child</p> $CHILD\ AAVE\ OUTCOME_{hijkl} = \pi_{0ijkl} + \pi_{1ijkl}(age) + \pi_{3ijkl}(pretest) + e_{hijkl}$ <p>Level 2: Teacher</p> $\pi_{0ijkl} = \beta_{00jkl} + \beta_{01jkl}(AAVE\ use) + r_{ijkl}$ <p>Level 3: Classroom</p> $\beta_{00jkl} = \gamma_{000kl} + u_{jkl}$ <p>Level 4: Center</p> $\gamma_{000kl} = \zeta_{0000l} + u_{kl}$ <p>Level 5: Cluster</p> $\zeta_{0000l} = \kappa_{00000} + u_l$                                 |
| What is the relationship between teacher use of complex syntax and children's use of complex syntax in during the EMT session and language sample contexts?                           | <ol style="list-style-type: none"> <li>1. Total number of complex syntax features</li> <li>2. Number of different complex syntax features</li> </ol>      | <ol style="list-style-type: none"> <li>1. Total number of complex syntax features in session (proximal)</li> <li>2. Number of different complex syntax features in session (proximal)</li> <li>3. Total number of complex syntax features in language sample (medial)</li> <li>4. Number of different complex syntax features in language sample (medial)</li> </ol> | <p>Level 1: Child</p> $CHILD\ COMPLEX\ SYNTAX\ OUTCOME_{hijkl} = \pi_{0ijkl} + \pi_{1ijkl}(age) + \pi_{3ijkl}(pretest) + e_{hijkl}$ <p>Level 2: Teacher</p> $\pi_{0ijkl} = \beta_{00jkl} + \beta_{01jkl}(complex\ syntax\ use) + r_{ijkl}$ <p>Level 3: Classroom</p> $\beta_{00jkl} = \gamma_{000kl} + u_{jkl}$ <p>Level 4: Center</p> $\gamma_{000kl} = \zeta_{0000l} + u_{kl}$ <p>Level 5: Cluster</p> $\zeta_{0000l} = \kappa_{00000} + u_l$           |

Appendix J

**Correlations of Child Complex Syntax and AAVE Measures**

|                       | AAVE total:<br>Session | AAVE ND:<br>Session | AAVE total: LS | AAVE ND: LS | CS total: Session | CS ND:<br>Session | CS total: LS | CS ND: LS |
|-----------------------|------------------------|---------------------|----------------|-------------|-------------------|-------------------|--------------|-----------|
| AAVE total: Session 1 |                        | .905**              | .060           | .012        | .388**            | .386**            | .289*        | .358**    |
| AAVE ND: Session      | .905**                 | 1                   | .005           | .000        | .412**            | .448**            | .363**       | .406**    |
| AAVE total: LS        | .060                   | .005                | 1              | .636**      | .079              | .077              | .043         | .110      |
| AAVE ND: LS           | .012                   | .000                | .636**         | 1           | -.030             | -.019             | .254         | .271      |
| CS total: Session     | .388**                 | .412**              | .079           | -.030       | 1                 | .946**            | .448**       | .436**    |
| CS ND: Session        | .386**                 | .448**              | .077           | -.019       | .946**            | 1                 | .430**       | .403**    |
| CS total: LS          | .289*                  | .363**              | .043           | .254        | .448**            | .430**            | 1            | .836**    |
| CS ND: LS             | .358**                 | .406**              | .110           | .271        | .436**            | .403**            | .836**       | 1         |

*Note.* ND=number of different words; LS=language sample; CS=complex syntax  
\*p<.05, \*\*p<.01, \*\*\*p<.001

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