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SPEECH-LANGUAGE PATHOLOGISTS' INPUT TO TODDLERS IN EARLY  
INTERVENTION: A PILOT STUDY

BY

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Bachelor of Science, Bridgewater State University, 2013

THESIS

Submitted to the University of New Hampshire in Partial Fulfillment of the

Requirements for the Degree of

Master of Science

In

Communication Sciences and Disorders

May, 2015

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TANYA J. WILLEY

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## ABSTRACT

### SPEECH-LANGUAGE PATHOLOGISTS' INPUT TO TODDLERS IN EARLY INTERVENTION: A PILOT STUDY

By

Tanya Willey

University of New Hampshire, May 2015

Caregivers interacting with young children in natural settings have been found to provide language input that is in tune with the child's output in terms of mean length of utterance (MLU). Previous research suggests that caregivers provide language input within the child's proximal zone of language development, that is 2.0-3.0 morphemes ahead of their child's MLU. The purpose of this exploratory study was to investigate whether speech-language pathologists (SLP) working in early intervention tailor their input in the same way.

Communication interactions between six speech-language pathologists and their toddler aged clients between the ages of 28 and 33 months were audio recorded during one of their regularly scheduled speech and language intervention sessions. MLUs for the SLPs and the children were calculated for each intervention dyad via the *Systematic Analysis of Language Transcripts* (SALT) version 2012 computer software program. The MLU of each SLP was then compared to the MLU of her client. Data analysis revealed that three of the

six SLPs directed their language input to the child at levels within the child's proximal zone of language development, between 2.0 and 3.0 morphemes greater than the child's MLU. The other three SLPs provided input at levels that exceeded the 2.0 to 3.0 morpheme range. Qualitative analysis suggest that factors other than the children's MLUs, such as their language comprehension levels, may have been a factor in the complexity levels of the SLPs input. Future research, employing larger sample sizes and careful measures of the children's language comprehension and cognitive levels, is indicated.

## CHAPTER I

### LITERATURE REVIEW

When learning language a young child is faced with the task of deducing grammatical rules and applying linguistic input that they receive from their environment. Caregivers, who are providing such input, make this task easier for the child by altering their language input to facilitate the child's language acquisition. It is well documented that caregiver language to typically developing children is simplified to be within the child's proximal zone of development, where they alter the complexity of their language input based on the complexity of the child's language level (Depaulo & Bonvillian, 1978; Drach, 1969; Phillips, 1973; Snow, 1972). More specifically, caregivers' mean length of utterance (MLU) in morphemes (words and word parts) has been identified as two to three morphemes longer than that of the child's MLU in morphemes (Cross, 1977; Rondal, 1980; Snow, Perlmann & Nathan, 1987; Stine & Bohannon, 1983).

This intuitive level of language input provided by caregivers is thought to be facilitative of language acquisition. Vygotsky (1978) in his theory of the zone of proximal development argues that learning is facilitated when material is presented slightly beyond the child's current abilities, at a level that can be mastered with the assistance of an adult. When mothers communicate with their children using a level of input that their children can understand, while maintaining slightly more advanced language forms than their children are able to produce expressively, they are providing an ideal language model that is within the child's zone of proximal development.

Research examining the effects of language input to typically developing children that falls outside the child's proximal zone is limited, and compromised methodologically (Cross, 1978; Nelson et al., 1984; Newport et al., 1977; Wexler & Cullicover, 1980). Even less is known about the language input being provided by caregivers and interventionists when speaking to children who have language disorders, particularly to children involved in early intervention programs (Kaiser, 1993; Kaiser & Roberts, 2013; Pepper & Weitzman, 2004; Yoder & Warren, 1993). Circumstantial reports from the clinical environment suggest that SLPs interacting with young children during early intervention sessions may provide language input that is different than that of caregivers interacting with typically developing children. That is, the language input being provided by speech-language pathologists in an early intervention setting has been speculated to fall outside of the child's proximal zone for language acquisition. If this is the case, the linguistic data being supplied to these children, at such a critical time in their development, may not be ideal for optimal language growth.

### **Caregiver Input to Typically Developing Children**

In order to acquire language, young children need to be exposed to and interact with people whose language use is more advanced than their own. Studies of adult speech directed to young children indicate that during communicative interactions adults continuously modify their speech in a number of different ways, which serve to facilitate the child's language acquisition (Depaulo & Bonvillian, 1978; Fernald, et. al., 1989; Grieser & Kuhl, 1988). Furthermore, as children get older and their language skills

become more complex the adults in their environment modify their linguistic input so that it grows with corresponding complexity.

Language modifications produced by caregivers are emphasized in the literature on mothers' language input; nonetheless, fathers (Bates, 1973; Berko-Gleason, 1973; Gleason & Weintraub, 1978; Golinkoff & Ames, 1979; Lipscomb & Coon, 1980; Rondal, 1980) and women who are not mothers (Snow, 1972) demonstrate the use of this style of speech when interacting with children as well. To address the issue of whether mothers and fathers equally adjust their length of utterance to that of a child's linguistic abilities Lipscomb & Coon (1980) compared the speech of fathers and mothers to young children in the age ranges of 19 to 43 months. Each child was recorded interacting on a separate occasion with both her mother and her father and verbatim transcripts were made to determine the degree of parental speech modification. Results indicated that both mothers and fathers adjust aspects of their language relative to the age and linguistic production skills of the child. In addition these speech adjustments were found to be very similar in the mothers and fathers speech. Specifically, parents of both sexes adjusted their length of utterance to a significant extent as a function of the production capacity of the child and moderated the diversity and concreteness of their vocabulary relative to the age and production skills of their child. Furthermore, research indicates that adults modify their speech to children irrespective of the complexity of the experimental task (Snow, 1972) or the sex of the child being addressed (Phillips, 1973).

Many features of caregiver speech patterns to young children have been found to be consistent across 14 languages (DePaulo & Bonvillian, 1978; Fernald, et. al.,

1989; Gleason & Weintraub, 1978; Nelson et al., 1983 Snow & Ferguson, 1977). Blount (1972) analyzed the speech of adults to children in Samoan and Luo cultures and found similar patterns in these two very different cultures, providing evidence that adults universally gauge and adjust their speaking styles to the child's age and linguistic level. In this study, children with lower MLUs were asked questions that required few semantic distinctions. The children with the longest MLU were asked questions that required more advanced language functions, such as labeling things and dealing with abstract relations.

Harkness (1977) studied the universality of maternal language adjustments by looking at the role of mothers and children on first language socialization in rural Africa. The experimenter videotaped twenty children between the ages of two and three for two hours while they were interacting with their mothers in their homes. Results indicated that mothers' and children's speech differed in MLU and complexity, with the mothers providing significantly more complex language input that is characterized by longer utterances. They also found that mothers adjusted the length and complexity of their speech as a function of the children's MLU.

### **Child Directed Speech**

Often called child-directed speech (CDS), or motherese, the style of speech with which adults talk to young children is sufficiently different from the ways in which adults talk to other adults. In 1978 DePaulo and Bonvillian converged data from 31 studies to yield a fairly consistent description of CDS. Compared with adult-directed speech (ADS), CDS is characterized by a slower rate, higher and more variable fundamental frequency,

more variable intensity, and significantly longer pauses between major syntactic constituents. CDS is less syntactically complex (i.e., fewer subordinate and coordinate clauses, less embeddings and fewer conjoinings, more “content” words) and has a limited variety of syntactic constructions (Pfuderer, 1969; Remick, 1971; Snow, 1972).

Adults frequently address children in short, simple sentences, which are grammatically flawless (Brown & Bellugi, 1964; Granowsky & Krossner 1970; Halliday, 1975), highly repetitive, and simplified phonologically (i.e., reduplication, lengthened vowels, distinctive consonant-vowel clusters). They speak to children about recently completed actions or about immediately present objects and pictures, with an emphasis on the here and now (Phillips, 1973). Adults tend to use a higher proportion of questions, a greater number of declarative sentences, and stress the word they are trying to teach and put the target word in the sentence final position (Ratner, 1996). Furthermore, child-directed speech involves a small vocabulary, where the same word is presented in many different utterances. CDS has its own unique lexicon of about 20-60 items that occur frequently, as well as numerous words that are modifications of those typically found in adult speech. This special vocabulary produces nouns disproportionately more often than verbs (Goldfield, 1993), and usually includes kinship terms, animal names, nicknames, words referring to body parts and functions, terms for basic qualities, and names of games and toys. Overall, the content of child-directed speech is more accessible to the child and its features make the child’s task of mapping words to their referents easier (Phillips, 1973; Zukow, 1990).



When using CDS to provide language input, research has shown that caregivers continuously modify their speech to generate an optimal discrepancy between the child's language level and the level of language input (Depaulo & Bonvillian, 1978; Snow, 1989). These moment-to-moment adjustments, known as fine-tuning, occur when caregivers adjust the complexity of their input to the level of the child's output and comprehension abilities, which is based on comprehension cues provided by the child. This optimal discrepancy between the child's output level and the level of caregiver input stays close enough that the child can comprehend the meaning of the utterance but also maintains just enough discrepancy that the novel structures being modeled in the utterance have not yet been mastered by the child (Snow, 1989). Consequently, the caregiver is providing a continually adjusted optimal discrepancy between the child's language abilities and the novel language structures to which the child is being exposed (Snow et al., 1987). Thus, fine-tuning implies that as the child's language abilities develop, the caregivers decrease the amount of simplification or modification they are producing in their CDS.

Not only will this optimal input level produced by the caregiver increase as the child gets older, but ideally the caregiver will talk about novel situations in a more simplified fashion than they would about familiar situations. Anything that decreases the likelihood of the child understanding the input would influence the caregiver to simplify his or her speech. Inevitably, this will lead caregivers to frequently change their input as their child grows and develops greater speech and language abilities (Snow, 1989).

The most likely influence on this pattern of utterance length modification is a feedback system that operates within normal conversation, which depends on cues from the listener (Gleason, 1977). Children who are linguistically immature understand shorter and simpler sentences, making longer and more conceptually and grammatically complex sentences difficult to comprehend. Therefore, caregivers will implicitly fine-tune the complexity of their speech in accordance with their assumptions about the child's language comprehension ability. When comprehension difficulties are communicated to the caregiver, either through facial expression or an incorrect response, the adult then has the ability to fine-tune his or her speech to allow for a successful communication exchange.

### **Evidence for a Finely Tuned Input System**

Multiple researchers have concluded that mothers' speech to their language-learning child increases syntactically with their child's increasing age (Broen, 1972; Longhurst & Stepanich, 1975; Reichle, Longhurst, & Stepanich, 1976). Results of these studies indicated that mothers of older children use more complex language functions than mothers of younger child. Specifically, they found a positive correlation between maternal MLU and the child's age.

Snow (1972) studied the speech of thirty middle-class mothers interacting with their 2- and 10-year old children to determine whether the mothers' speech to children just learning to talk differed from their speech to older children. Results indicated that the mothers' speech to 2-year-olds was simpler, more redundant, and had a lower MLU than their speech to the older children. Phillips (1973) replicated these findings by

comparing 30 mother-son pairs and 27 mother-daughter pairs (with children aged 8, 18, and 28-months old), who were each recorded interacting during a free play situation. Findings indicated that speech addressed to younger children is syntactically less complex and contains less varied and more concrete vocabulary. Phillips further concluded that the complexity of a mother's speech does not begin changing until some point around the child's first birthday which is likely due to the fact that the adjustments in CDS depend on aspects of communication between the child and the mother that are not present at 8 months of age. For instance, a child at 8 months would not be expected to provide verbal feedback for his or her mother to adjust her speech accordingly.

Numerous studies have reported that maternal mean length of utterance (MLU), a measure of syntactic complexity first described by Brown and his colleagues (Brown, 1973), is positively correlated with children's comprehension abilities (Bohannon & Marquis, 1977; Clarke-Stewart, VanderStoep, & Killian 1979; Garvey, 1977; Pfuderer, 1969; Snow, 1972). Once children begin to show rudimentary signs of language comprehension their mothers begin to increase the length and complexity of their utterances (Stern et al., 1983). The adult does not need to know anything about the child's particular stage of development; they unconsciously produce modified speech in response to the signal of non-comprehension or inattention (Gleason & Weintraub, 1978).

Bohannon and Marquis (1977) studied the ways in which caregivers fine-tune their utterances based on their child's comprehension, and found that children play an active role in influencing the speech that they hear on a day-to-day basis. Results

indicated that children signal communicative failure after adults produce long, complex utterances and signal success after adults produce short, simple sentences. Adults reacted to signals of non-comprehension in a stereotypic fashion, by reducing their length of utterance following failures, and using longer more complex utterances after successes. The researchers concluded that non-comprehension feedback has an immediate effect on adult utterance lengths where a signal of comprehension varies inversely with the MLU of the preceding adult utterance. As the children in the study demonstrated non-comprehension, the adults' MLUs dropped dramatically and as the adults MLU increased the probability of the child demonstrating non-comprehension increased. Both grammatical complexity and mean length of utterance were controlled on a moment-to-moment basis through feedback indicative of the listener's comprehension ability. Expanding on this, Stine and Bohannon (1983) found that non-comprehension cues from the children in their study tended to depress the MLUs of several of the adult utterances following that cue. In summary, few cues of non-comprehension may be needed for the adult to maintain a level of short and simple utterances for the child to comprehend the message.

### **Evidence for Utterance Length Modifications**

Evidence supporting the argument that mothers fine-tune the complexity of their language input has been cited in research indicating that caregiver MLU increases concurrently with the child's language abilities. Drach (1969) and Snow (1972) found that the MLUs produced in CDS are drastically different than those produced in adult directed speech (ADS). The ADS samples were more variable in terms of length of

utterance and differed considerably in terms of average length. In support of these claims, Ringler (1978) found ADS utterances to be twice as long as CDS utterances (7.8 words versus 3.0).

Researchers have found that caregivers use their child's feedback to adapt their speech, in length and complexity, to that of the child's level as he or she becomes linguistically more advanced (Clarke-Stewart, Vanderstoep, & Killian, 1979; DePaulo & Bonvillian, 1978; Newport, 1975; Pfuderer, 1969; Snow, 1972). Studies show a significant correlation between mothers' and children's MLU starting at 18 months of age (Chapman, 1981; Phillips 1973). Studies examining the average MLU for mothers and children engaged in free play suggest that the mother's speech averages about 2.4 morphemes longer than her child's during the 12-27 month period with MLUs ranging between 2 and 3 morphemes longer than the child's in the latter half of the child's second year of life. For older children, both mother and child MLU increases with the child's age, but the difference between their average MLUs decrease (Chapman, 1981; Longhurst & Stepanich, 1975) where the average difference is 1.7 morphemes for children 2:5 – 3:5 year olds. Thus, caregivers adjust their language input as their child's language abilities expand.

Glanzer and Dodd (1975) found that mothers on average produced an MLU that was 2.07 morphemes ahead of their child's average MLU at 22 months of age, 1.82 morphemes ahead of the child at 25 months of age, and 1.29 morphemes ahead of the child's average MLU at 29 months of age. Similarly, Rondal (1978) examined the speech of mothers interacting with their children aged 20 to 32 months at their home

during free play. Results indicated that the mothers on average provided language input that was 2.97 morphemes ahead of the child's average mean length of utterance in morphemes when they were 23 months of age, and 1.96 morphemes ahead of their child when they were 30 months of age. In another study, Rondal (1980) examined fathers and mothers interacting with their children during free-play, story telling, and during a family meal situation. Analysis of their data revealed that the parents MLU stayed, on average, 2.36 morphemes ahead of their child's average MLU. Hoff-Ginsberg (1986) also reported similar results and found that the mothers in her sample produced an average MLU that was 2.42 morphemes ahead of the child.

Retherford et al. (1980) examined the language samples of six pairs of mother-child dyads while interacting in two half-hour free play conversations for evidence of fifteen semantic roles and five syntactic categories. All children were initially taped when they were just beginning to produce two word combinations (between the ages of 1:7 and 2:0) and then again 3 to 6 months later. Results of mother and child MLU revealed that the mother's average MLU in this study stayed ahead of her child's average MLU by 2.92 morphemes during the first recording. Both mother and child average MLU increased significantly during the second recording, yet the mother still stayed within her child's zone of proximal development and produced utterances that were ahead of her child on average about 2.7 morphemes.

In a longitudinal study addressing the role of input factors on language acquisition, Cross (1977) examined play sessions between mothers and their typically developing children to analyze maternal language input. The subjects were sixteen

middle-class, English-speaking mother and child dyads. The children were between the ages of 19 and 32 months of age and differed in average MLU by two morphemes. Of the 62 parameters of maternal speech examined in the study, 35 were significantly correlated with child listener variables including MLU. Cross found that on average a mother's MLU was only a small step ahead of her child's MLU, averaging 2.6 morphemes ahead of the child. Mothers' MLUs (4.8) were on average less than three morphemes longer than their children's (2.2) shortest utterances and less than half a morpheme longer than their children's longest utterances (4.4) demonstrating significant positive correlations between child MLU and maternal MLU. Additionally, significant correlations were found between the length of the mothers' utterances and measures of child language comprehension, as well as child vocabulary and age. In almost all cases, a stronger relationship was found between maternal speech variables and measures of the child's comprehension ability, suggesting that mothers are adjusting their speech complexity based on their children's comprehension ability rather than their expressive ability. Given that the children in the Cross (1977) study varied in age by only 12 months and by average MLU of less than two morphemes, these results provide substantial support for a well-tailored input system that strongly supports the fine-tuning hypothesis for language input. It is clear that the mothers are more sensitive to the children's underlying abilities than to the average length of their utterances. Results indicate that when children of different chronological ages are matched in terms of their ability to comprehend language there are no differences in the syntactic complexity of the maternal speech addressed to those children.

Stine and Bohannon (1983) examined the interactions between one child with twenty-one adults during free play at two different periods of time, once at age 2:8 when the child's average MLU was 3.59 and again at age 3:0 when the child's MLU was 3.73. Closer analysis of the data reported in this study reveals that the adults' average MLU when addressing this child when he was 2:8 was 3.69 morphemes ahead of the child, and when he was 3:0 was 3.38 morphemes ahead of the child. Averaging these together, the adult input was 3.71 morphemes ahead of the child's average MLU.

Snow, Perlmann and Nathan (1987) studied five children (four boys and one girl) aged 1:5 to 1:10 interacting with their mothers at weekly intervals over a period of 12-30 weeks during highly routinized situations and during free play. Closer analysis of the data in this study reveals that the average maternal input in one routine situation was higher by 3.28 words per utterance, in another routine situation by 2.64 words per utterance, and during free play by 2.34 words per utterance. Averaging the situations shows that mothers in this study provided input to their children at a level that was 2.75 words ahead of the child's level. Maternal speech was more complex and less semantically contingent in the free play situations and child speech was similarly more complex during free play and less complex during routine activities.

Seitz and Stewart (1975) examined two groups of children whose mean ages were 23 and 56 months of age to determine the relationships between mothers and children's speech with regard to complexity and usage of selected speech types. The average mean length of utterance in words for these two groups indicated that the mothers of the younger children provided language input, which was on average 2.25



words ahead of their child's. For the group of older children, both mother and child MLU increased significantly and the average MLU with which the mother provided input ahead of her child decreased, averaging 1.4 words ahead of her child's utterances. Mothers' mean utterance length was correlated with the frequency of the younger children's utterances, indicating that mothers may be gauging the young child's understanding of language by his responsiveness to their questions an inference that is also supported in this study by the positive correlations between mothers' questions and children's responses. Similarly, Nelson (1973) reported on a longitudinal study of 18 children between one and two-years old and reported that mother's average MLU was roughly 2.24 words ahead of the child's average MLU in words. Baldwin and Baldwin (1973) found that for children aged 30 months, their mothers provided input to them that was on average 1.7 words per utterance ahead of the child's words per utterance.

### **Evidence that Fine-Tuning Promotes Language Development**

The consistency and extent of the above evidence suggests that CDS may play an important role in children's linguistic development, that is, the special characteristics of CDS play a causal role in the child's acquisition of language (Cross, 1977; Snow, 1972). Moerk (1976) analyzed the verbal interactions of 20 mothers with their children and concluded that motherese is a teaching register, designed to elicit verbal responses, provide information regarding the content and structure of language, and shape the form of child utterances. Cross (1977) found at the maternal discourse level that mother's language was organized to facilitate child language acquisition through its reference to events which were perceptually, cognitively, and semantically available and

salient to the child. Murray, Johnson, and Peters (1990) found that by producing simple input, a mother can lead her child to more advanced receptive language development than if the input was highly complex. Furthermore, some researchers argue that motherese affects language development in terms of influencing the child's conceptual and vocabulary development (Clarke-Stewart, 1977, 1979; DePaulo & Bonvillian, 1978; Nelson 1973; Snow, 1972). Glanzer and Dodd (1975) observed that mothers most effectively elicit responses from their children when they adapt the length of their utterances to the child's language level.

In the domain of language content, researchers argue that mothers with longer MLUs have children with longer MLUs (Furrow et al., 1979), and diversity in caregiver speech significantly predicts corresponding diversity in later child speech (Huttenlocher et al., 2010). Particularly, the number of nouns and verbs produced per utterance in the mother's speech affects the number of nouns and verbs per utterance that are produced in the child's speech (Newport et al., 1977).

Newport et al. (1977), found that motherese contributed to language specific paradigmatic devices, such as tense and plural markings that are specific to the language being learned. Mother's language was found to functionally influence the child's learning of things such as turn taking and dialogue (Snow, 1972; Greenfield & Smith, 1976).

Ma et al. (2011) examined whether 21 and 27-month old children learned novel words better in CDS or in ADS by comparing the two conditions on a word-learning task. Their findings demonstrated that young language learners, at 21 months of age, learned

new words when they were presented in CDS but not when they were presented in ADS. Furthermore, they found that 27-month olds reliably learned words in both CDS and ADS, which supports the assumption that CDS facilitates word mapping at the start of lexical acquisition and its influence fades as the child proceeds in language development.

Furrow, Nelson, and Benedict (1979) investigated the relationships between children's linguistic environments and their language acquisition. Speech samples were taken from seven children at the one-word stage of development, between the ages of 1:6 and 2:3, with their mothers, which were then analyzed on a number of semantic and syntactic categories to determine correlations between mothers' speech and children's subsequent language development. Their results indicated that children whose mothers spoke more simply learned more words than children whose mothers spoke with greater complexity. Researchers found that simpler CDS predicted faster growth in language development over a succeeding 6-month period for children in the one word stage. In conclusion, simple language constructions by the mother facilitated language growth, whereas more complex language hindered language development. Furthermore, they found that several characteristics of mothers' speech, including utterance length, significantly predicted later child speech.

### **Evidence Disputing the Fine-Tuning of Caregiver Input**

The above evidence is not without controversy, however. Some researchers dispute the motherese hypothesis and have found negative results for the effects of caregiver input on the child's language development (Nelson et al., 1984; Wexler &

Cullicover, 1980). Limited research has been done to examine the effects of input that does not adhere to the child's proximal zone of language development and that which has been done is compromised methodologically, making the findings and interpretations of such studies difficult to resolve.

Newport et al. (1977) failed to find positive correlations between maternal speech and the children's subsequent grammar development, which has resulted in claims that mothers are not fine-tuning their language syntactically to their child's developing productive abilities. These researchers argue that children construct the same language knowledge under widely varying environmental influences thus the environment does not need to be narrowly specified and the input does not need to be ordered in any principled way. They reported only non-significant positive correlations between the child's MLU and maternal MLU, suggesting that many features of the mother's speech changed in accordance with the child's age, not his competence with constructional features of the language. According to the researchers, they found no compelling evidence that mothers fine-tune their language input to the growing language competence of their children. However, their study measures mother's speech in words per utterance and child speech in morphemes per utterance, making results difficult to compare.

Cross (1978) designed an experiment to examine which maternal speech variables affect a child's rate of linguistic acquisition. She recruited 16 children (six males and ten females) who had the same comprehension abilities and MLUs ranging from 1.5 to 3.5 morphemes and recorded spontaneous conversations of each child

interacting with his or her mother. Language samples were analyzed for measures of syntax including length and complexity. Results indicated that the mothers' MLUs ranged between 4.1 and 5.4 morphemes, with the average difference between all of the children's and mothers' MLUs within a range of 1.8 to 3.3 morphemes. Cross (1978) concluded that the lack of syntactic variation suggests that mothers are unable to monitor their syntactic level, and are not sensitive to small variations in the children's maturity. However, the conclusions drawn from this study may be flawed given the evidence that maternal syntactic complexity is at least partially controlled by the child's comprehension abilities. By matching the children based on their language comprehension ability one would expect to see no differences in syntactic complexity from the mothers. Since Cross (1978) found no differences in maternal MLU based on her child participants who were matched based on their comprehension abilities, the study in turn provides evidence for the feedback model of motherese. That is, evidence that mothers' MLUs fell within a small range was due to the fact that they were being sensitive enough to match their MLU to the child's language comprehension abilities.

### **Speech Language Pathologists in Early Intervention**

When working with children who have language impairments, SLPs agree that linguistic input should be simplified especially to children who are just beginning to produce single words and simple two- and three-word combinations (VanKleeck et al., 2010). Exactly how much simplification is being provided in the early intervention setting, however, is widely unknown. To date, no research has been conducted to examine the language input that SLPs use when interacting with young children in an

early intervention setting. Given what we know about language input and its effects on the child's subsequent language development, it is imperative that SLPs stay within the child's proximal zone of language development when providing input in early intervention in order for the child to be provided with optimal language input to facilitate language growth.

Two commonly used speech and language intervention programs that incorporate research regarding appropriate language input to children with language disorders include the Hanen *It Takes Two to Talk* program and the Enhanced Millieu Teaching (EMT) program. Both of these programs assert that a primary focus of their intervention philosophy is to adjust the communicative environment in such a way that language acquisition is facilitated. Both intervention programs involve modeling by SLPs to teach parents how to incorporate speech and language strategies in the home, and promote the use of altered language input as a primary means of facilitating language development through the use of SLP models. However, neither goes as far as to specify the exact language level that mothers and interventionists should be using.

The Hanen *It Takes Two to Talk* program is a family-centered, parent-focused language intervention program for toddlers and preschoolers with language disorders. The program is designed to provide parents with strategies to support their children in learning language naturally throughout the day (Pepper & Weitzman, 2004). The *It Takes Two to Talk* program is based on well-researched principles of intervention that emphasize the importance of responsive, simplified language input to accelerate children's communication development. The theoretical foundation for this program

adheres to the social interactionist perspective of language acquisition, which asserts that simplified language input provided by caregivers will help children make comparisons between nonlinguistic and linguistic contexts in their environment to induce the relationship between objects, actions, external events, and words (Girolametto & Weitzman, 2006). *It Takes Two to Talk* follows the structural hypothesis model, which focuses on the structural features of language input (length of utterances and grammatical complexity) during intervention sessions. Through this framework it is asserted that adult language input should grammatically be one step ahead of the child to facilitate language development by providing models that are within the child's zone of proximal development (Girolametto & Weitzman, 2006). Thus, *It Takes Two to Talk* interventionists (i.e., speech-language pathologists) teach parents to reduce the structural complexity of their speech by using shorter utterances, a slower rate of speech, and fewer utterances. The focus of the program is to teach parents and interventionists how to take turns with their child, to continue their interactions by matching the length of their turn with the length of the child's turn by matching the child's pace and interests. When communicating with a child who has a language disorder, the use of these strategies by both the SLP and the parent assumes that structural simplifications of language input are crucial for facilitating child language learning.

The role of the SLP in *It Takes Two to Talk* is multifaceted, where the child receives early language intervention that is implemented by parents and interventionists. The SLPs role in early language intervention is to teach parents language facilitation strategies. In order to do this the SLP must be able to implement

and model those strategies for the parents. The SLPs mastery of these strategies is crucial in order to evaluate the most effective strategies for an individual child and to troubleshoot with parents when a strategy is not working or they are having difficulty with its implementation (Girolametto & Weitzman, 2006).

The Enhanced Milieu Teaching Program (EMT) is a naturalistic, conversation-based model of early language intervention that builds on a child's interests and initiations to model and prompt language with children in the early stages of language development (mean length of utterance 1.0-3.5) (Hancock & Kaiser, 2006). EMT utilizes developmentally appropriate responsive communication strategies (i.e., contingent responses, language modeling, expansions of child utterances) with behavioral teaching strategies to increase the frequency and complexity of the child's language (Kaiser & Roberts, 2013). Behavioral strategies used in EMT include arranging the environment to increase the likelihood that the child will communicate, selecting and teaching specific language targets appropriate to the child's skill level, responding to the child's initiations with prompts for elaborated language that is consistent with the child's targeted skills, and functionally reinforcing the child's communicative attempts by providing access to requested objects, continued adult interaction, and feedback in the form of expansions and confirmation of the child's utterances (Kaiser & Roberts, 2013).

A major theoretical perspective of EMT is derived from the social interactionist view on learning language through meaningful communicative interactions (Hancock & Kaiser, 2006). EMT asserts that language learning is the result of responsive modeling of increasingly complex forms in social, dyadic interactions (Hancock & Kaiser, 2006).



The responsiveness of the caregiver to the child's communicative attempts provides a framework in which models of new language occur continuously with the child's focus of attention and actions that support the child's learning of new forms and meanings. EMT involves following the child's attentional lead and teaching based on the child's interests and communicative intentions.

EMT uses the normal developmental sequence of skill acquisition as a guide for target skill selection and sequencing. Selection of appropriate targets that are slightly higher than the child's productive competence and the explicit use of scaffolding techniques contingent on the child's communicative attempts are used to ensure there is a communicative match between the child and the adult (Yoder & Warren, 1993).

SLPs providing EMT need knowledge of and experience with applying the EMT procedures in order to teach parents to use the strategies at home. The SLPs skills and experience in EMT intervention allow him or her to model the intervention procedures for the parent, provide practical knowledge about the types of adaptations that may be required for the child to learn, and establish credibility of both the EMT procedures and the professional's skills when working collaboratively with the child's parents (Hancock & Kaiser, 2006).

It is clear that language facilitation and modeling is one of the foremost variables targeted within EMT. However, much like the Hanen *It Takes Two to Talk* program, nowhere is it stated that parents should be explicitly taught to model and expand their child's language to be within the child's proximal zone of language development, which

should fall within the range of 2.0 to 3.0 morphemes ahead of the child's language production.

Exactly how much simplification of language SLPs in the early intervention setting are providing, however, is widely unknown. Circumstantial reports from the clinical environment suggest that SLPs may lose their intuitive interaction skills, thereby falling outside of the child's proximal zone of development when interacting during therapy sessions. If SLPs are going beyond the child's proximal zone and are not providing children, who have already fallen behind both in quality and quantity in terms of their language production abilities, with the appropriate amount of language input, the child's ability to acquire verbal language will be compromised. If this is the case, and SLPs are not supplying children with an ideal level of language input, the child's language development may be put further at risk. A greater understanding of SLPs current use of language input in and early intervention setting is needed.

### **Purpose of the Study**

The purpose of this study was to pilot-investigate whether SLPs working with young children in early intervention settings adhere to the children's proximal zones of language development when providing language input. The answer to this question has both theoretical and clinical significance. In terms of the former, it offers the chance to shed light on variables that may affect adult language input to young children who experience language delays. That is, children with established speech and language disorders present the unique opportunity to evaluate language input independent of the child's MLU. The chronological age of the child with a speech and language disorder, for

example, may be significantly higher than the child's productive language age, as measured in MLU. Other factors such as the child's cognitive level, language comprehension ability, and physical well-being may also play a role in adult language input.

This study is of clinical interest because it is important to understand whether, or how, SLPs adjust their language input to children with speech and language disorders. Anecdotal reports suggest that SLPs may be over or under adjusting their input in a clinical setting. The reasons for this over or under adjustment, however, are unclear. It could be speculated that SLPs may, over-time, "lose" their intuitive ability to adjust their MLU as their client advances in language skill. Due to the fact that SLPs are in the position of modeling appropriate input for family members of children with speech and language disorders, it is important to verify that such modeling is indeed occurring.

## CHAPTER II

### METHODS

#### **Recruitment Procedures**

Recruitment measures were approved by the University of New Hampshire's Human Subjects Review Board (see appendix F). Participants were recruited for this study via email and phone messages. Early intervention center directors in the New Hampshire seacoast and northern Massachusetts areas were contacted, requesting that SLPs be notified of the study and determine if any of their child clients might meet the qualification criteria (see appendix A). Inclusion criteria for child participants included meeting the early intervention center's qualification for services and having a language age between 24 and 29 months as documented by a qualified speech-language pathologist. Exclusion criteria for child participants included a known hearing loss or a diagnosis of an autism spectrum disorder. Inclusion criteria for the SLPs included holding the clinical competencies (CCC-SLP), being American Speech-Language-Hearing Association (ASHA) certified, have been working with the child for at least four sessions prior to the study, and have been working in an early intervention setting for a minimum of one year.

After clients were identified as meeting the study's qualification criteria, SLPs were responsible for approaching the children's parents to present them with a description of the study and a consent letter to ask if they would be willing to have their child participate (see appendix B). Once parents agreed to participate the SLPs

contacted the researcher to determine a day and time that would be best to observe and record their therapy sessions.

The early intervention centers' directors were responsible for checking the individual client files to ensure the potential participants met the study requirements. To maintain confidentiality, I had no access to the participants' personal files.

Parents of the child participants agreed to allow their children to participate in this study by signing a recruitment and consent letter that was presented to them by their SLP (see appendix D). SLPs agreed to participate in this study by signing a consent letter (see appendix C). Child participants agreed to participate in this study by giving verbal assent, by saying yes to the question "Can I watch you play and record what you say?"

SLPs completed a demographic checklist (see appendix E) that provided additional information about each of the participants. This checklist included the child's gender, date of birth, diagnosis, most recent MLU, and hearing screening result, if available.

### **Participants**

Six children, five boys and one girl, and their female SLPs were recruited from early intervention centers in New Hampshire and Massachusetts to participate in this study. All of the children met the state's qualifications for early intervention services, had an identified language delay or disorder, had a language age of 24 to 29 months, no known hearing loss, and were not suspected to have an autism spectrum disorder. The children in the study ranged in age from 28 to 33 months, with a mean age of 31

months. All of the SLPs were actively involved with the family on a weekly basis, had been providing services to the child for a minimum of four sessions prior to the study, were American Speech-Language-Hearing Association (ASHA) certified (CCC-SLP), and had a minimum of one-year of experience in the early intervention setting. There was no effort made to control for the gender of either child participants or for the SLPs. See Table 1 for a summary of characteristics about each dyad.

Dyad A was a 33-month-old boy and a female SLP who had been working in early intervention part-time for the past four years. Child A was receiving early intervention services due to an expressive language delay with articulation concerns. The observation and language sample for this dyad was recorded in the child's home in New Hampshire.

Dyad B was a 28-month-old boy and a female SLP who had been working in early intervention part time for just over a year. Child B was eligible for early intervention services due to his spontaneous speech intelligibility being understood less than 25% of the time with unfamiliar listeners. The observation and language sample recorded for this dyad took place in the child's home in New Hampshire.

Dyad C was a 28-month-old boy and a female SLP who had been working in early intervention two days a week for one year. The speech-language pathologist interacting in this dyad also interacted in Dyads D, E, and F. Child C was receiving early intervention services due to a speech and language delay. This observation and language sample were recorded in a therapy room at an early intervention center in Massachusetts.

Dyad D was of a 30-month-old boy and a female SLP who has been working in early intervention two days a week for one year. Child D was eligible for early intervention services due to a developmental delay. The observation and language sample for this dyad took place in a therapy room at an early intervention center in Massachusetts.

Dyad E was a 30-month-old girl and a female SLP who had been working in early intervention two days a week for one year. Child E was referred to early intervention services due to premature birth, small gestational age, and failure to thrive in association with Russell Silver Syndrome. Child E was eligible for early intervention speech and language services due to an expressive language delay, with a focus on improving her articulation and intelligibility. The observation and language sample for this dyad took place in a therapy room at the early intervention center in Massachusetts.

Dyad F was made up of a 32-month-old boy and a female SLP who had been working in early intervention two days a week for one year. Child F was eligible for early intervention services due to a speech and language delay. This observation and language sample was recorded in a therapy room at the early intervention center in Massachusetts.

### **Materials**

Materials used for this research included the audio/video function of the iPad 4<sup>th</sup> generation and the *Systematic Analysis of Language Transcripts* (SALT) 2012 computer software (Miller & Nockerts, 2012). The audio/video function of the iPad was used to audio-record the child while interacting with his or her speech-language pathologist. The

language samples were then transcribed and analyzed using the SALT computer software program, which was loaded onto a desktop computer. SALT is a language-sampling program that provides more than 50 measures of spoken language based on a language sample inputted orthographically. The language measure targeted in this study was the mean length of utterance (MLU), which was calculated for both the child and speech-language pathologist interacting in each dyad.

### **Data Collection Procedure**

The research approach utilized in this study was non-experimental and observational in nature. The verbal interaction of SLPs and their child clients when communicating during regularly scheduled intervention sessions were audio-recorded. Two of the language samples were recorded in the child's home and four samples were recorded at the early intervention center the child regularly attended. Setting choice for the recording was based on where the child typically received intervention services.

Once signed consent was obtained from the parents and the SLP and assent was obtained from the children the following instructions were given "Thank you for letting me observe the session. I will sit over here (in the corner of the room) and audio-record the sample on my iPad. I will not interfere with the session in any way; please go on with your session as you normally would without me here." I then sat approximately four feet from the client and ran the iPad video function for thirty-minutes to record a language sample from the intervention session.

The first fifty utterances containing an initiation and a response from both the child and the SLP were transcribed. To address inter-observer reliability, a trained



examiner who was blind to the research and underwent two hours of training with reliability checks in advance of her work, also transcribed the samples. Inter-rater reliability measures for the transcribed samples were 92%. The transcribed samples of both the child and the SLP in each dyad were then entered into the Systematic Analysis of Language Transcripts (SALT) computer program, which computed their respective MLUs. Next, the MLU of each SLP was compared to those of the child with whom she was interacting in order to determine the degree to which her MLU matched the child's MLU during the intervention session.

Table 1  
*Participant Descriptive Information*

Dyad	Child Age	Child Gender	Diagnosis	SLP Years Experience	SLP Gender
A	33 months	Male	ELD & SSD	4 Years Part-Time	Female
B	28 months	Male	ELD	1 Year Part-Time	Female
C	28 months	Male	S/LD	1 Year Part-Time	Female
D	30 months	Male	S/LD	1 Year Part-Time	Female
E	30 months	Female	ELD	1 Year Part-Time	Female
F	32 months	Male	S/LD	1 Year Part-Time	Female

Notes:

S/LD = speech/language delay

ELD = expressive language delay

SSD = speech sound disorder

Dyad A's audio-recorded intervention session took place in the client's home with his mother present. Client A's mother intermittently interacted with her child during the observation. Client A's older sister was also present during this recording but she stayed upstairs in her room for the duration of the sample. The first activity child A was presented with was a farm puzzle that contained a barn and multiple farm animals (i.e., cow, chicken, dog, birds). Next, they played with multiple colored counting bears and cups, which the client requested the color and number of bears he wanted to sort based on the color of his cups.

Dyad B's audio-recorded intervention session took place in the client's home with his mother present. Client B's mother frequently interacted with both her child and SLP frequently throughout the sample. During this interaction the child and SLP played with various vehicles (i.e., cars, trucks, buses, motorcycles) and blew bubbles.

Child C was brought to the early intervention center by his aunt, and his mother joined in after twenty minutes. During the audio recording, the client's aunt sat to the side and observed the session, and his mother interacted with the speech-language pathologist, asking questions and interacting with her child throughout the entire session. During this interaction, the client and SLP looked at an interactive book that had flaps and pockets for the client to actively be involved while exploring the story. The book presented different pictures of animals (i.e., squirrels, cats, seals, sheep) and prompted the reader to help give out Valentine's Day cards to all of the animals.

Dyad D's audio-recorded language sample took place at the early intervention center with his mother present, but she minimally interacted with the SLP. During the

recording, client D and his speech-language pathologist played with different colored hearts, sorting them based on size and color, and then colored a picture.

Child E's grandmother brought her to the session but did not interact or interfere with the session in any way; she sat next to the door of the therapy room and observed the session. This session took place at the early intervention center, where the client and SLP first looked at an interactive book that had flaps and pockets for active involvement while exploring the story, and then played with modeling dough.

Client F's mother, baby sister, and a friend of his mother attended the early intervention session with him. The client's baby sister made various noises during the session and the mother's friend interacted with the baby while the session was going on, but they did not interact or make comments to the client during this time. The client's mother interacted with the SLP during the beginning of the session to update her on her son's progress. She asked the SLP questions about her son but remained quiet after the initial 10 minutes. During this session the client and SLP read an interactive farm book with flaps for a variety of animals (i.e., dog, chicken, cow, horse). Next, the two played with a farm set, using a tractor and animals on the floor of the treatment room.

## CHAPTER III

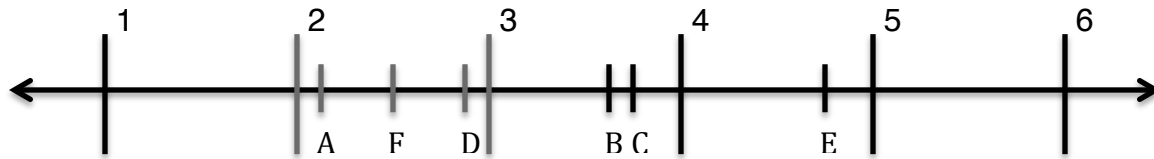
### RESULTS AND DISCUSSION

#### **Findings**

To examine whether the complexity of SLPs input to toddlers with language disorders in a clinical setting is similar to that of caregivers' input to typically developing toddlers in a natural setting, six language samples of SLPs communicating with their clients during regularly scheduled intervention sessions were gathered. A MLU of the language samples for the child and SLP in each dyad were calculated. The MLUs of the SLPs were then compared to the MLUs of their respective clients to determine whether they were providing language input within the proximal range of 2.0 to 3.0 morphemes greater than the child's MLU.

The overall pattern of results can be seen in Figure 1. During three of the dyad interactions, the SLP provided input within the proximal zone of 2.0-3.0 morphemes greater than the child's mean length of utterance. During the other three dyad interactions the SLP provided language input outside the proximal zone, at levels of 3.67 (dyad B), 3.75 (dyad C), and 4.88 (dyad E) morphemes greater than the child's MLU.

Figure 1  
*Difference in mean length of utterance*



Notes:

1-6 = difference in MLU

A-F = dyads

Data were analyzed qualitatively to closely examine the dyads for patterns that might shed light on potential factors that may have contributed to the greater than average complexity of the SLPs input in the three dyads outside the target range (dyads B, C, and E). A number of intrinsic and extrinsic variables were considered, the first of which was the intervention setting. If it could be shown that the three samples of higher than expected SLP MLUs were collected in the clinic, a more artificial setting, a pattern related to communication context could be presented as an area of further research and analysis. As can be seen in Table 2, however, the intervention setting for two of the three dyads of interest (C and E) took place in the early intervention clinic; the third session (dyad B) took place at the child's home. Therefore, no pattern for intervention setting was identified.

Table 2  
*Qualitative Results*

Dyad	Setting	Child Age	Child MLU	SLP MLU	Difference In MLU	Presence of a Parent
A	Home	33 months	2.72	4.75	2.03	Yes
B	Home	28 months	1.96	5.63	3.67	Yes
C	Clinic	28 months	1.49	5.24	3.75	Yes
D	Clinic	30 months	1.56	4.46	2.90	Yes
E	Clinic	30 months	1.42	6.30	4.88	No
F	Clinic	32 months	1.34	3.82	2.48	Yes

Next, the ages of the children were considered. The average age of the participants in this study ranged from 28 to 33 months, with a mean age of 31 months. As Table 2 indicates, the three children in the dyads of interest (B, C, and E) were aged 28, 28, and 30 months, respectively; the youngest of all the participants. While the sample size of the present study does not permit generalization, this finding suggests that child's chronological age may play a role in the language input that is provided by his or her SLP. If so, this would be consistent with the work of Newport et al., (1977) in which chronological age was found to be a variable in adult language input that was directed to typically developing children.

The third variable qualitatively examined was the children's clinical diagnoses. Of particular interest was whether or not the type of developmental disorder affecting the child's speech and language development influenced the complexity of the language input provided by his or her SLP. Two of the three children who received higher than

expected input levels carried diagnoses of isolated speech and language delays without any other confounding factors. The third was diagnosed with Russell Silver Syndrome, which is a growth disorder characterized by delayed physical growth before and after birth and, in this child's case, requires a feeding tube for adequate nutrition. The focus of speech and language therapy for this child was on oral motor weakness and motor speech development, not higher-level language ability or cognitive development. Goals for this client targeted articulation skills such as omissions, distortions, and substitutions, as well as the intelligibility of her speech as her MLU increases. It may be viewed as similar to the case of any child with limited output ability, in the presence of physical constraints. In these cases it is logical to assume that caregivers of children with physical disabilities, might adjust their input in accordance with the child's comprehension ability, not his or her productive ability.

In sum, the three children receiving higher than expected language input were all receiving early intervention services for speech and language development in the presumed absence of cognitive delays. The children who received language input within the targeted range were diagnosed with expressive language delay, speech and language delay, and developmental disability, all of which are presumed to involve intervention for possible cognitive delays. Suggesting, then, that the SLPs could have been altering their MLU based on the child's presumed cognitive ability.

Related to clinical diagnosis is the issue of the children's language comprehension ability. It is possible that the developmental level of the children's language comprehension could have been a factor in the level of language complexity

provided by their SLPs. If so, evidence for this would be consistent with Cross (1978) who reported research findings implying that mothers of typically developing children match their MLUs to their children's language comprehension levels. In cases of expressive (not receptive) language delay and speech-sound disorders, the child's language comprehension abilities are generally disproportionately higher than his or her expressive language abilities. Therefore, it may be the case that SLPs intuitively direct their language input in accordance with the child's comprehension level, rather than his or her expressive level. If so, we would expect to see SLPs' MLUs outside the child's proximal zone of language development, in the direction of higher rather than lower mean length of utterances, which was seen in the present study. However, the lack of receptive and expressive language scores for the participants in this study make definite conclusions problematic.

A fourth factor explored was the type of activity the children were involved with during their intervention sessions. It is possible that the conversation in certain interactive situations could be altered by the context in which they are provided. That is, SLPs may use simpler utterances when interacting with children about more complex subjects. Table 1, shown in the methods section, indicates that dyads A, B, and D were primarily play-based interactive activities whereas C, E, and F involved interactions primarily with books. Given that no patterns with regard to the interactive context or activity were found, it is concluded that toys and activities did not present as a confounding factor in this study.



Another variable considered, and one that relates to conversational context, was the presence of other individuals in addition to the child and SLP in the early intervention sessions. Analysis reveal that participants' mothers were present during sessions with dyads A, B, C, D, and F. Therefore, no pattern for the presence of mothers was indicated. This prompted an informal examination of the amount of interaction each mother had with the SLP during the session to determine whether interference had any influence on SLPs MLUs. Results of the analysis indicate that mothers of children in dyads B and C interacted frequently with the SLP and her child during the sessions. It is possible that these interruptions caused the SLP to alter the rhythm of their input, thereby influencing her MLU outside the target range. This variable should be studied further using larger participant samples.

### **Conclusions**

Previous research has shown that caregivers interacting with typically developing toddlers provide language input at a complexity level of 2.0-3.0 morphemes greater than their child's MLU. To date, no research has been conducted to examine the language input of SLPs who hold the responsibility of modeling appropriate language input to caregivers of children with speech and language disorders. Accordingly, the purpose of this preliminary investigation was to study whether the language input, measured by MLU, of SLPs interacting with their toddler-aged clients is within the client's proximal zone, and if not, what factors might have played an explanatory role.

Studying adult language directed to children with speech and language disorders is of theoretical importance because it provides an opportunity to investigate how adult

language input may be affected by factors other than the child's language output.

Results of the present study are inconsistent with previous research looking at interactions between typically developing toddlers and their caregivers. In the present study, three of the six language samples recorded indicate that SLPs were providing language input to their toddler-aged clients that was higher than the expected range of 2.0-3.0 morphemes ahead of the child's mean length of utterance. Therefore, the present study suggests that variables other than the child's utterance length may indeed contribute to the complexity of adult language input directed to them.

Qualitative analysis of the data in the present study implies that characteristics of the children's overall language functioning may have contributed to the difference in language input provided by their SLPs. More specifically, the child's level of cognitive functioning and language comprehension may explain the higher degree of complexity in the SLPs' level of language input. Based on the fact that the three children who received more complex input were carrying diagnoses of language disorders in the absence of cognitive disorders, it could be speculated that SLPs in the present study may have been using their intuitive sense of their client's language comprehension ability rather than the child's output as a guide to their own levels of language input. The design of this study does not, however, permit definitive conclusions.

Given the preliminary nature of this study, clinical implications remain unclear. If it were confirmed that SLPs are appropriately adjusting their language input to match their clients' comprehension levels, no changes in graduate program education would be implied. If, however, mismatches between client and clinician language are found to

occur for other reasons, educational training curricula should address the reasons for the mismatches and how SLPs can best self-monitor their language input.

### **Limitations and Implications for Future Research**

In interpreting the results of the present study, several important limitations should be noted. First, only six speech-language pathologist/child communication dyads were studied. This makes it difficult to generalize the results of this study to the larger population. With a larger sample size, variables such as the child's diagnosis, chronological age, expressive and receptive language scores, communication context, and the SLPs level of experience could be carefully evaluated.

Second, the children were not pretested for language comprehension and cognition levels at the time of the study. This limitation affects the ability to move beyond speculation in the interpretation of the possible influence that the children's comprehension skills and cognitive level may have on the SLPs' language input.

### **Suggestions for Future Research**

These findings indicate a clear need for further research in this area. Given the small sample size, replication of the present study should be conducted. Future research in this area should expand the number of participants on a geographically more diverse scale. Additional research should also be conducted to more carefully study factors that affect adult language input to young children with and without speech and language disorders. Such factors should include children's language comprehension ability and chronological age. Such research would make an excellent contribution to the scientific literature on caregiver and child language input.

In addition, and perhaps pending results of the previous suggested research, studies designed to look at communication sciences and disorders pre-service curricula would be beneficial to determine what specific training SLP students receive regarding appropriate language input in the early intervention setting.

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## APPENDICES

## RECRUITMENT MATERIALS

## APPENDIX A

### REFERRAL LETTER TO EARLY INTERVENTION CENTERS

Dear Early Intervention Providers,

My name is Tanya Willey. I am a second year graduate student in the Communication Sciences and Disorders Master's program at the University of New Hampshire. I am conducting a thesis research project, under the supervision of Dr. Penelope Webster, Ph.D. CCC-SLP, for the purpose of observing and documenting the language interactions between children in early intervention programs and their speech-language pathologists. I am writing to ask if you would review the children enrolled in your early intervention program and refer any who meet the following inclusion criteria:

- Meet your center's qualifications for early intervention services;
- Have a language age between 24 and 29 months (producing two-word combinations) as documented by a qualified speech-language pathologist;
- Have a passed hearing screening, or no indication of hearing difficulties as documented by a qualified speech-language pathologists;
- Do not have an autism diagnosis.

Once permission has been obtained, I will ask that you record the participating clients during one of their regularly scheduled early intervention sessions while they are interacting with their speech-language pathologists and email me the sample. In reviewing this sample I will simply be observing and documenting the language interaction that I see.

The protocol for my research project calls for a fifteen to twenty minute videotaped language sample that is recorded during one of the child's regularly scheduled early intervention sessions. This research will take place either in the child's home or where the child typically receives services. I will be reviewing the tapes only to observe and document the behaviors that I see. I will preserve participants' identity by assigning each child and speech-language clinician with a code; no identifiable information will be required after video sampling.

If you believe you have clients who fit the above criteria and would be willing to refer them for this project I would greatly appreciate it. I am requesting, then, that you review your client files to determine who meets my inclusion criteria. For client's that meet this criteria I would like you to obtain consent, in the form of a signed consent form, from their speech-language clinician and distribute parental consent forms to the parent or guardians of those children. Once I receive both the clinicians' and parents' consent forms I will schedule a time to observe the early intervention session.

If you have any questions or concerns I can be reached at [tanyajwilley@gmail.com](mailto:tanyajwilley@gmail.com) or at 978-460-3718. Thank you so much for your time and consideration.

Tanya Willey

Graduate Student Researcher

University of New Hampshire

## APPENDIX B

### RECRUITMENT LETTER TO PARENTS OF CHILDREN RECEIVING EARLY INTERVENTION SERVICES

Dear Parents,

My name is Tanya Willey. I am a second year graduate student in the Communication Sciences and Disorders Master's program at the University of New Hampshire. I am conducting a thesis research project, under the supervision of Dr. Penelope Webster, Ph.D. CCC-SLP, for the purpose of observing and documenting language interactions between children in early intervention programs and their speech language pathologist's. I am writing to ask if you would consider your child to be a part of this research study.

The study involves an audiotaped language sample, of about 15-20 minutes, that is recorded during one of your child's regularly scheduled early intervention sessions. I can either come to your child's intervention session and record the sample, or you or your speech language pathologist can record the sample and email it to me; whichever is easiest and most comfortable for you. If I come to record the sample I will not be interfering with the therapy sessions in any way, I will be there only to observe, document behaviors, and videotape their interaction. I will preserve your child's confidentiality by using a coding system, which will assign your child and their speech language pathologist with a number so no identifiable information is used. Upon completion of the study, all audiotapes will be destroyed. Your center's director, or your child's speech language pathologist, will provide me with information on a demographic



form indicating your child's date of birth, most recent or estimated average length of utterance, most recent hearing screening if it is on file with the date it was performed, and if your child has a specified diagnosis, so I will not need to look into any personal files.

Thank you so much for your consideration. If you have any questions or concerns I can be reached at [tanyajwilley@gmail.com](mailto:tanyajwilley@gmail.com) or at 978-460-3718.

Tanya Willey  
Graduate Student Researcher  
University of New Hampshire

## APPENDIX C

### SPEECH-LANGUAGE PATHOLOGIST CONSENT FORM

Dear Speech Language Pathologists,

I am conducting a research study for the purpose of observing and documenting language interactions between children enrolled in speech-language early intervention and their speech-language pathologist's. More specifically, I am interested in learning more about the nature of the speech used by both child and clinician. I plan to observe approximately 20 children who have language disorders interacting with their speech language pathologists. I am writing to invite you to participate in this project.

If you give your consent to participate in this study, you will be asked to do the following:

- Engage in a regularly scheduled and planned therapy session with your client.

If you agree to participant in the study, you understand that:

- The regularly scheduled therapy session will be audio and/or video recorded.
- Written transcripts will be made of the session for the purposes of data collection.
- Audio and/or video recordings and transcripts will be kept in a locked filing cabinet and myself, and my faculty advisor Dr. Penelope Webster, Ph.D. CCC-SLP, will be the only ones who have access to the data. These

recordings and data will be in the locked filing cabinet so I can review them if there are any questions about the results. All recordings will be deidentified and stored securely for at least three years upon completion of the study.

- The potential risks of participating in this study are expected to be minimal, however you may feel stress or anxiety for being video recorded.
- I will not identify you as a participant in this study; however there is a very minimal risk that individuals who are not involved in this study may discover that you are involved in a research study. All measures to maintain your identity will be taken, including the use of a coding system for data collection, deletion of all recordings once transcriptions have been completed, and storage of all data in a locked filing cabinet for the duration of the study.
- Data collected from the audio and/or video recordings will be analyzed quantitatively and qualitatively and reported in aggregate using a coded system. Information obtained through this research will be disseminated as a master's thesis publication and will be presented at a graduate research conference.
- You will not receive any compensation for participating in this project.
- Participation is strictly voluntary.
  - If you refuse to participate, there will be no penalty.
  - If you agree to participate then change your mind, you may withdraw at any time during the study without penalty.

I, a graduate student clinician, in the Communication Sciences and Disorders Department at the University of New Hampshire, will conduct this research.

It is my goal to maintain the confidentiality of all data and records associated with your participation in this research. However, there are rare instances when I am required to share personally identifiable information (i.e. according to policy, contract, regulation). You should also understand that I am required by law to report certain information to government and/or law enforcement officials (i.e. child abuse, threatened violence against others).

If you have any questions about this research project or would like more information before, during, or after the study, you may contact Tanya Willey at 978-460-3718 or [tanyajwilley@gmail.com](mailto:tanyajwilley@gmail.com).

If you have any questions about your rights as a research subject, you may contact Julie Simpson in the UNH Research and Integrity Services 603-862-2003 or [Julie.simpson@unh.edu](mailto:Julie.simpson@unh.edu) to discuss them.

I have enclosed two copies of this letter. Please sign one indicating your choice and return it. The other copy is for your records.

Thank you for your consideration.

Sincerely,

Tanya Willey

Graduate Student Researcher

University of New Hampshire Communication Sciences and Disorders

Yes, I \_\_\_\_\_ consent/agree to participate in this  
research project.

No, I \_\_\_\_\_ do not consent/agree to participate in this  
research project.

\_\_\_\_\_

Signature

\_\_\_\_\_

Date

APPENDIX D  
PARENT CONSENT FORM

Dear Parents,

I am conducting a research study to observe and document the language interactions between children enrolled in speech and language early intervention services and their speech language pathologists. More specifically, I am interested in learning more about the nature of the speech used by both child and clinician. I plan to observe approximately 20 children who have language disorders interacting with their speech language pathologist and am writing to invite your child to participate in my project.

If you give consent for your child to participate in this study, he or she will be asked to do the following:

- Engage in a regularly scheduled and planned therapy session with his or her current speech language pathologist.

If you give consent for your child to participant in the study, you understand that:

- Your center's director will provide me with your child's date of birth, most recent documented or estimated average length of utterance, most recent documented hearing screening if it is on file with the date it was performed, and if your child has an identified diagnosis.
- Your child's regularly scheduled therapy session will be audio recorded.

- Written transcripts will be made of your child's therapy session for the purpose of data collection.
- Audio recordings and transcripts will be kept in a locked filing cabinet where myself, and my faculty advisor Dr. Penelope Webster, Ph.D. CCC-SLP, will be the only people who have access to the data. These recordings and data will be kept in the locked filing cabinet so I can review them if there are any questions about the results. All recordings will be deidentified and stored securely for at least three years upon completion of the study.
- The potential risks for your child's participation in this study are expected to be minimal, however, he or she may feel stress or anxiety for being recorded.
- I will not identify your child as a participant in this study; however there is a very minimal risk that individuals who are not involved in this study may discover your child is involved in a research study. All measures to maintain your child's identity will be taken, including the use of a coding system for data collection, deletion of all recordings once transcriptions have been completed, and storage of all data in a locked filing cabinet for the duration of the study.
- Data collected from the audio recordings will be analyzed quantitatively and qualitatively and reported collectively using a code system. Information obtained through this research will be disseminated as a master's thesis publication and will be presented at a graduate research conference.
- Your child will not receive any compensation for participating in this project.

- Participation is strictly voluntary.
  - If you refuse to allow your child to participate, there will be no penalty.
  - If you agree to allow your child to participate then change your mind, you may withdraw at any time during the study without penalty.

I, a graduate student clinician, in the Communication Sciences and Disorders Department at the University of New Hampshire, will conduct this research.

It is my goal to maintain the confidentiality of all data and records associated with your child's participation in this research. However, there are rare instances when I am required to share personally identifiable information (i.e. according to policy, contract, regulation). You should also understand that I am required by law to report certain information to government and/or law enforcement officials (i.e. child abuse, threatened violence against others).

If you have any questions about this research project or would like more information before, during, or after the study, you may contact Tanya Willey at 978-460-3718 or [tanyajwilley@gmail.com](mailto:tanyajwilley@gmail.com).

If you have any questions about your rights as a research subject, you may contact Julie Simpson in the UNH Research Integrity Services 603-862-2003 or [Julie.simpson@unh.edu](mailto:Julie.simpson@unh.edu) to discuss them.

I have enclosed two copies of this letter. Please sign one indicating your choice and return it. The other copy is for your records.



Thank you for your consideration.

Sincerely,

Tanya Willey

Graduate Student Researcher

University of New Hampshire Communication Sciences and Disorders

Yes, I \_\_\_\_\_ consent/agree to allow my child to participate in this research project.

No, I \_\_\_\_\_ do not consent/agree to allow my child to participate in this research project.

\_\_\_\_\_

Signature

\_\_\_\_\_

Your Child's Name

\_\_\_\_\_

Date

APPENDIX E

DEMOGRAPHIC INFORMATION COLLECTION SHEET

(For researcher use only) Identifiable Code:

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Gender:

Date of Birth:

Most recent documented, or estimated MLU on file:

Date of most recent documented MLU on file (if available):

Results of most recent documented hearing screening on file (if available):

Date of most recent hearing screening on file:

Child's diagnosis (if available):

## APPENDIX F

### IRB APPROVAL LETTER

#### University of New Hampshire

Research Integrity Services, Service Building  
51 College Road, Durham, NH 03824-3585  
Fax: 603-862-3564

03-Oct-2014

Willey, Tanya  
Communication Sci. & Disorders, Hewitt Hall  
4 Library Way  
Durham, 03824

**IRB #:** 6083

**Study:** Speech Language Pathologists and Linguistics Input

**Approval Date:** 24-Sep-2014

The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved the protocol for your study.

**Approval is granted to conduct your study as described in your protocol for one year from the approval date above.** At the end of the approval period you will be asked to submit a report with regard to the involvement of human subjects in this study. If your study is still active, you may request an extension of IRB approval.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the attached document, *Responsibilities of Directors of Research Studies Involving Human Subjects*. (This document is also available at <http://unh.edu/research/irb-application-resources>.) Please read this document carefully before commencing your work involving human subjects.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or [Julie.simpson@unh.edu](mailto:Julie.simpson@unh.edu). Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,



Julie F. Simpson  
Director

cc: File  
Webster, Penelope