

6-29-2018

# The Use of Expansions to Increase the Mean Length Utterance of Preschool Students

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**THE USE OF EXPANSIONS TO INCREASE THE MEAN LENGTH UTTERANCE OF  
PRESCHOOL STUDENTS**

A Thesis

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Master of Education

in

Curriculum and Instruction:  
Early Childhood Education

by  
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B.A., Washington State University, 2015  
August 2018

## TABLE OF CONTENTS

Abstract.....	iii
Chapter	
1. Introduction.....	1
Justification.....	1
Language Development.....	1
Language Interventions.....	3
Purpose.....	4
Research Questions.....	5
Research Design.....	5
Benefits and Limitations.....	5
Assumptions.....	6
Definitions.....	6
2. Literature Review.....	8
Language Development.....	9
Mean Length Utterance.....	10
Teacher’s role in Language Development.....	12
Types of Language Interventions.....	13
3. Methods.....	17
Setting.....	17
Participants.....	18
Behavior Definitions.....	19
Baseline.....	20
Expansion Intervention.....	20
Generalization.....	21
Observation Procedure.....	21
Data Collection.....	22
Interobserver Agreement.....	22
Experimental Design.....	23
4. Results.....	24
5. Discussion.....	28
Clinical Implications.....	29
Limitations and Future Research.....	30
Conclusion.....	31
References.....	32
Appendix A. Instructional Review Board Approval.....	37
Vita.....	38

## ABSTRACT

Language is an important area of development addressed in preschool, as it is the foundation for literacy development and the way children express their thoughts and understandings. Mean length utterance (MLU) can be used as a measure of a child's expressive language development. One intervention that has been used to increase MLU is *expansion*. Expansion is when an adult responds to a child's utterance by expanding their sentence to form a more complete or complex sentence. This study used an Expansion Intervention to increase the MLU of preschool aged students. The subjects consisted of three preschool children attending a Title 1, private preschool. The children were identified as behind in language development, according to *Teaching Strategies Gold Checkpoint*. Using a multiple baseline design, each child's MLU was calculated across a baseline, intervention and generalization period. The Expansion Intervention was used to increase the child's MLU while discussing picture books. A generalization probe was conducted six months following the initial expansion intervention to assess the transfer of increased MLU to small group and center environments. The children's MLU increased by an average 0.62 morphemes when the Expansion Intervention was applied; the generalization probe yielded mixed results. Teachers should consider the use of expansions to increase MLU within the natural routines and activities of the early childhood classroom. Further research is needed to address the transfer of the increase across environments and from a one-to-one situation to a large group situation.

## CHAPTER 1. INTRODUCTION

### **Justification**

Literacy is highly valued in society as a child's ability to read and write is directly related to positive outcomes in their life such as their ability to be successful in school, how much they will contribute to our society (NAEYC & IRA, 1998, p. 196) and their future earning potential (Ritchie & Bates, 2013). Language development during the early childhood years is crucial, given that language skills are a precursor for literacy development (Heroman, Jones, & Baker, 2016). Children must develop their language skills before they develop their ability to read and write (Heroman et al., 2016). It is the job of early childhood educators (teachers) to provide students with an environment that promotes language development. Research suggest that this can be accomplished through the creation of learning environments that include language modeling through discussion and read alouds (Shedd, & Duke, 2008), the opportunity to practice their language skills with the teacher and their peers (Al-Harbi, 2015; Heroman et al., 2016) and intervention activities (NAEYC, 2009).

### **Language Development**

Classroom assessment and observation scales assess the quality of language in the classroom (Environment Rating Scales Institute, 2016; Pianta, La Paro, & Hamre, 2008; U.S. Department of Health & Human Services, 2008) underscoring the importance of language development. One such assessment is the *Classroom Assessment Scoring System (CLASS)*, which evaluates language in the classroom under the heading "Instructional Support: Language Modeling," CLASS scores the teacher(s)' support of conversational skills, vocabulary development, and their strength of language modeling (Pianta, La Paro, & Hamre, 2008). The *Early Childhood Environmental Rating Scale (ECERS)* also evaluates language development;

ECERS rates language in their “Language and Reasoning” subscale by scoring children’s access to books and pictures in the classroom, the way teachers encourage communication, and the use of language both formally and informally (Environment Rating Scales Institute, 2016; Harms, Clifford & Cryer, 2015).

While ECERS and CLASS both value overall language use in the classroom, a more child-specific measure that assesses a child’s expressive language is mean length utterance (MLU) (Casby, 2011). MLU is used to assess whether a child is making age appropriate progression towards adult language acquisition (Blossom, Perpich, Rice, Rytting, Smolik, & Thompson, 2010). MLU is calculated by taking the number of morphemes, the smallest form of a word that cannot be broken down any further, (Merriam Webster, 2018) and dividing it by the number of utterances, to find an average and this number can be used as a criterion for possible language delays or disorders (McAfee & Shipley, 2008). Children who are not progressing towards the age-typical MLU need additional support and/or intervention to help them progress appropriately.

Miller and Chapman (1981) mapped out the developmental norms which are still used when assessing a child’s mean length utterance development by studying the connection between age and MLU. These researchers calculated the MLU using morphemes, rather than words, as some words have multiple morphemes. Calculating the morphemes demonstrates a more detailed view of the child’s language development (Miller & Chapman, 1981). Miller and Chapman (1981) outlined the age-expected MLU for children 18 months (1 year, 6 months) of age through 60 months (5 years) of age. A child who is not meeting these MLU targets could be considered behind in their language development. Although published several decades ago, Miller and

Chapman's developmental norms are still used today (Blossom et al., 2010; Hadley, McKenna & Rispoli, 2018).

### **Language Interventions**

Teachers can facilitate supporting children's language development within the context of routine classroom activities. When children are not meeting the age expected language development through these routine classroom activities, teachers can implement interventions (Coleman, Roth, & West, 2009). A speech and language intervention utilizes a "set of techniques to facilitate speech and language development" (Gladfelter, Wendt, & Subramanian, 2011, p. 2). The intention of using an intervention is to increase the child's ability to communicate in everyday activities and teachers plan an intervention based on what will help that specific child communicate and interact easier in their everyday environment (Kaiser & Roberts, 2011). The American Speech and Hearing Association (ASHA) has called for the use of evidence-based interventions to promote language development in young children (American Speech-Language-Hearing Association, 2018). An evidence based intervention is one that has "current, high-quality research evidence" showing its effectiveness (American Speech-Language-Hearing Association, 2005, para 1).

One such intervention is *expansion*. An expansion is when a child makes a statement and the teacher or adults responds by expanding their sentence to form either a more complete or complex sentence (Nelson, 1989), more recently known as a conversational recast (Cleave, Becker, Curran, Owen Van Home & Fey, 2015). Expansion interventions can be naturally occurring interventions that have been documented outside of the classroom. Research has found that the use of expansions inside and outside of the classroom are effective to increase the

language development of children (Fletcher, Cross, Tanney, Schneider & Finch, 2008; Levickis, Reilly, Girolametto, Ukoumunne, & Wake, 2014; Scherer & Olswag, 1984).

Yoder, Spruytenburg, Edwards & Davies (1995) used expansions and an intervention with students who had developmental delays and found that the expansion intervention increased the children's MLU in generalization periods. Their expansion intervention was conducted while looking through picture books and their MLU data were collected in a different environment, with different adults looking at objects rather than books; this study showed the generalizability of expansion interventions (Yoder et al., 1995).

More recent research has used similar procedures as Yoder et al. (1995) with similar results (Wong & Foster-Cohen, 2012). In Wong & Foster-Cohen's (2012) study, they examined the effect of expansions and the effect of expansions paired with a cloze procedure on a child's conversational skills including their ability to maintain on topic during the conversation. Wong & Foster-Cohen's (2012) interventions allowed the children to select the item they wanted to interact with from a selection of books and objects and the adult employed either a) expansions only, or b) expansions and a close procedure. This study found that while both increased the child's conversation skills, but the expansion only group showed the largest increase therefore supporting the use of expansions (Wong & Foster-Cohen, 2012).

## **Purpose**

The purpose of the present study was to analyze the effectiveness of the Expansion Intervention to increase the language of children in an early childhood classroom. Expansions can be used within the context of everyday routines in the early childhood classroom and requires only materials found in the classroom.

## **Research Questions**

1. Will the use of an Expansion Intervention during a read aloud session increase the mean length utterance of targeted children closer to the chronological expectation as specified by Miller and Chapman (1981)?
2. Will gains made during the Expansion Intervention generalize to other routines and activities in the early childhood classroom?

## **Research Design**

This study utilized a single subject research design to measure the effects of an Expansion Intervention on mean length utterance in targeted children who exhibited delays in language. Specifically, a multiple baseline across subjects was used, which allowed for interventions to be created based on individual, initial baseline data. This type of study allows for small populations, with which the researchers are interested, in solving behavior problems on an individual basis (Kazdin, 2011). Data were collected until a stable pattern of behavior was observed during each phase of the study.

## **Benefits and Limitations**

A benefit of a single subject research design is the use of visual analysis of the data to ensure that there are positive effects observed before further implementation across subjects (Kazdin, 2011). Another benefit was that the Expansion Intervention fit within the context of the naturally occurring routine of the early childhood classroom. It was a low-cost, low-labor intensive intervention. One limitation was that the teacher served as the researcher and may have been biased, as she was familiar to the children. Because the researcher was the teacher, she was also able to understand the children's utterances at a higher level than someone who wasn't familiar with them, and therefore may have found their utterance to be more intelligible.

Another limitation to this study would be the generalizability of the results across subjects. We addressed this by having both male and female children, one of whom had a diagnosed speech disorder and two of whom did not.

A potential threat to the internal validity of a study such as this is maturation; the children will grow older as the study progresses (Kazdin, 2011). With that in mind, the increase in MLU can be compared to the age expected MLU increase following Miller and Chapman's (1981) MLU chart of approximately 1.24 morphemes per year. Any growth in MLU beyond what would be expected to occur in the time frame of the intervention that can be directly attributed to the Expansion Intervention. A potential threat to the external validity of a study such as this is generality across subjects (Kazdin, 2011). The ability to transfer this intervention to different children is supported in this study by having both male and female children and children with and without diagnosed speech disorders.

### **Assumptions**

1. Gains in MLU are due to the Expansion Intervention, as other services delivered to targeted children remained the same for the duration of the study.
2. The teachers' familiarity with the children remained constant; therefore, her understanding of the children's language did not account for increases in intelligibility in MLU.

### **Definitions**

*Mean Length Utterance* has been defined as the average number of morphemes in each utterance (Blossom et al., 2010; McAfee & Shipley, 2008).

*Expansion* has been defined as an adult utterance made in response to a child's utterance that expands the child's utterance by increasing the complexity or completeness of it (Nelson, 1989; Wong & Foster-Cohen, 2012; Yoder et. al, 1995).

*Intelligibility* refers to the ability to be understood, or how much of an utterance is understood (American Speech-Language-Hearing Association, 2018b).

## CHAPTER 2. LITERATURE REVIEW

*Early childhood* refers to the period of time from birth through 8-years-old; *early childhood education* is the education of children infancy through third grade (NAEYC, 2009). This period of time is often referred to by other names such as preschool, pre-k, pre-kindergarten, nursery school, and pre-primary school. Early childhood education classrooms were developed to increase the success of children by supporting their “academic and social development” (Burchinal, Vandergrift, Pianta & Mashburn, 2010, p.166). Early childhood education is an important area of study as the benefits of early childhood education extend past the early childhood years: students who attended a quality preschool program are significantly less likely to be below grade level in reading (18% less likely) and math (33% less likely) in 4<sup>th</sup> grade when compared to their peers that had either not attended a preschool program or had limited preschool experience (Bakken, Brown & Downing, 2017, p.266). The research is clear that *quality* preschool program are linked to academic performance (Bakken et al., 2017; OECD, 2016).

For a preschool program to be of quality, it must implement developmentally appropriate practice “that promotes young children’s optimal learning and development” (NAEYC, 2009, p.1). The National Association for the Education of Young Children (NAEYC) states that high quality, developmentally appropriate preschool programs use curriculum that addresses children’s physical, social, emotional and cognitive development (NAEYC, 2009).

While physical, social, emotional and cognitive development are areas that early childhood education programs must focus on to be developmentally appropriate, language development is fundamental as it connects all of the developmental areas (NAEYC, 2009). Due to the significance of language development, a variety of classroom observation and classroom

assessment tools evaluate the quality of language in preschool classrooms (Environment Rating Scales Institute, 2016; U.S. Department of Health & Human Services, 2008). The *Classroom Assessment Scoring System* (CLASS), assess language development under the Instructional Support domain, titled “Language Modeling,” by evaluating the teacher(s)’ support of conversational skills, vocabulary development, and their strength of language modeling (Pianta, La Paro, & Hamre, 2008). *The Early Childhood Environmental Rating Scale* (ECERS) evaluates language development in their Language and Reasoning subscale by assessing children’s access to books and pictures in the classroom, the way teachers encourage communication, and the use of language both formally and informally (Environment Rating Scales Institute, 2016; Harms, Clifford & Cryer, 2015).

### **Language Development**

Language development is an important part of preschool as it is the “foundation of literacy” and the way children express their thoughts and understandings (Heroman et al., 2016, p. 9). A child needs to develop their language skills before they develop their ability to read (Bourque-Meaux & Norris, 2018) and write (Heroman et al., 2016). Language development milestones are categorized by age group, usually in 1-2 year increments (Canadian Language & Literacy Research Network, 2009; McAfee & Shipley, 2008) with the exception of MLU which is broken into 3 month increments (Miller & Chapman, 1981). The milestones address both receptive (language that can be understood) and expressive (language the child produces) (Casby, 2011).

**One-to-two years (12-24 months of age).** At 1-2 years of age, children begin to produce words with meaning and combining words to create sentences (American Speech-Language Hearing Association, n.d). Their total vocabulary averages 50 words, and consists of mostly

nouns (Ranalli, 2012). Children in this age group use a combination of intelligible and unintelligible utterances, averaging 25-50% intelligibility as they approach 2 years of age (McAfee & Shipley, 2008). At 1 year 6 months, the age expected MLU is 1.31 and as children progress towards 2 years of age the expected MLU is 1.92 (Miller & Chapman, 1981).

**Two-to-four years (24 -48 months of age).** At 2-4 years of age, a child's "speech is 50-75% intelligible" (McAfee & Shipley, 2008, p. 95). Children's vocabulary averages 300-400 words and they begin to move from two word utterances to sentences that contain 3 words (Ranalli, 2012). At this age, the expected MLU range is 1.92 (24 months of age) and 4.4 (48 months of age) (Miller & Chapman, 1981).

**Four-to-six years (48 – 72 months of age).** At 4-6 years of age, children's vocabulary will increase so that their receptive vocabulary (words they can understand when heard) are averaging 13,000 words, they should be able to use both past and future tense of words, produce sentences between four to six words long (McAfee & Shipley, 2008). A child at this age should be understood by most and be able to communicate clearly and their sentences should include details (McAfee & Shipley, 2008).

### **Mean Length Utterance**

Mean length utterance (MLU) is used to evaluate a child's language development, and can demonstrate if a child is making age appropriate progression towards adult language acquisition (Blossom, Perpich, Rice, Rytting, Smolik, & Thompson, 2010; McAfee & Shipley, 2008). MLU measures "expressive language of young children," meaning the language the child produces rather than the receptive language, the language that the child can comprehend (Casby, 2011, p. 286). MLU is a strong representation of a child's language development (Blossom et al., 2010; Miller & Chapman, 1981). MLU is measured as the mean number of morphemes that a

child uses in each utterance and can be used as a criterion for possible language delays or disorders (McAfee & Shipley, 2008).

Mean length utterance was first developed by Nice in 1925; she proposed calculating the average length of a child's sentence, using words, to assess a "a child's progress in the attainment of adult language" (Nice, 1925, p. 378). Brown (1973) further studied the use of MLU, followed by Miller and Chapman (1981) who mapped out developmental norms which are still used when assessing a child's mean length utterance development. These researchers calculated the MLU using morphemes, rather than words, as some words have multiple morphemes and show a more detailed view of the child's language development (Miller & Chapman, 1981). A morpheme is the smallest form of word, that has meaning, and that cannot be broken down any further (Merriam Webster, 2018). MLU is expected to progress an average of 1.24 morphemes per year from the age of 1 year 6 months to 5 years (Miller & Chapman, 1981). At 4 years old expected MLU is 4.4 morphemes, at 4 years 3 months expected MLU is 4.71, at 4 years 6 months expected MLU is 5.02, at 4 years 9 months expected MLU is 5.32 and at 5 years expected MLU is 5.63 (Miller & Chapman, 1981). A child who is not meeting these MLU targets could be considered behind in their language development.

Early childhood education is an important tool in our society; it prepares our youngest members of society for success. Within early childhood education, language development is important as it connects all other domains of learning; children's physical, social, emotional and cognitive development (NAEYC, 2009). Children's language can be assessed against age-expected averages including mean length utterance as a measure.

## **Teacher's Role in Language Development**

Coleman, Roth and West (2009) describe three tiers of support classroom teachers can provide to assist students in meeting their language development goals. Tier one involves the classroom curriculum and the instruction that the whole class receives. Tier two consist of small groups of students who need additional support and are not reaching their goals based on the tier one curriculum alone. Tier three support is individualized and often done in a one-on-one setting that involves an evidence-based intervention to address that child's needs. As part of tier one, teachers can support children's language development within the context of routine classroom activities. These include modeling higher levels of speech through self and parallel talk (Pullen & Justice, 2003), encouraging discussion between classmates and adults during small group and whole group activities such as read alouds (Heroman et al., 2016), and reading in small groups (Kaderavek & Justice, 2001). Tier two can include the same components as tier one but in a smaller group of students who need additional support. Tier three support will utilize interventions such as narrative interventions (Spencer, Petersen, Slocum, & Allen, 2015), repeated storybook exposure (Justice, Meier & Walpole, 2005), and expansions (Nelson, 1989) that address specific needs of the individual child.

**Self and parallel talk.** Self-talk is “an adult's ongoing description of her own activities or thoughts” and parallel talk is their “ongoing description of a child's activities” (Pullen & Justice, 2003, p. 94). Self and parallel talk is useful for students who are not producing spontaneous utterances regularly as the speaking is done by the adult as a model for the child, but does not require any verbal input from the child to begin with. Research has found that the use of parallel talk can increase the number of spontaneous utterance made by children (Raver et al., 2012).

**Discussions.** A well designed early childhood learning environment provides children with the opportunity to practice their language with the teacher and their peers (Heroman et al., 2016). This practice can take place in many ways, one of which is through discussions. These discussions can happen in a variety of situations, including while reading in small groups or in a one-on-one setting between a teacher and a child. Reading in small groups supports language growth in both young children who are progressing as expected towards their age expected speech goals and those who are not progressing as expected (Kaderavek & Justice, 2002). Reading in a small group setting is effective as it allows the teacher to focus on an area of language or literacy development that is specific to the child (Kaderavek & Justice, 2002) and provides content for students and teachers to discuss.

### **Types of Language Interventions**

There are a variety of language interventions in the research literature that have been demonstrated to produce increases in children's language. Narrative interventions (Petersen, Brown, Ukrainetz, Wise, Spencer & Zebre, 2014; Spencer et al., 2015), repeated storybook exposure (Justice et al., 2005), and expansions (Bellon-Harn, Hoffman & Hard, 2004; Fletcher et al., 2008; Levickis et al., 2014; Nelson, 1989; Scherer & Olswang, 1984) have all been used successfully to produce increases in children's language.

**Narrative interventions.** A narrative is a retelling of a story. A narrative can be the retelling of a personal story or the retelling of a story a child heard, and involves explaining who, what, where, when, why and the emotions involved (Petersen, Brown, Ukrainetz, Wise, Spencer & Zebre, 2014). A narrative requires language skills as children must produce multiple utterances in order to adequately retell the story (Spencer et al., 2015). A narrative intervention provides children with a visual cue, such as symbols, to assist them in retelling the narrative with

details (Spencer et al., 2015). The teacher providing the intervention can show the students the visual cue to remind them to describe that part of the story. Research supports the use of narrative interventions in whole group settings (Spencer et al., 2015) and in small group intervention (Petersen et al., 2014) to increase the child's language. This intervention involves training for the teacher that can take multiple hours and requires the use of intervention specific materials (Spencer et al., 2015).

**Repeated storybook exposure.** Repeated exposure to storybooks that contain vocabulary unknown to the child can increase a child's vocabulary (Justice et al., 2005). While reading the text, the adult elaborates on vocabulary words that are new or unknown to the student by providing a definition and using it in a sentence that provides context to the child (Justice et al., 2005). Repeated exposure requires students to be exposed to the same text multiple times, which can be labor intensive as teachers, parents or speech therapists must have the book with them to implement the intervention and requires students to maintain interest in the book after multiple readings.

**Expansions.** One such intervention is *expansion*. An expansion is when a child makes a statement and the teacher or adults responds by expanding their sentence to form either a more complete or complex sentence (Nelson, 1989). Expansions are a form of modeling; the adult (researcher, teacher, parent) models a higher level of language skills for the student (Bellon-Harn, Hoffman & Hard, 2004; Nelson, 1989). Modeling is when an adult does an activity or task and a child observes it (Marion, 2011), and is a way to show students what is expected of them. Modeling has a strong influence on the learning of children (Bandura, 1986). When the expanded sentence is modeled, students can hear what the expected level of language sounds like and can

model their own speech after it. Expansions require limited amount of materials as they expand on the child's utterance and can be done in many environments.

Expansion interventions are naturally occurring interventions that have been documented outside of the classroom. Scherer and Olswang (1984) found that 2-year olds whose mother's used expansions had higher rates of spontaneous two-word utterances. Children would often repeat the mother's expansion at first, but over time would produce the expanded sentence on their own (Scherer & Olswang, 1984). These findings were supported by Fletcher et al. (2008), who found that a parent's use of expansions while reading with their 24-month-old child was connected to the child's expressive language development at 30 months old. They found that frequent reading with children was important, but the use of strategies such as expansions and questioning during the reading were what lead to increase expressive language and interest in reading at 30 months (Fletcher et al., 2008). Similarly, a 2014 study found that the use of expansions was the *only* parental reading strategy that lead to an improvement in the language of two to three-year-old children (Levickis et al., 2014). This previous research focused on the use of expansions as an intervention for children in the 2-3 year age range and demonstrate a lack of literature on the use of expansions to increase the MLU of children in the 4-6 years of age range.

In summary, language development is important in early childhood education as it is the precursor for literacy development (Heroman et al., 2016) and literacy development is important for success in our society (NAEYC & IRA, 1998). When a child is not progressing towards their age expected language development, a teacher needs to utilize an evidence-based intervention to target the child's area of weakness (Coleman, Roth, & West, 2009). An Expansion Intervention is a good intervention for students who need to expand the length of their sentences as it is

evidence based and requires a limited number of resources and additional training for teachers. The use of expansions is evidence based as previous studies have demonstrated its effectiveness in increasing mean length utterance in young children (Fletcher et al., 2008; Levickis et al., 2014). Expansions also can be done in many environments as they do not require specific materials.

## CHAPTER 3. METHOD

### Setting

The preschool program was full day, lasting 7 hours Monday-Thursday, and 6 hours on Friday. It was located in a private, Title 1 school that served students from preschool 3 through sixth grade. Although it is a private school, it does receive Title 1 funding and student receive state scholarships to cover the cost of attendance. The classroom was a pre-k 4 classroom that required all students to be 4 years old as of the first day of school. The students' families are required to complete 20 service hours at the school, therefore there is a high level of parental involvement on campus. The preschool program was evaluated 4 times using the CLASS assessment and scored an average of 5.13 out of a possible 7 points, rating it as proficient (Department of Education, 2016). The classroom environment was organized according to the guidelines in the Creative Curriculum 6<sup>th</sup> Edition (Dodge, Heroman, Colker, Bickart, Berke, & Baker, 2016). The classroom had one large group carpeted area, 5 centers and 3 small group tables. There was a total of 15 students enrolled, 9 of whom spoke English as their first language, 5 of whom spoke Spanish as their first language and 1 who spoke Arabic as their first language. The classroom was staffed with a lead teacher and an assistant teacher in the room during all instructional time; both teachers only spoke English. The lead teacher was a certified preschool through third grade teacher and had 4 years of experience as a lead teacher, two of which were spent working with students who had developmental delays. The author of this paper was the lead teacher in the classroom. The assistant teacher was new to the profession with no classroom experience and was working towards her Child Development Associate Credential. Neither teacher had previous experience with students who had speech delays.

## Participants

Children were identified by their teacher, who also served as the researcher in this study, based on their *Teaching Strategies Gold* checkpoint levels (Burts, Berke, Heroman, Baker, Bickart, Sanders & Tabors, 2016). The three children scored significantly below their age level expectations in the language objectives on the Teaching Strategies Gold Checkpoint. Kurt and Iain scored an average of 2 levels below and Dana scored an average of 2.2 levels below the expected level of language for a pre-k 4 student. At the beginning of the study, Kurt was 4 years, 8 months old, and had an individualized education plan (IEP) for a diagnosed speech delay. Kurt had been seeing the same speech therapist for 2 years, twice a week during the school year, and three times a week during the Summer time. Prior to this study, Kurt was regularly producing sentences that were 5 words in length, but his speech was often unintelligible and the teacher struggled to understand what he was trying to communicate on a regular basis. Kurt could produce sentences between 2-3 words long that were intelligible. This is below the expected MLU for his age of 5.02 (Miller & Chapman, 1981). Dana was 4 years, 3 months old at the start of the study, and did not have a formally diagnosed speech delay, and therefore did not receive speech services. Prior to this study, Dana was regularly producing sentences that were 2-3 words long, and often repeated a variation of the same sentence, “Mommy Daddy” and “I want McDonalds.” Her speech was below the age expected MLU of 4.71 (Miller & Chapman, 1981). Iain was 4 years, 11 months old at the start of the study and did not have a formally diagnosed speech delay, and therefore did not receive any speech services. Prior to this study, Iain was regularly producing sentences that were 2-3 words long, all of which were intelligible, but he did not speak in class often. His speech was well below the age expected MLU of 5.63 (Miller & Chapman, 1981). All three children spoke English as their first and only language. The study was

approved by Louisiana State University's Institutional Review Board. The researcher obtained parental consent and child assent.

### **Behavior Definitions**

**Child behavior.** The targeted behavior was to meet the age appropriate level of mean length utterance for each child. This level varied between the children as their ages varied between 4 years 3 months and 4 years 11 months. For Kurt, who was 4 years 8 months at the beginning of the study, the target was to increase his MLU to between 5.02-5.32. For Dana, who was 4 years 3 months at the beginning of the study, the target was to increase her MLU to 4.71. For Iain, who was 4 years and 11 months at the beginning of the study, the target was to increase his MLU to 5.63. For this increase to occur, students must be using sentences that are either longer in length or include the use of plurals, contractions or endings such as –ing and –ed. (McAfee & Shipley, 2008).

**Teacher behavior.** An *expansion* was defined as an utterance made by the researcher in response to the child's statement that builds on the child's statement by creating either a full sentence or a more complex sentence (Nelson, 1989). For example, if a child said, "big ball" the researcher would respond, "The girl has a big ball." The goal of the expansion was not to change the content of the child's utterance, but rather to expand it. When a child's sentence was incomplete, such as "Throw the" the researcher would respond "She can throw the ball." After the researcher state the expansion, they paused to give the child a chance to repeat it or add to it if they wanted to, if the child did not initiate the repeat, the researcher would move on and ask an open-ended question about the pages of the book they were looking at. Children were not asked to, nor encouraged, to repeat the expansion, but were given time to if they chose to do so (Cleave, Becker, Curran, Owen Van Horne, Fey, 2015).

## **Baseline**

During baseline, the teacher regularly used sentence starters for specific tasks with all students. For example, when the students selected their center she provided the sentence starter “I would like to go to the \_\_\_\_ center” and required the children to repeat it before they could move to the center. If the students did not use the full sentence, the teacher would repeat the full sentence back to them. Sentence starters were also used when asking to use the restroom, for going to the water fountain and for apologizing to a friend. For the students who were regularly using unintelligible sentences, the teacher asked multiple follow up questions and had the student point to what they wanted to express, but no specific or consistent intervention or plan was used.

## **Expansion Intervention**

The Expansion Intervention procedure was modeled after Yoder, Spruytenburg, Edwards & Davies’ (1995) study and Wong and Foster-Cohen’s (2012) study. In Yoder et al. (1995) study, expansions were used to increase the MLU of children with developmental delays. In Wong and Foster-Cohen’s study, expansions were used to increase communication skills and compared to other interventions. Similar to the baseline phase, students would look through picture books with the researcher. Unlike the baseline phase, an intervention was used when students responded with a limited or short sentence. The researcher would use an expansion on their sentence. An *expansion* is an utterance made by the researcher in response to the child’s statement that builds on the child’s statement by creating either a full sentence or a more complex sentence (Nelson, 1989). For example, if a child said, “big ball” the researcher would respond, “The girl has a big ball.” The child was not required to repeat the sentence said by the researcher, but with the use of an expansion, children often will repeat all or a portion of the sentence back (Scherer & Olswang, 1984).

## **Generalization**

Following the end of the intervention, the teacher continued using the Expansion Intervention in a less systematic format with all students in the classroom. She continued to use expansions when reading in small groups with students as well as during whole group activities, but it was not consistent or used as a maintenance technique. A generalization probe was done six months after the completion of the Expansion Intervention by recording the three children in a variety of small group environments around the classroom including the block center, the puzzle center, library center, playdough center, art center and small group instruction.

## **Observation Procedure**

To collect data during the baseline phase, the researcher used a collection of picture books, some of which had words and some of which did not. The students had not read any of the books before, but they all consisted of story lines the students could relate to or had some prior knowledge about. Books included topics such as school, home, family, and nature. The books were a mix between fiction and non-fiction texts as the words in the book were not used, just the photos/illustrations. The words were not used as the intention was to focus on language rather than reading or listening skills; wordless books, or interacting with just the photos in the book rather than the words, encourages the use of imagination and leads to children developing their own stories for the illustrations (Heroman et al., 2016). To initiate discussion, the researcher would ask open-ended questions such as, “What do you see happening on this page?” Similar to Bellon-Harn, Credeur-Pampolina & LeBoeuf’s (2013) study on language interventions, the questions were generally “wh” questions (what, where, why, when). After asking a question, the researcher would pause to give the student time to think and respond. The researcher would then continue a discussion through the book, without prompting the student to expand on their

sentences or using any form of language intervention. Intervention data were collected in the morning, using the procedure described above, to ensure that the intervention completed that day did not affect the results.

### **Data Collection**

Baseline data were collected so that each child had a minimum of three data points before the intervention phase began. Data were collected with one day between sessions. The data for this study was collected using Voice Memos, an audio recording application on an iPhone 6. The researcher recorded each session and then listened to the recordings to transcribe each utterance on a recording sheet. These transcribed utterances were then scored and the MLU was calculated. To calculate morphemes, each word said by the child received 1 point, with additional points given to words that were plural, ended with -ed, -ing, and contractions (McAfee & Shipley, 2008). The MLU was calculated by dividing the total number of morphemes, by the total number of utterances.

One child, Kurt, produced a large number of unintelligible utterances, which made standard data collection difficult. Because of this, a protocol similar to Barnes et al. (2009) was used, where each unintelligible word received an X and was counted as one morpheme. In this study, utterances that had a minimum of 50% of the morphemes intelligible were included. If less than 50% were intelligible, the entire utterance was not included in data.

### **Interobserver Agreement**

A secondary observer, a graduate student in psychology, was trained to calculate the MLU using the guidelines set by McAfee & Shipley (2008, p. 261), which scored morphemes as follows: one point for each word, with additional points for “plurals (s, or ‘s), past tense (-ed), progressive (-ing), and contractions”. When a single word was repeated or stuttered such as “the,

the, the, the” it was scored as a single morpheme. The secondary observer listened to the recorded audio, transcribed each utterance and then calculated the MLU in the same manner as the primary observer. The interobserver agreement was calculated by having one baseline, intervention and generalization period, per child, transcribed and scored by a secondary observer (nine sessions transcribed total) (Kratochwill et al., 2010).

To calculate the interobserver agreement, a frequency ratio was used. A frequency ratio divides the smaller number by the larger number, and multiplies it by 100 (Kazdin, 2011). In this study, the smaller MLU was divided by the larger MLU and multiplied by 100 to find the interobserver agreement of each observation that was scored by two observers. The interobserver agreement was 82.1% (range, 69 – 95.65%); which is within the recommended range (Kazdin, 2011).

It is important to note that the primary observer was more familiar with the children, and therefore, found the children’s language more intelligible than the reliability observer, who was unfamiliar with the children. This likely impacted the interobserver agreement.

### **Experimental Design**

This study utilized a single subject multiple baseline design across children (Kazdin, 2011). Multiple baseline designs are appropriate when children receive intervention individually, staggered over time (Kazdin, 2011). The present study adhered to the recommendations set forth by the *Single-case design technical documentation* with the exception of a minimum of “at least 5 data points per phase” in the baseline phase (Kratochwill et al., 2010, p.16). The baseline phase had 3 data points, which meets the minimum needed number of points to “demonstrate existence or lack of an effect” (Kratochwill et al., 2010, p.16).

## **CHAPTER 4. RESULTS**

This study sought to determine if the teacher's use of an Expansion Intervention would increase MLU in preschool aged children. The raw MLU of the three children, between the ages of 4 years 3 months and 4 years 11 months at the start of the study, were compiled from a baseline, Expansion Intervention and generalization phase to examine the impact of an Expansion Intervention (Figure 1). Table 1 reflects the mean length utterance across children across all phases of the research study. Note: Target MLU was adjusted during the generalization phase to reflect children's chronological age at this time.

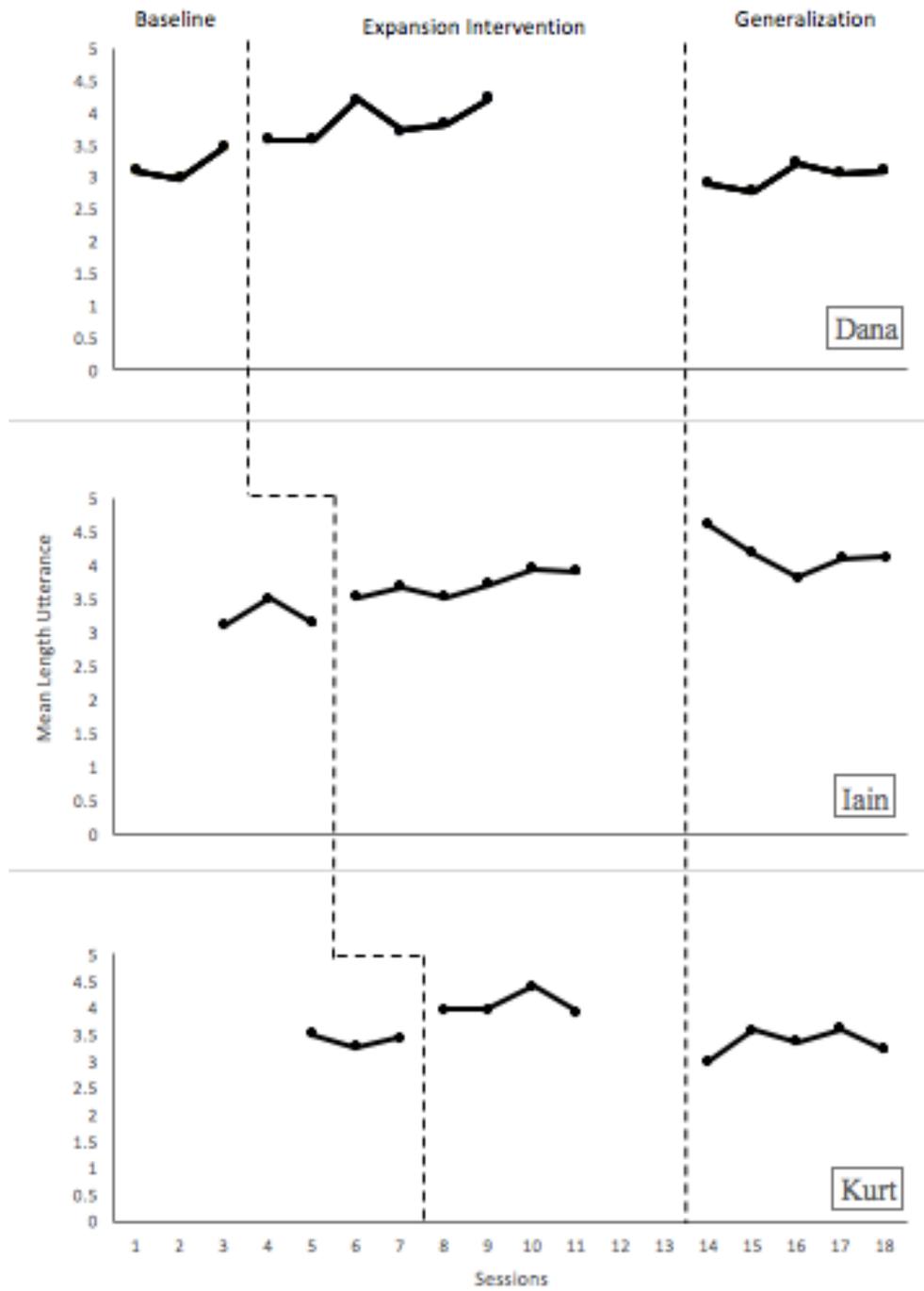


Figure 1. Raw scores for mean length utterance across children during all phases of the research study.

**Kurt.** During baseline, Kurt, 4 years, 8 months old, averaged 3.4 MLU (range, 3.26 - 3.51 MLU), 67.7% of the age expected MLU. When the Expansion Intervention was applied, Kurt averaged 4.1 MLU (range, 3.91 - 4.4 MLU). This represents an increase of 0.7 MLU, and moved him closer to the age expected MLU of 5.02 or 81.7% of the age expected MLU. During generalization Kurt was 5 years 1 month old, his MLU averaged 3.35 (range, 3.0-3.6 MLU), which moved him further away from his chronological age expected MLU of 5.64 (59.4% achievement of age expected MLU).

**Dana.** During baseline, Dana, 4 years, 3 months old, averaged 3.17 MLU (range, 2.97 - 3.45 MLU); 67.3% of the age expected MLU. When the Expansion Intervention was applied, Dana averaged 3.85 MLU (range, 3.57 - 4.2 MLU). This represents an increase of 0.68 MLU, and moved her closer to the age expected MLU of 4.71 or 81.7% of the age expected MLU. During generalization, Dana was 4 years 9 months old, and her MLU averaged 3.0, (range, 2.76 – 3.22 MLU), which moved her further away from her chronological age expected MLU of 5.32 MLU (56.4% achievement of age expected MLU).

**Iain.** During baseline, Iain, 4 years and 11 months old, averaged 3.24 MLU (range, 3.1 - 3.5 MLU), 57.5% of the age expected MLU. When the Expansion Intervention was applied, Iain averaged 3.71 MLU (range, 3.52 - 3.94 MLU). This represents an increase of 0.47 MLU, and moved him closer to the age expected MLU of 5.63 or 65.9% achievement of the age expected MLU. During generalization, Iain was 5 years and 4 months old, and his MLU averaged 4.28 (range, 3.8 – 4.6 MLU), which moved him closer to his chronological age expected MLU of 6.25 (68.48% achievement of age expected MLU).

Table 1. Mean Length Utterance Across Children across All Phases of the Research Study. Note: Target MLU was adjusted during the generalization phase to reflect children’s chronological age at this time.

	Kurt	Dana	Iain
Target MLU	5.02	4.71	5.63
Baseline MLU	3.4	3.17	3.24
Intervention MLU (compared to baseline)	4.1 (+0.7)	3.85 (+0.68)	3.71 (+0.47)
Generalization Target MLU	5.64	5.32	6.25
Generalization MLU (compared to baseline)	3.35	3.0	4.28

## CHAPTER 5. DISCUSSION

The ability to communicate is an important social skill that is highly valued by American society. When a child can use complete and complex sentences, it is easier for parents and teachers to understand the child's needs. Children in the current study were struggling with their language skills, producing sentences with a MLU that were under the expected level for their age. An Expansion Intervention was used to increase their MLU to an age appropriate level. The use of the Expansion Intervention was successful and produced increases in all three children's MLU. Overall the growth across children averaged 0.62 morphemes, which moved the children closer to their age appropriate MLU. The Expansion Intervention provided six months of growth for the children, given the expected yearly increase of 1.24 morphemes per year (Miller & Chapman, 1981). This increase suggests that the Expansion Intervention is a successful intervention for increasing the MLU of preschool students.

The findings of this study are consistent with previous studies on the use of expansions to increase the language development of young children (Fletcher et al., 2008; Levickis et al., 2014; Scherer & Olswang, 1984). It found that an Expansion Intervention applied in the classroom does increase the MLU of students.

The generalization period was completed to assess how the Expansion Intervention's impact on MLU generalized into other settings in the classroom. Once the intervention phase ended, the teacher no longer used the Expansion Intervention in a systematic format. The teacher did continue to use the expansions in other areas of the class, but not as a formal intervention or in set intervals. In this period, students MLU was calculated while interacting with other students in small groups, the environment was different but their MLU was transcribed and calculated using the same procedure as the baseline and expansion phase. For one subject, Iain, his MLU

was significantly higher during the generalization period than it was during the intervention phase. He had a 15.4% increase in MLU. For two of the subjects, Dana and Kurt, their MLU was lower during the generalization phase by 23% and 18% respectively. Iain had the lowest MLU for his age at the beginning of the study; he was 10% further from his age expected MLU than the other two subjects. He demonstrated growth across the intervention and generalization period, making the largest improvement during the intervention phase, 8.4% growth, and 2.58% growth during the generalization phase. Dana and Kurt both progressed towards their age expected MLU during the intervention phase, but moved backwards during the generalization phase (-0.15 and -0.05 MLU respectively).

This was a low-cost, non-labor-intensive intervention that fit within the context of naturally-occurring routines of the early childhood classroom. The results of this study are intended to be used by classroom teachers who are seeking interventions for their students who are struggling with their language development. The Expansion Intervention requires minimal preparation of materials, minimal time to implement and no extensive training.

### **Clinical Implications**

The main purpose of this study was to analyze the teacher's ability to use the Expansion Intervention to increase the mean length utterance of children in an early childhood classroom. This study found that an Expansion Intervention was successful at increasing the MLU of students and therefore teachers should consider utilizing it to address students in their classrooms struggling with producing age appropriate MLU. Based on the results found in the generalization phase, the Expansion Intervention should be maintained as long as needed. The regression during generalization suggests the effects did not last long beyond the end of the

protocol. Thus, for sustained improvement teachers should attempt to continue the protocol for as long as possible.

Teachers can involve the parents of students in the Expansion Intervention. Involving parents in language interventions and teaching parents how to support their child's language intervention has been shown to positively affect children (Kaiser & Roberts, 2011). By educating parents on ways to use the Expansion Intervention at home, it would increase the number of times per day or week that a child is receiving the intervention and limit the possibility of regression over long breaks from school.

### **Limitations and Future Research**

One major limitation of this study was that it was focused on one-on-one and small group settings, all with an adult present. There was limited data collected during the generalization period that addressed the transfer of the skill from one-on-one to small group settings, but no data that assessed peer-to-peer communication when an adult was not present or the children's MLU outside of a school environment.

In this study, there were some threats to the internal validity. One threat to the internal validity of this study could be history effect, or an effect of external events on the findings (Kazdin, 2011). During data collection, students had a period of time out of school for a holiday, which meant they spent more time at home and were not receiving their normal in class instruction. It is impossible to know what type of interactions students were having during this time. For the one student receiving speech services, the services were not altered during the time this research was conducted, therefore any change in MLU can be attributed to the Expansion Intervention. Experimenter bias could also have affected these results, as the primary researcher was not blinded to the study hypotheses and interacted with the children as the lead teacher

outside of the study. However, a secondary observer was used to separately transcribe and score the data. The researcher also made sure not to change any elements of her interactions or instruction in the classroom, other than what occurred during the specific Expansion Intervention. While this does not guarantee that expansions were not occurring at other times, it does ensure that any expansions that did occur were occurring before the study and, thus, results during this time period can still be attributed to the Expansion Intervention.

Future research is needed to address the transfer of increased mean length utterance from the one-on-one and small group activities to whole group activities and/or social situations. The generalization period did not provide conclusive evidence that the increase of MLU transferred to other environments. Future research could address this by developing a study that implemented the Expansion Intervention in different environments.

## **Conclusion**

This study sought to determine if the teacher's use of an Expansion Intervention would increase MLU in preschool aged children. Teachers must provide interventions for children who are not producing the age expected MLU levels as language development is directly related to their future literacy development (Heroman et al., 2016). The use of the Expansion Intervention was successful in increasing the MLU of three preschool students as the three made over six months of growth in their MLU. Following the recommendations of common classroom assessment tools (Environment Rating Scales Institute, 2016; U.S. Department of Health & Human Services, 2008), and early childhood curriculums (Heroman et al., 2016), to prioritize language development in preschool, the results of this study provides educators with an intervention that is easy to learn and quick to implement in the classroom to increase their student's language development.

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APPENDIX A. INSTIUTIONAL REVIEW BOARD APPROVAL



Institutional Review Board
Dr. Dennis Landin, Chair
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ACTION ON PROTOCOL APPROVAL REQUEST

TO: Cynthia DiCarlo
Education
FROM: Dennis Landin
Chair, Institutional Review Board
DATE: October 19, 2017
RE: IRB# 3943
TITLE: Use of expansion to increase mean length utterance in preschool students

New Protocol/Modification/Continuation: New Protocol

Review type: Full \_\_\_ Expedited X Review date: 10/11/2017

Risk Factor: Minimal X Uncertain \_\_\_ Greater Than Minimal \_\_\_

Approved X Disapproved \_\_\_

Approval Date: 10/18/2017 Approval Expiration Date: 10/17/2018

Re-review frequency: (annual unless otherwise stated)

Number of subjects approved: 3

LSU Proposal Number (if applicable):

Protocol Matches Scope of Work in Grant proposal: (if applicable)

By: Dennis Landin, Chairman [Signature]

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING - Continuing approval is CONDITIONAL on:

- 1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects\*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. SPECIAL NOTE: When emailing more than one recipient, make sure you use bcc.

\*All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at http://www.lsu.edu/irb

## **VITA**

Kaitlyn Geffen was born in British Columbia, Canada. She was called to teaching at a young age. After receiving her bachelor's degree in Human Development and Early Childhood Education from Washington State University, she entered the classroom. Kaitlyn has taught both Kindergarten and Pre-K 4. She expects to graduate with her Master's of Education in August 2018, and plans to remain in the classroom as a teacher.