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Language-Supportive Strategies and their Associations with Child Language Outcomes During Instructional Time

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LANGUAGE-SUPPORTIVE STRATEGIES AND THEIR ASSOCIATIONS WITH CHILD LANGUAGE OUTCOMES DURING INSTRUCTIONAL TIME

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University

by

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Dedication

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Abstract

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In this dissertation, I conducted a correlational study that examined the frequency of educator-delivered language-supportive strategies during instructional time in public Kindergarten classrooms. Additionally, I explored the association between educators' use of language-supportive strategies and child language outcomes. To index child language, I assessed a sample of 96 children from 10 different classrooms on standardized measures of expressive and receptive language. I recruited 10 educators to participate in the present study and assessed their use of language-supportive strategies during instructional time in the classroom through transcription and coding of audio recordings. The educators completed demographic forms for themselves as well as their 10 children who participated in the study. Descriptive data revealed educators used close-ended questions most frequently and open-ended questions least frequently

during instructional time. The results of the path analyses reported that educators' use of *Scaffolding* was associated with child language outcomes. This study provides an exploratory analysis of educators' use of language-supportive strategies and their relation to child language outcomes. I conclude by discussing future research and the implications of these findings for practice and policy.

Chapter 1

Introduction

Children's language development and growth are of significant importance to policymakers, educators, and professionals as language skills are essential for a child's ability to navigate their environment, form relationships, read, write, and experience academic, social, and emotional success (Dickinson et al., 2010; Law et al., 2000; Yew & O'Kearney, 2013). The need for high-quality language learning environments in the classroom is clear as language is a foundational component to daily living and overall success (Chow et al., 2018; Yew & O'Kearney, 2015). However, educators begin their careers in the classroom with minimal knowledge or experience on how to create high quality language learning environments through the use of language-supportive strategies (Cunningham et al., 2009). District, state, and national educational boards' expectations as well as national governing laws (e.g., Every Child Succeeds Act and No Child Left Behind) task educators with the responsibility of ensuring all children in their class succeed (Every Student Succeeds Act, 2014; Dickinson & Tabors, 2001; National Association for the Education of Young Children, 1998; No Child Left Behind, 2001). This discrepancy highlights the importance of training educators as it is critical for them to use language-supportive strategies to establish an environment aimed at maximizing language development in the classroom (Chow et al., 2018; Mashburn et al., 2008; Storch & Whitehurst, 2003).

Early Childhood Education and Kindergarten

Currently, early childhood education is a main focus for policymakers, researchers, and professionals. Policymakers discuss increasing federal funds to support early childhood education as well as access to public preschool programs (e.g., Head Start) to ensure children are school ready (Crosnoe et al., 2016; Gormley et al., 2005; Heckman, 2013; Individuals with Disabilities Education Act, 2004). Despite their efforts enrollment in public preschool programs remain low and over one third of children from low socioeconomic families are not enrolled in any early childhood education program (Duncan & Magnuson, 2013). Because enrollment in early childhood education remains low, kindergarten is the first schooling experience in which all children are present and represented.

Researchers study and report professional developments to aid early childhood educators in using effective strategies to support children's literacy and language development (Markussen-Brown et al., 2017). Additionally, researchers examine the benefits of high-quality early childhood programs as well as the influence of early childhood educators' use of language-supportive strategies and their association with child language outcomes (Cabell et al., 2015; Justice et al., 2008; Justice & McGinty, 2012; Wasik & Hindman, 2011). These studies reported positive findings in changes of educators' use of language-supportive strategies and increases in child expressive and receptive language at the early childhood level. Limited research examines educators' use of language-supportive strategies and their association to child language outcomes in early elementary school.

A recent study examined the effects of a language-focused classroom intervention on first, second, and third graders; the findings showed significant increases in child vocabulary and comprehension monitoring (Justice et al., 2019). Justice and colleagues' study (2019) paved a

path for more researchers to examine language-supportive strategies in elementary school. There are still gaps in the current literature as this study did not include kindergarten classrooms and implemented an intervention study rather than examining educators' baseline use of language-supportive strategies.

Language Development in Preschool and Kindergarten

In order to know how to best support child language development in preschool and kindergarten it is necessary to obtain an understanding of typical child language development. Three domains of language that are essential to a child's overall ability to communicate and experience success include morphology, vocabulary, and syntax (Turnbull & Justice, 2016). It is critical for early childhood and kindergarten educators to create a high-quality language environment in their classrooms and implement language-supportive strategies that support child morphological, vocabulary, and syntactical development. Below I discuss the foundational components of these three areas and their significance to child language outcomes.

Morphological development refers to a child's acquisition of inflectional and derivational morphemes (Turnbull & Justice, 2016). For example, a child demonstrates their inflectional morphological ability when they use plural and possessive "s" and regular and irregular past tense. A child exhibits understanding of derivational morphemes when they begin to add prefixes and suffixes to their words, thus, changing the meaning of the word as well as expanding their vocabulary (e.g., care to careful) (Turnbull & Justice). A child's understanding and use of these morphemes begin in infancy and continue to progress rapidly though preschool and into early elementary school (Brandone et al., 2006). Typically, a child masters inflectional morphology between six and seven years of age; therefore, in kindergarten or first grade (Nippold, 2016). Derivational morphology continues to develop as their vocabulary continues to

expand. Morphological awareness is directly associated with vocabulary and is a foundational component to children's vocabulary development (Nippold, 2016). Further, morphology is an essential building block for children's communication, language, and reading development (Nippold, 2016).

Similarly, to morphological development, children's vocabulary development begins in infancy and continues to expand into preschool and well through their school-aged years (Turnbull & Justice, 2016). Their vocabulary development influences all other realms of their language development. For example, as children's vocabulary expands so does their use of derivational morphemes and complex syntactical structure (Nippold et al., 2007). It is imperative for children to continue to hear, comprehend, and use age appropriate vocabulary to ensure their vocabulary inventory continues to expand.

Syntactical development refers to children's abilities to understand the rules of language; how words are organized into sentences (Turnbull & Justice, 2016). Children demonstrate their syntactical ability through their sentence length, variability in sentence type (e.g., declarative, negatives, and interrogatives), and sentence complexity (e.g., ability to combine phrases and/or clauses with conjunctions) (Turnbull & Justice). For example, syntax allows children to formulate sentences that say, "who did what to whom." Syntactical development emerges around 18 months of age when children begin putting two-word phrases together (Nippold et al., 2007). However, syntax develops most rapidly between the ages of five and six, which indicate that syntactical growth occurs during the preschool and kindergarten years (Nippold et al., 2007).

Morphological, vocabulary, and syntactical development are all interconnected and together compose children's overall language abilities. The three language domains are foundational for mastery of oral language competencies, which link to school readiness for

kindergarten (Justice et al., 2009; Paul & Norbury, 2012). Hoff's (2003) learning from input hypothesis states that the components of children's language are dependent on the exposure to those properties in child-directed speech. This hypothesis supports the reasoning behind why it is important to use language-supportive strategies during the preschool and early elementary school years as this is the most critical timeframe of child language development (Nippold, 2016; Nippold et al., 2007). If a child does not attend preschool or a preschool with a high-quality language environment as measured by educators' use of language-supportive strategies, then their likelihood of exhibiting school readiness decreases. When children begin kindergarten without preschool experience educators are under more pressure to ensure these children succeed. It is imperative for these educators to establish a high-quality language environment with language -supportive strategies as child language is associated with academic, emotional, social, and behavioral success (Chow & Wehby, 2018; Justice et al., 2009).

Language -Supportive Strategies

A review of literature beginning on page 10 highlights the importance of educators' use of language-supportive strategies within early childhood programs and the positive associations between these strategies and child language outcomes. This study proposes to examine kindergarten educators' use of four language-supportive strategies: (1) *Modeling*, (2) *WH-questions*, (3) *Expansion,* and (4) *Scaffolding*. Table 1 provides definitions and examples of each language-supportive strategy.

Table 1

Definitions and Examples of Language Supportive Strategies

Variable	Definition	Example
Modeling		
Direct Modeling	Educator provides an exact example of the desired child response.	Educator: Say, we go to gym today. Child: We go to gym today.
Vocabulary Modeling	Educator demonstrates the correct use of a vocabulary word in a sentence.	Educator: The giraffe has a long neck to reach the leaves on the tree. Child: My headphone cord is long to reach my ears and the computer.
Alphabet Modeling	Educator provides an exact example of the letters and sounds of the alphabet. Educator may provide a word that demonstrates the sound for the child.	Educator: Aaa (sound), apple, A Child: Aaa (sound), apple, A
Route-Instruction Modeling	Educator demonstrates an exact or ideal example of the task to be completed.	Educator: I roll the dice, then match the number I rolled to the color on the worksheet. The color is blue. I colored my feather blue. Child: Completes the task
WH-Questions		
Open-ended	Educator requests a response by asking a question that provides the child an opportunity to respond with more than one word. *Child response is greater than two words.	Educator: What is your favorite memory from your vacation. Child: My favorite memory is building a sandcastle at the beach with my dad.
Close-ended	Educator requests a response by asking a question that asks for a simple typically one- or two-	Educator: Who jumped over the fence? Child: The dog.

	word answer. * Think test question	
Expansion	Educator provides a response to a child, group, or whole class that extends, lengthens, or adds to the child's previous utterance that was just said. * Must increase length of child utterance.	Child: The dog jumped. Educator: The active dog jumped over the tall fence.
Scaffolding		
Generalizing	Educator prompts a child, small group, or class to take the context of the lesson beyond the current scenario.	Educator: Tell me about a vacation you have been on. Child: I went to the beach like the family in the book.
Reasoning	Educator prompts a child, small group, or class to explain the "why".	Educator: The dog ran out of the fenced in yard. Why do you think he left the yard? Child: To chase a squirrel.
Predicting	Educator prompts child, group, or whole class to describe what might happen next or hypothesize an outcome.	Educator: What do you think will happen next? Child: The boy will catch the dog.
Co-participating	Educator prompts a child, a group, or the whole class to produce the correct answer through the completion of their response with the educator. * When the children and educator are reading together, and children are actively engaged.	Educator: Call out with me the word that is what utensil you use to eat cereal. Educator and Child: Spoon!
Reducing Choices	Educator prompts a child, a group, or the whole class to produce a correct response by reducing the number of correct answers in the choice selection	Educator: What animal is white and lives in the cold? A polar bear or flamingo? Child: Polar Bear

This study proposed to examine educators' use of language-supportive strategies at the start of the school year to assess whether educators used these strategies as soon as children entered kindergarten. It is essential for kindergarten educators to use these language-supportive strategies immediately in order to establish a high-quality language environment. Additionally, it provides an immediate language rich environment for those children who did not attend preschool. For the children who did not attend preschool, kindergarten is likely their first exposure to instruction unless otherwise provided by a caregiver. Furthermore, these relatively low-effort language-supportive strategies together can form a rich language learning environment in the classroom which, in turn, will support child language development and their overall success (Chow & Wehby, 2018; Justice et al., 2018)

Early Childhood Education Exposure and Differential Instruction

Children enter kindergarten at a variety of different skill levels based on their previous experiences and exposures to education and language-rich environments (Pianta et al., 2020). Children's previous exposure to early childhood education programs influences their success in school (Dickinson & Tabors, 2001; Connor et al., 2005). However, one third of children from low socioeconomic status (SES) communities do not begin kindergarten with previous formal educational experiences, suggesting that kindergarten may be their first exposure to an educational environment (Duncan & Magnuson, 2013). Half of children from low SES communities are ill-prepared for kindergarten with regards to their language, vocabulary, academic, and social-emotional skills (Barnett et al., 2018; Lipsey et al., 2018; Pianta et al., 2020). Approximately half of children from low SES communities are either not enrolled in early childhood education programs or are not attending high-quality programs. High-quality early childhood education programs that create language-rich environments and encourage an

increased focus on literacy may enhance children's language, vocabulary, and early reading skill growth (Dickinson & Tabors, 2001; Nelson et al., 2003). Connor and colleagues (2005) reported that children who attended high-quality early childhood education programs were associated with higher language and vocabulary outcomes than their peers who did not attend.

Because of the variety of skill levels upon entry into kindergarten, educators need to be prepared to immediately establish a high-quality language-rich environment. They can establish this environment through the use of language-supportive strategies and differential instruction. Differential instruction refers to an educator's ability to provide individualized instruction to the children in their classroom based off their ability level (Massey et al., 2008). However, majority of educators are not prepared, due to minimal exposure and training, on how to establish a high-quality language-rich environment, implement language-supportive strategies, or provide differential instruction (Cunningham et al., 2009; Schachter et al., 2016). The early childhood education literature reports the benefits of training early childhood educators on how to effectively use language-supportive strategies to create a language-rich environment (Cabell et al., 2015; Pentimonti et al., 2017; Roberts& Kaiser, 2015). On the contrary, there is minimal research on the benefits of professional developments and trainings on informing kindergarten educators on how to effectively use language-supportive strategies. Based on the early childhood education research, it is likely that kindergarten educators would also benefit from professional developments and trainings. Using language-supportive strategies to support children's language growth is beneficial for all children in the classroom regardless of their early childhood education exposure.

Language-supportive strategies not only contribute to a language-rich environment in the classroom but will also aid educators in providing differential instruction. For example,

Scaffolding requires educators to implement a hierarchy of prompts based on a child's current ability level (Pentimonti et al., 2017). Thus, providing kindergarten educators with professional developments or trainings on Scaffolding may increase their potential to implement differential instruction with regard to their children's language ability. In this study, I investigated kindergarten educators' foundational use of language-supportive strategies and discussed the implications and future direction needed to better prepare educators in creating a language-rich environment and using differential instruction (e.g., Scaffolding).

Educator Training and Measurements

In the literature, numerous experimental studies discuss implementing interventions which inform and train educators on individual language-supportive strategies. However, when assessing educators on their implementation of these strategies, researchers use aggregate measures that report an educators' score on their language environment not their frequency of each language-supportive strategy. For example, many studies use the Early Literacy and Language Classroom Observation (ELLCO; Smith & Dickinson, 2002) to assess educators' use of language-supportive strategies. This measure does not assess the frequency or proportion at which each educator implements the taught language-supportive strategies, but instead assess the classroom's language environment more broadly. The current study aimed to address a gap in the research by evaluating kindergarten educators' use of language-supportive strategies and coding them independently to examine (1) the strategies educators used most frequently and (2) explore the associations between these strategies and child language.

Method

I conducted a correlational study that investigated the frequency of educators' use of language-supportive strategies during instructional time in public Kindergarten classrooms.

Additionally, I examined the association between educators' use of language-supportive strategies and child language outcomes. To assess child language, I administered standardized measures of expressive and receptive language to a sample of 96 children across 10 different classrooms. This study provides preliminary findings of exploratory analyses of educators' use of language-supportive-strategies and their relation to child language outcomes.

Research Questions

1. How frequently do kindergarten educators use language- supportive strategies during instructional time in their classroom?
2. Are kindergarten educators' years of experience and level of education associated with the frequency they use language-supportive strategies?
3. Are kindergarten educators' frequency of language -supportive strategies associated with child language outcomes when controlling for child cognitive ability and gender and educators' years of experience and level of education?

The aim of this study was to examine how frequently educators' used language - supportive strategies during instructional time in the classroom and their associations to child language outcomes. I found educators used language-supportive strategies at a reduced rate during instructional time in the classroom. The ten educators used close-ended questions most frequently and open-ended questions and predicting least frequently during instructional time. Educators' experience and level of education did not predict their frequency of language-supportive strategies. Educators' frequency of *Expansion, WH-questions,* and *Scaffolding* associated with child language outcomes. In the discussion section I provide potential explanations and implications for these findings.

Chapter 2

Review of the Literature

The inability to effectively develop and use speech and language skills is one of the most common developmental delays found among preschool children (Law et al., 2000). Children with language delay experience more difficulty making and maintaining relationships, engaging in their classroom, demonstrating appropriate behavior, and establishing fundamental skills (Roth et al., 2002). Additionally, children with language delay experience higher rates of anxiety, withdrawnness, aggressiveness, and noncompliance (Maggio et al., 2014). These negative characteristics increase the likelihood of future emotional and behavioral instability, which can negatively impact their school readiness (Beitchman et al., 2001; Chow et al., 2018; Justice et al., 2008; Tomblin et al., 2000).

School Readiness and Kindergarten

School readiness signifies a child's ability to meet school and classroom expectations relative to age-appropriate cognitive, language, and social skills (Ackerman & Barnett, 2005). Children with language delay score lower on school readiness assessments than their typically developing peers (Justice et al., 2009). National laws and governing bodies expect early childhood educators (ECEs) to ensure all children in their class are school ready (Dickinson & Tabors, 2001). Therefore, it is critical for ECEs to create a language rich environment within the classroom aimed at maximizing language development (Chow et al., 2018; Mashburn et al., 2008).

Despite state and national policies that aim to increase access to early childhood education programs for children from low SES communities, enrollment still remains a challenge. One third of children from low SES communities do not attend early childhood education or preschool programs (Duncan & Magnuson, 2013), and half of these children do not attend high-quality preschool programs (Dickinson & Tabors, 2001; Nelson et al., 2003). This suggests that these children may not be immersed in a rich language learning environment prior to kindergarten entry. Because of this challenge, 50% of children who come from low SES communities have a higher risk of decreased school readiness as well as the potential for delayed language (Barnett et al., 2018; Lipsey et al., 2018). It is essential to train and prepare not only early childhood educators but kindergarten educators as well. It is critical for kindergarten educators to know how to effectively implement language-supportive strategies and use differential instruction to ensure that children who did not attend early childhood or preschool programs are immediately immersed in a rich language learning environment.

Early childhood and kindergarten educators should implement language-supportive strategies to create a language-rich environment in the classroom and support child language development and growth. Language-supportive strategies will allow educators to support all children in the classroom as well as help educators provide differential instruction. For example, kindergarten educators will need to provide additional support to those children who did not attend an early childhood or preschool program. However, early childhood and kindergarten educators do not receive sufficient training during their pre-service education to implement language-supportive strategies and differential instructions to create a supportive language environment (Cunningham et al., 2009). Because of their limited training and exposure during their pre-service programs it is critical to provide educators with professional developments and

trainings to ensure they feel knowledgeable and able to implement language-supportive strategies. Currently, there is limited research examining kindergarten educators use of language-supportive strategies. In this review, I focus on synthesizing research on professional developments, trainings, and interventions for early childhood educators aimed at creating a classroom environment which support children's language development and growth through the use of language-supportive strategies. I aimed to use this review to help inform next steps for research in early elementary school.

Language-Supportive Strategies

The literature reports the positive association between teachers' use of language-supportive strategies and child language development, such as modeling, communication-facilitating behaviors, expansion, and scaffolding.

Modeling supports child language development and increase the child's comprehension and verbal expression of novel vocabulary and higher-order language (Justice et al., 2018; Cabell et al., 2015; Justice et al., 2008). ECEs can model higher-order language through producing more syntactically complex sentences and phrases. Further, modeling sentences with more complex syntax is associated with growth in child language skills (Hoff, 2003; Huttenlocher et al., 2002).

Communication-facilitating behaviors include using an appropriate rate of speech, expanding conversation by using open-ended questions, and encouraging talk between peers. Communication-facilitating behaviors are associated with child vocabulary skills (Justice et al., 2018). These increases in vocabulary improve child language skills and contribute to lower levels of problem behaviors in the classroom (Chow & Wehby, 2018) which, in turn, allow children to maintain access to classroom activities.

Expansion provides children with a model of higher language skills and an opportunity to learn novel information because the ECEs extends children's utterances with more semantically or syntactically complex forms (Pence et al., 2008; Proctor-Williams & Fey, 2007). ECEs' use of expansion in their responses to their children's requests, comments, or questions are associated with an increase in child language skills (Wasik, et al. 2006; Wasik & Hindman, 2011) and child language growth overtime (Cabell et al., 2015).

Pentimonti and colleagues (2017) define scaffolding through high and low support strategies. Low support strategies include generalizing, reasoning, and predicting and high support strategies include co-participating and reducing choices. Scaffolding contributes to more turns during conversation, which increases the length of the conversation and provide ECEs with more opportunities to use modeling and expansion (Chow et al., 2019).

The majority of ECEs are not adequately trained to implement modeling, communication-facilitating behaviors, expansion, and scaffolding (Cunningham et al., 2009), thus preschool programs may not be able to create rich-language environments (Justice et al., 2008). It is essential to increase ECEs' training on implementing language-supportive strategies to ensure children are school ready with age-appropriate language, social, and behavioral skills.

Ecological-Transactional Framework

I use two models, ecological (Bronfenbrenner, 1994) and transactional (Sameroff, 2009) theories to address the purpose of this review and describe the relation of ECEs' strategies and children's language skills. In the context of language development, Chow and colleagues (2018) describe the ecological-transactional model as a framework, which highlights both the connected systems of the classroom environment with the more specific relationship between ECEs and their children. For the purposes of this review, I focus on the classroom environment (presence

or absence of a rich language environment through the use of language supportive strategies) and its influence on children's language ability.

Bronfenbrenner's (1994) ecological model describes human development as a set of interrelated systems through four interacting principles, (1) microsystems, which describes interpersonal interactions and immediate surroundings, (2) mesosystems, which focuses on direct interactions between two individuals that are a part of the microsystem, (3) exosystems, which indirectly affects the individual, and (4) macrosystems, which encompasses societal and cultural beliefs. This model represents the interrelations between an individual and their direct and indirect surroundings. In the model, ECEs directly affect children and their language learning environment, the interventions targeting language development directly affect ECEs, and indirectly affect children and their environment, and policy emphasizing high-quality preschool programs directly affects intervention and indirectly affect ECEs, children, and the language learning environment.

Sameroff's (2009) transactional model describes the influence of language and communication on children's behavior in their interactions with their ECEs. Sameroff's (2009) model identifies proximal and distal influences; (1) proximal factors include the child's relationship with their caregivers and educators and (2) distal factors include the interventions for ECEs and the policy around ECEs' preservice training.

An ecological-transactional framework provides an example of the relations between ECEs' use of language-supportive strategies as well as how their use of language-supportive strategies influences their classroom environment and their children. Because of the relationship between ECEs and children these interventions have a direct influence on children and their language skills. The ecological-transactional model reveals the interconnected relations that

impact children and their language skills. Burn and colleagues (2015) suggest that educator-child relationships are inseparable from children's academic and social growth and development as educator-child relationships are the path through which educators deliver instruction (Hamre & Pianta, 2001; Rudasill et al., 2006). Because children require the use of language to navigate and engage in positive relationships and their school environment, language is an essential characteristic of the ecological-transactional model (Chow et al., 2018).

Literature Review Purpose

The purpose of this systematic literature review was to examine ECEs' outcomes after the implementation of interventions which focus on strategies that support child language ability. Second, I identified the effect that educator-directed interventions have on children's language skills. There were three aims for this systematic literature review. First, I described the characteristics of early childhood educator directed interventions which are focused on improving child language outcomes. Second, I examined ECEs' use of language-supportive strategies and their associations with child language outcomes. Lastly, I used this systematic literature review to inform future research with kindergarten educators. Because the majority of the current literature focuses on early childhood education, I extend previous research by investigating effective professional developments, trainings, and interventions for kindergarten educators.

Literature Review Method

Search Strategy

The researcher used a comprehensive search strategy and obtained articles from the following databases, Education Research Information Center (ERIC), PsycINFO, Linguistics and Language Behavior Abstracts, Web of Science, and PubMed. The search strategy included:

((language OR receptive OR expressive OR verbal OR "oral language" OR "communicative development" OR "language delay" OR "language development" OR "language acquisition" OR "language disorder*" OR "language impairment*" OR "delayed language" OR "communication disorder*" OR "communicative disorder*" OR "late talk*" OR comprehension) AND ("early childhood" OR "young children" OR preschool* OR "pre-kindergarten" OR "pre-k") AND ("prekindergarten teacher*" OR "Pre-K teacher*" OR "preschool educator*" OR "early childhood teacher*" OR "early childhood educator*") AND ("Head Start" OR headstart OR "head-start" OR "early intervention" OR conversation OR "child-directed speech" OR coaching OR "language model" OR curricul* OR program* OR training OR instruction OR intervention OR "professional development")). The researcher did not apply a date range to the search strategy to intentionally examine language-based intervention studies from all eras. The initial search strategy resulted in 1,702 articles. Additionally, the researcher conducted a manual search from Makussen-Brown and colleagues (2017) meta-analysis to identify any articles that the search strategy did not find.

Eligibility Criteria

Inclusion Criteria

Eligible studies implemented experimental designs including randomized control trials and quasi-experimental designs. The experimental interventions included educator directed, language-based interventions. All eligible studies reported ECEs' outcomes after implementation of a language-focused intervention. This review also synthesized children's outcomes; however, children's outcomes were not required to meet eligibility criteria. To meet inclusion criteria, the studies' participants were in-service ECEs who teach children between the ages of three and five

years old in public preschool programs. All eligible articles were peer reviewed and published; therefore, this review does not include theses or dissertations.

Exclusion Criteria

Studies involving children under the age of two or above the age of five met exclusion criteria. Studies conducted and reported in a language other than English were excluded from this review. Additionally, studies that examined educators or children who are English Language Learners met exclusion criteria. This review did not include single case designs or qualitative studies as I excluded single case designs in order to be able to directly compare studies methodological rigor and changes in ECEs' behavior. The exclusion criteria included private preschool or early childhood programs.

Screening and Coding

The search strategy resulted in 1,702 studies, and six additional studies from the manual search. After the removal of doubles, 1,294 studies remained. I screened 1,294 studies' titles and abstracts using the inclusion and exclusion criteria. Title and abstract screening resulted in the exclusion of 1,189 articles. I coded the remaining 105 articles with the same eligibility criteria, which resulted in the exclusion of 78 studies. At conclusion of screening, 22 articles remained. Figure one shows the PRISMA diagram,

After the 22 articles met inclusion criteria, I coded all studies on relevant variables identified a priori: ECEs' demographic information, children's demographic information, format of intervention, intervention content areas, language-supportive strategies, ECEs' outcomes, child outcomes, and methodological rigor. For reliability, I randomly selected 30% of articles, and a research assistant independently coded all variables; we achieved 100% agreement.

Literature Review Results

Setting and Participants

The 22 studies took place in three different countries, 15 in the United States, six in Canada, and one in Australia. Five studies used a course or workshop to train ECEs, indicating that their interventions took place at local universities and in conference rooms dependent on the participants' geographical locations. One study examined coaching as a professional development approach, which implied that the study occurred in the preschool classroom, and 14 studies employed both courses, workshops, or in-service trainings and in-person coaching or mentoring which took place at local universities or conference rooms and in preschool classrooms. The remaining two studies took place online.

The 22 studies included, 2,387 ECEs. Majority of the ECEs were female. There was a diverse range of educators; level of experience; 10 studies involved educators with experience between two and 10 years, and 11 studies included educators with experience between 10 and 20 years. One study did not include the years of experience for their ECEs. The participants varied across their level of education as well, ranging from high school graduates to master's degree holders. Majority of the participants received an associate or undergraduate degree. The ECEs included in this review worked in public preschool programs such as public prekindergarten, Head Start, or local community programs. The 20 studies that implemented a randomized control trial reported no significant differences in ECEs' demographic information including their race, gender, education level, or years of experience.

Thirteen of the 22 studies included children participants, totaling 5,150 child participants within this review. The children attended public preschool programs. The majority of children were approximately four years old. Twelve of the 14 studies involving children used a

randomized control trial and reported no significant differences in the children's demographic information including their race, gender, and age.

Early Childhood Educator Outcomes

Fifteen studies reported positive ECEs' outcomes post-intervention. Six studies reported an increase in scores on language subscales of the Early Literacy and Language Classroom Observation (ELLCO; Smith & Dickinson, 2002), which is a measure of ECEs' language environment and language and literacy curriculum. Language environment includes climate of the environment, opportunities of extended conversation, and efforts to build vocabulary. The language and literacy curriculum include instructional strategies used and educator responsiveness (ELLCO; Smith & Dickinson, 2002). Four studies reported increases in ECEs' communication-facilitating behaviors as specifically defined by the use of open-ended questions. Additionally, two studies reported positive ECEs' outcomes in other components of communication-facilitating behaviors such as encouragement of conversation. Three studies reported increases in ECEs' scores on the Classroom Assessment Scoring System (CLASS; Pianta et al., 2006). The CLASS measures educator-child interactions through emotional support, classroom organization, and instructional support (Pianta et al.,2006). For this review, instructional support is the focus as it assesses the strategies educators may use during educator-child interactions (Pianta et al., 2006). One study reported an increase ECEs' language modeling post-intervention and another study reported positive ECEs' outcomes in regard to their use of expansion. Girolametto et al. (2012) reported an increase in ECEs' use of scaffolding to obtain more complex utterances. Landry and colleagues (2013) reported an increase ECEs' scores on the Teacher Behavior Rating Scale (TBRS; Laundry et al., 2000). The oral language subscale on the TBRS measures the teacher's ability to speak clearly and use appropriate grammar, ability to

model expressing ideas in complete sentences, encouragement of engaging children in conversation, use of scaffolding, connecting and relating information to previous activities, and use of thinking questions (Landry et al., 2000).

Five studies reported mixed results in regard to ECEs' language outcomes. Girolametto and colleagues (2003) reported increases in communication-facilitating behaviors (conversation and encouragement of peer-directed utterances during shared book reading, but not during play. Two studies reported increases in their use of level three utterances but not in their use of level four; utterance complexity increases and lengths through scaffolding. Piasta et al., (2012) reported increases in ECEs' use of communication-facilitating behaviors, but not in their use of language developing strategies, and in 2017 Piasta and colleagues reported an increase in ECEs' CLASS (Pianta et al., 2006) scores, but not in ECEs' knowledge and practice of language and literacy. Lastly, three studies reported no positive findings for ECEs post-intervention,

Child Outcomes

Nine studies reported positive child outcomes post ECE-directed intervention. Four studies reported increases in child conversation length whereas two studies reported an increase in child vocabulary as reported by the Expressive One Word Picture Vocabulary (3rd ed.; EOWPVT–III; Brownell, 2000). Similarly, two studies reported increases in child vocabulary as reported by the Peabody Picture Vocabulary Test (3rd ed.; PPVT–III; Dunn & Dunn, 1997). Girolametto and colleagues (2012) reported increases in children's use of level three and level four utterances.

Two studies reported mixed findings for child outcomes. Both these studies reported increases in children's use of level three utterances, but not level four utterances outcomes. Only two studies reported no significant findings in regard to child outcomes.

Intervention Format

In this review, we defined coaching as a collaborative professional development model where the ECEs and coach/ mentor work together to implement the targeted strategies as well as analyze the effectiveness of implementation and the strategies on the desired ECEs' and child outcomes (Sutherland et al., 2015; Synder, 2007). Coaching without the pairing of a workshop or training was the least commonly implemented intervention method. One study used skill-focused coaching as a professional development to improve quality of literacy and language environments. McCollum and colleagues reported mixed findings; they reported no significant differences between the experimental and control group in their use of strategies during book reading to support language and comprehension but reported significant findings in ECEs' use of oral language facilitation.

Workshops, courses, or in-service trainings encompassed the second most implemented intervention for informing ECEs of effective evidence supported strategies to increase language development in the classroom. Five of the included studies employed a course or workshop only intervention. All five courses included concepts on how to support children's language development within the classroom. Two of the courses used an established curriculum, whereas the three remaining studies established their own trainings based off evidence-supported strategies. Two of the studies examined the effectiveness of a lecture style course where upon completion participants were eligible to receive three or four college credits. Additionally, these two courses extended over a lengthier time. The other three studies used a short-term in-service training, which involved day long interventions. The most commonly used strategy amongst the course interventions was the in-service one- day intensive training.

Four of the studies that implemented a workshop, course, or in-service training only method reported positive ECEs' outcomes. Dickinson and Caswell reported increases in ECEs' instructional strategies and oral language facilitation; however, the greatest changes showed on literacy features. Hamre and colleagues displayed greater knowledge on vocabulary, social language, and narrative skills as well as increased use of language facilitation strategies (open-ended questions, conversation, and expansion). Similarly, Scarinci and colleagues reported an increase in ECEs' use of expansion and communication-facilitating behaviors. Lynch reported higher scores on ECEs' language environment (discourse climate, extended conversation, and efforts to build vocabulary).

The most commonly employed intervention method involved the use of both in-service trainings, workshops, or courses combined with coaching or mentoring. Sixteen studies examined the effectiveness of a combination of both a professional development course as well as coaching with feedback on the specific strategies learned from the trainings. Two of the studies used an online application to provide their course as well as their mentoring, and nine studies used a workshop method followed by coaching sessions. The number of coaching sessions ranged from three sessions total to weekly sessions that lasted for 15 weeks. However, between the nine studies, 9.3 was the average frequency of coaching sessions. Four studies employed group training programs followed by individual coaching sessions, and the remaining study provided a course followed by weekly coaching sessions. Nine of the 15 studies implemented an established program from the Hanen Center.

Nine of these intervention studies reported positive ECEs' outcomes. Majority of these findings occurred during book reading. These nine studies found positive increase in a variety of areas, but predominately in ECEs' use of language strategies during book reading.

Nine of thirteen studies reported positive findings for their child participants' in regard to their improvement in their language ability as reported by standardized language assessments EOWPVT-III (Brownell, 2000), PPVT-III (Dunn & Dunn, 1997), and PLS-IV (Zimmerman et al., 2002).

Intervention Content Areas

The in-service trainings, workshops, or courses focused on a variety of different content areas in regard to language development. The most commonly taught area of language development was conversation with 10 studies. Four of the 10 studies reported positive ECEs' outcomes; significant increases in ECEs' use of communication-facilitating behaviors, scaffolding to increase utterance length and complexity, language environment, and expansion. Five of the 10 studies reported positive child outcomes; increases in child vocabulary and use of complex language as assessed through standardized assessments. The second most taught area of language development was vocabulary with seven studies. Two of the seven studies reported increases in ECEs' use language facilitation/ language eliciting strategies (open-ended questions, conversation, and expansion) and one reported increase in child receptive and expressive vocabulary.

Use of Language-Supportive Strategies

Majority of the studies mention specific, individual language strategies (e.g., modeling, communication-facilitating behaviors, expansion, and scaffolding) in their literature review and in the explanation of their interventions provided to ECEs. However, the results do not report the ECEs' use of or effect of the strategies independently, but instead used standardized measures to observe and assess ECEs' use of language strategies through overarching categories. Seven of the studies used the ELLCO (Smith & Dickinson, 2002), four used the CLASS (Pianta et al.,

2006), and three used the TBRS (Landry et al., 2000). Therefore, these thirteen studies did not report ECEs' use of language strategies independently, but rather as categories such as the language environment or oral language. Below a narrative is provided regarding the intervention studies and their language strategies.

Nine studies incorporated modeling in their intervention; however, only one of these studies reported the ECEs' use of modeling or the significance of modeling in the results. Hamre and colleagues reported significant findings for ECEs that received a course verse those in the control group that did not in their use of language modeling as reported by the CLASS (Pianta et al., 2006).

Seventeen of the studies included communication-facilitating behaviors in their interventions; however, only five of these studies reported the results of ECEs' use of communication-facilitating behaviors and the effect of communication-facilitating behaviors on ECEs and child language outcomes. Only one study that used and reported outcomes of communication-facilitating behaviors reported significant increases in ECEs' use of communication-facilitating behaviors and three reported increases in child vocabulary, mean length of utterance, or length of conversation (Milburn et al., 2014).

Nine interventions included expansion, but only one study reported the results of ECEs' use of expansion. Scarinci and colleagues found overall positive findings as after intervention ECEs' use of number of communication–facilitating behaviors increased, but ECEs' use of expansion remained the same from pre-to post intervention.

Seven of the studies incorporated scaffolding in their intervention. Three of the seven studies reported the results of ECEs' use of scaffolding. One of these three studies reported significant findings in ECEs' use of scaffolding and increase in child language complexity

(Girolametto et al., 2012). In this intervention study, ECEs increased their use of scaffolding from pre-to post intervention and in comparison, to the control group. Additionally, the children in the experiment used higher level utterances from pre-to post intervention and in comparison, to the control group (Girolametto et al., 2012).

Methodological Rigor

In order to identify whether studies met essential quality standard, this review used Gersten and colleagues (2005) essential quality indicators. The essential quality indicators provided a means to assess the following areas of each study: participants and sampling, implementation of the intervention, outcome measures, and data analysis.

Eight of the 22 studies met all four standards for methodological rigor. Majority of the studies that did not meet essential quality standard neglected to include a power analysis within their data analysis or failed to discuss their treatment fidelity.

Discussion of Literature Review Findings

This systematic review examined ECE- directed, language-based interventions as well as how these interventions impacted ECEs' outcomes and child language ability. Overall, the outcomes reported in the studies suggest there are limited effective interventions for ECEs that target and report strategies which support child language. Majority of the studies (n= 15) reported positive ECEs' findings, a limited number of studies reported language strategies independently in the results, and only eight of the 22 studies demonstrated sufficient methodological rigor. The studies' methodological rigor provided critical information about the quality and method of the interventions. The findings discussed below provide significant insight into interventions along with implications for future research and practice.

Early Childhood Educator and Child Outcomes

The primary aim of this review was to analyze the intervention studies and the effects on ECEs' and child outcomes. Over half the studies reported increases in ECEs' oral language, language environment, and language-facilitating behaviors as measured through standardized observation measures such as the ELLCO (Smith & Dickinson, 2002), TBRS, (Landry et al., 2000), and CLASS (Pianta et al., 2006). These categories included the four foundational language strategies discussed through this review, (1) modeling, (2) communication-facilitating behaviors, (3) expansion, and (4) scaffolding. Because the interventions studies used standardized observation measures to report ECEs' outcomes it is not possible to assess how frequently ECEs used these four strategies. Through the results of this review the researcher cannot report direct associations between modeling, communication-facilitating behaviors, expansion, or scaffolding and child language outcomes because the intervention studies grouped them into categories. The results are unclear as to the most beneficial frequency of each of these strategies.

The literature reports that changes in ECEs' use of these language strategies increase child language in the classroom (Justice et al., 2018; Pence et al., 2008; Pentimonti et al., 2017). More specifically, these strategies support child vocabulary and conversation skills (Cabell et al., 2015). The results demonstrated ECE- focused interventions influence changes in child language ability as over half the studies with child language outcomes reported increases in child vocabulary, complex language, mean length of utterance, or number of exchanges during conversation. Majority of the intervention studies that include child outcomes in this review analyzed the relationship between ECEs' use of language strategies and child vocabulary skills through means of the PPVT-III (Dunn & Dunn, 1997) or EOWPVT-III (Brownell, 2000).

However, none of the included studies assessed child vocabulary skills and conversation skills despite the literature reporting that these two child outcomes are essential for language development and assess a wide variety of language skills, expressive and receptive language as well as pragmatics or social language (Cabell et al., 2015). Child vocabulary and conversation skills further support each other: the more a child engages in multi-turn conversation and longer exchanges the more opportunities they are provided to learn, comprehend, and practice novel vocabulary (Cabell et al., 2015; Justice et al., 2018).

The findings of this review support previous literature; changes in ECEs influence changes in the children in their classroom (Markussen-Brown et al., 2018). For example, as shown in this review, increases in ECEs' ability to create a language environment through their discourse, ability to extend a conversation, and build child vocabulary is positively correlated to increases in child vocabulary.

Format of Intervention

The results of this review show that there are three intervention formats which are most frequently used: (1) in-service trainings, courses, or workshops, (2) coaching or mentoring, and (3) a combination of interventions one and two. Markussen-Brown et al., (2017) reported that the addition of coaching increases the overall effect of an intervention. Sixty percent of the intervention studies that implemented a course with the addition of coaching reported increases in ECEs' use of language strategies. Additionally, 100% of the intervention studies that reported positive outcomes for children's language development used combined interventions.

These findings were potentially confounded with the intensity and duration of the intervention. Of the five studies that used a combined intervention and reported positive outcomes for early childhood educators, 80% had higher intensity and a longer duration than the

remaining 20% of the studies. Increased intensity and length of an intervention were previously shown to increase positive outcomes for early childhood educators (Justice & McGinty, 2012; Markussen et al., 2017). Interestingly, child outcomes revealed an opposite finding, as only 33% of the dual interventions with positive findings implemented increased intensity and duration during the intervention period.

Intervention Content Areas

Only two of the intervention studies included content information on the importance and knowledge of implementing both conversation and vocabulary. The use of conversations between ECEs and children increase child vocabulary as they provide the child an opportunity to learn and use novel words (Cabell et al., 2015). The results show that including conversation and vocabulary within the intervention content is essential in increasing child language outcomes. However, as shown through this review the current interventions are not providing the most effective content to increase child language outcomes as they are not including both information on how to support child vocabulary and conversation skills.

Language-Supportive Strategies

Majority of the interventions in the 22 studies included language strategies in the material taught to ECEs as the purpose of these interventions was to support child language development in the classroom. However, it is unclear as to which language strategies are associated with the greatest change in child language outcomes or whether a combination of the four strategies is the most effective for improving child language outcomes. The findings from this literature review did not resolve this question as majority of the studies did not report the effect of each strategy independently. For example, 68% of the studies involved an intervention which targeted communication-facilitating behaviors, however, only a third of these studies reported ECEs' use

of communication-facilitating behaviors. Approximately 60% of the studies used measures (e.g., CLASS, ELLCO, TBRS) which combined language strategies into categories such as language environment or oral language. Because of combining these strategies into overarching categories, it remains uncertain as to whether or not these four language strategies are associated with changes in child language outcomes. It is critical to report these strategies independently in order assess whether direct associations exit between each of these strategies and child language outcomes or whether a combination of the four is needed to affect child language ability. Because current intervention studies did not report the frequencies of each strategy it is impossible to examine the most effective dosage to increase child language outcomes (e.g., vocabulary, conversation skills).

Possible Explanations for the Results of the Literature Review

There are numerous plausible explanations for these findings. First, a potential explanation for each studies' findings may be due to their methodological rigor; majority of the studies which met all quality indicators reported positive findings. Furthermore, studies may not have found positive outcomes for various reasons an insufficient sample size, poor implementation fidelity, inappropriate measures, and incorrect data analysis. Second, individuals learn in different and unique ways; for example, one ECE may absorb information better through course work whereas another educator may experience higher quality learning through practice and feedback. This is a possible explanation as to why a combined intervention reports the highest effects because it provides multiple components and a variety of instruction for different types of learners. Third, the preexisting relationship between the ECE and child potentially influenced the direction of the results. A child's language ability is likely to influence their relationship with their educator, and the quality of the relationship may influence how the ECEs

engage with the child during the intervention (Split et al., 2015). For example, the ECEs may not effectively implement the language strategies when working with this child or engage in frequent conversation with this child due to the preexisting relationship. Fourth, the relationship between the ECEs and the coach may also influence educator and child outcomes. Without establishment of positive rapport, an individual is less likely to accept feedback in a receptive manner (Sutherland et al., 2015). Therefore, strong rapport between the coach and the ECEs may increase the use of the targeted strategies. Fifth, some of the ECEs participated in courses that took place at universities, and the ECEs could receive credits for enrolling in the course. This additional incentive of receiving college credit may have influenced the results.

Limitations of the Literature Review

There are numerous factors which limit the interpretation of the findings. First, it is possible that the search strategy or used databases did not capture eligible studies. Second, this review implemented stringent inclusion criteria, which increased the potential of missing intervention studies. Third, each included study met peer review and published criterion, which indicates that the research did not analyze grey literature. Fourth, the findings for child outcomes are limited because studies were included in this review based on the requirement of having ECEs' outcomes, so there are intervention studies targeting language strategies that report child outcomes which are not included in this review. Fifth, it is difficulty to tease apart literacy and language skills during early childhood. These intervention studies do not focus on language skills independently but as a packaged intervention with pre-literacy skills such as phonological awareness, print awareness, and letter knowledge. The ECEs implemented and received coaching primarily during literacy activities such as shared book reading, which hinders me from reporting if the language outcomes only occurred when paired with literacy strategies or during shared

book reading.

Implications of the Literature Review for Research and Practice

The findings from this review have important implications for the field. The results from this review support previous findings; professional developments that include a course plus the addition of coaching are the most effective intervention format (Markussen-Brown et al., 2017). Even though ECEs' outcomes varied, the improvement in child language outcomes suggested that interventions using coaching/mentoring and coursework are the most effective. This review and Markussen-Brown's (2017) review provide support that interventions, professional developments, or trainings for ECEs should use coaching/mentoring and coursework to ensure the best outcomes.

Content area in the interventions varied; however, only two studies included content on conversation skills and vocabulary, and both revealed positive ECEs' and child outcomes. The findings of this review revealed that intervention studies are not focusing on both conversation strategies and vocabulary skills despite the research on the significance of conversation skills and vocabulary to child language development (Cabell et al., 2015). Majority of ECEs' instruction occurs within conversation (Hamre & Pianta, 2001; Rudasill et al., 2006), which signifies the importance of conversation skills for a child. Communication-facilitating strategies support child conversation and vocabulary skills as they teach children how to engage in multi-turn conversations, which increases their opportunity to learn and use novel vocabulary (Cabell et al., 2015; Justice et al., 2018).

The majority of the intervention studies described individual and effective language strategies for ECEs use in the classroom in their introductions as well as included the strategies in their interventions for ECEs. However, over half of the studies did not examine ECEs' use of

the individual strategies but used aggregate measures which combined the strategies into categories such as language environment. Even though studies included modeling, communication-facilitating behaviors, expansion, and scaffolding in their intervention protocols, we do not know whether or not the use of these strategies impact child language outcomes. This review informed the dissertation study to examine kindergarten educators' individual use of language-supportive strategies to provide the field with information regarding educators' foundational use as well as which strategies associate to child language outcomes.

Future Research

The findings from this review reveal gaps in the research and show the need for future research. A long history of the literature shows the benefits of teachers' use of modeling, communication-facilitating behaviors, expansion, and scaffolding are strategies on child language development; however, majority of researchers use measures which combine these strategies into broad categories such as language environment. Future researchers should access educator's use of modeling, communication-facilitating behaviors, expansion, and scaffolding through detailed methods such as momentary time sampling (1) to provide data on how frequently each individual strategy is being used, and (2) to determine if the use of each language strategy uniquely predicts child language outcomes. I used this review to direct the dissertation study. Therefore, in the dissertation study I aimed to assess kindergarten educators' individual use of language-supportive strategies and their associations with child language outcomes.

Future studies should examine specific child language outcomes such as conversation skills and vocabulary that are directly aligned with the skills that each evidence-based language-supportive strategy aim to improve. For example, conversation skills and vocabulary encompass receptive and expressive language processing as well as pragmatic language. Additionally,

higher conversational skills and vocabulary are significantly associated with future academic success (Cabell et al., 2015; Justice et al., 2008). By increasing child conversation and vocabulary skills, educators may be able to support improvements across a variety of child outcomes including but not limited to their language, academics, behavior, and social success (Chow & Wehby, 2018). In the dissertation study, I assessed expressive vocabulary, receptive vocabulary, expressive syntax, and receptive syntax.

Table 2

Codes and Definitions

Study code	Description
ECE demographic	ECE gender (Female or Male) ECE education level (associate degree, bachelor's degree, master's degree)
Child Demographic	Child Age (3-5) School
School Demographic	School SES level
Intervention Format	Course: Workshops, trainings, or coursework Coaching: ECE receives feedback Combination: Course and coaching
Intervention Content Area	Vocabulary: Teachings on importance of and how to increase child vocabulary Conversation Skills: Teachings importance of and how to increase conversations Oral language: Broad teachings on child expressive language Narrative: Teaching on child story telling
Language Strategies	Modeling: Model of higher-order language production Communication-facilitating behaviors: Warm affect, slow rate of speech, conversation expansion, open-ended questions, and encouragement of talk between peers Expansion: Extend children's utterances with more semantically or syntactically complex forms Scaffolding: Generalization, reasoning, prediction
ECE Outcomes	Assessments: Scores on TBRS, ELLCO, CLASS Change in ECE use of language strategies Educator-child interactions Utterance Type
Child Outcomes	Vocabulary: PPVT-III, EOWPVT-III Complex language: PLS-IV Utterance: Type and length

Table 3

Descriptions of Educator and Child Outcomes Post-Intervention

Authors (Year)	Design	Educators	Children	Intervention Format	Intervention Content Area	Positive Educator Outcomes	Positive Child Outcomes
Girolametto et al., (2003)	RCT	16	92	Course and coaching	Conversation*		+
Wasik et al., (2006)	RCT	16	207	Course and coaching	Vocabulary	+	+
Flowers et al., (2007)	RCT	16	92	Workshops and coaching	Narrative, conversation*		
Girolametto et al., (2007)	RCT	16	64	Workshops and coaching	Conversation*		
Dickinson & Caswell (2007)	Quasi-Experimental	70	-	Course	Oral language	+	
Neuman & Cunningham (2009)	RCT	304	-	Course, Course and coaching, and control	Oral language	+	
Landry et al., (2009)	RCT	262	1,786	Online course and mentoring	Language development, children's talk		+
Domitrovich et al., (2009)	RCT	87	-	Workshops and mentoring	Vocabulary	+	
Powell et al., (2010)	RCT	Part 1: 73 Part 2: 88	759	Workshop and coaching	Vocabulary, oral language, comprehension	+	
Landry et al., (2011)	RCT	Year 1: 213 Year 2: 209	Year 1: 1264 Year 2: 1328	Online course and mentoring	Language development, children's talk		+
Wasik & Hindman (2011)	RCT	30	541	In-service training and coaching	Conversations, shared book reading	+	+
McCollum et al., (2011)	RCT	12	-	Coaching	Shared book reading	+	
Girolametto et al., (2012)	RCT	20	76	Workshops and coaching	Conversation*, shared book reading	+	+

Hamre et al., (2012)	RCT	440	-	Course	Vocabulary Pragmatics Narrative	+	
Piasta et al., (2012)	RCT	49	330	Workshop and coaching	Conversation*		+
Landry et al., (2014)	RCT	65	542	Course and coaching	Scaffolding	+	
Milburn et al., (2014)	RCT	20	76	Workshop and coaching	Conversation*	+	+
Scarinci et al., (2015)	Quasi-Experimental	47	-	Course	Language development, conversation*	+	
Namasivayam et al., (2015)	RCT	32	124	Workshop and coaching	Vocabulary, conversation*, shared book reading	+	+
Gettinger & Stoiber (2016)	RCT	22	-	In-service training and coaching	Vocabulary, oral language, comprehension		
Lynch (2017)	RCT	27	-	Course	Vocabulary, oral language, conversation, shared book reading	+	
Piasta et al., (2017)	RCT	535	-	Workshop, workshop and coaching, and control	Oral language, conversation*	+	

Note. *Hanen Program used for course in intervention. RCT=randomized control trial.

Table 4

Language-Supportive Strategies Included in Interventions

Authors	Communication-Facilitating Behaviors	Modeling	Expansion	Scaffolding
Girolametto et al., 2003	+	+	+	
Wasik et al., 2006	+	+	+	+
Dickinson & Caswell, 2007	+			
Flowers et al., 2007	+			+
Girolametto et al., 2007	+			+
Landry et al., 2009	+	+	+	+
Domitrovich et al., 2009			+	+
Neuman & Cunningham, 2009	+			
Powell et al., 2010	+			
Landry et al., 2011				+
Wasik & Hindman, 2011	+	+	+	
McCollum et al., 2011	+	+	+	
Hamre, et al., 2012		+	+	
Piasta et al., 2012	+	+	+	
Girolametto et al., 2012				+
Landry et al., 2014	+	+		+
Milburn et al., 2014	+	+	+	+
Namasivayam et al., 2015				
Scarinci et al., 2015	+		+	
Gettinger & Stoiber, 2016				
Piasta et al., 2017	+	+	+	
Lynch, 2017	+			

Note. These strategies are included in their interventions, but not all these interventions report findings for these strategies.

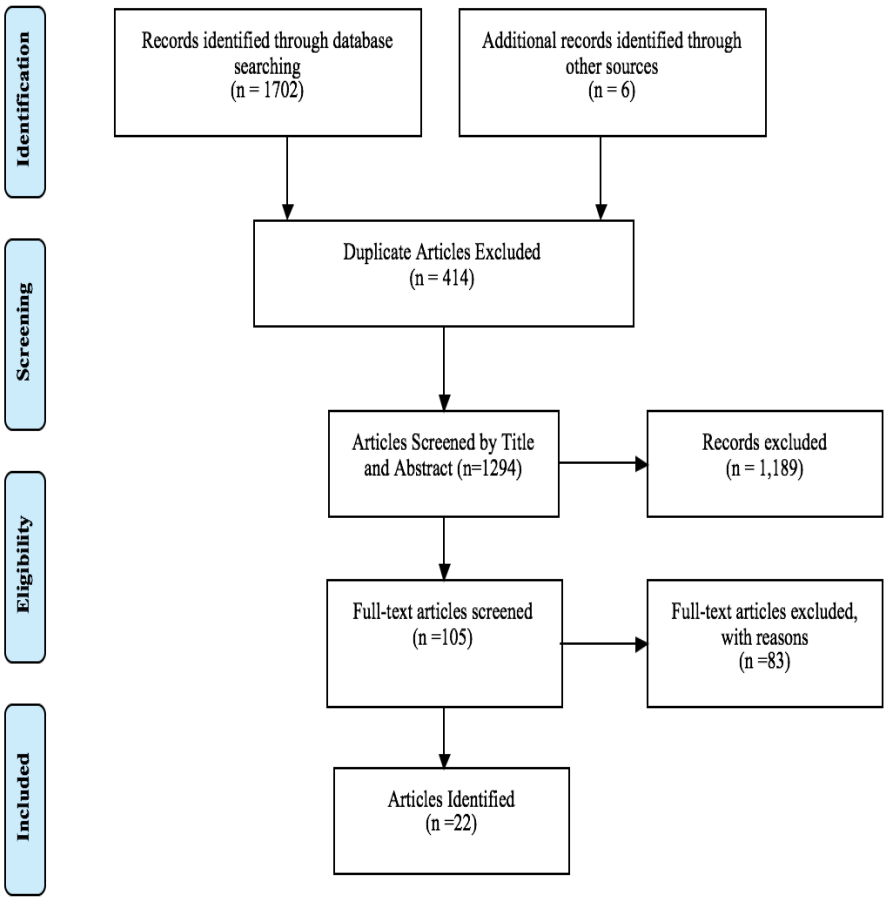
Table 5

Methodological Rigor of Included Studies

Authors	Participants and Sampling	Implementation of Intervention	Outcome Measures	Data Analysis
Girolametto et al., 2003	+		+	+
Wasik et al., 2006			+	
Dickinson & Caswell, 2007	+	+	+	+
Flowers et al., 2007	+		+	
Girolametto et al., 2007	+		+	
Domitrovich et al., 2009	+	+	+	+
Landry et al., 2009	+	+	+	
Powell et al., 2010	+	+	+	
Landry et al., 2011	+	+	+	+
Wasik & Hindman, 2011	+	+	+	+
McCollum et al., 2011	+	+	+	
Hamre, et al., 2012	+		+	
Piasta et al., 2012	+	+	+	+
Girolametto et al., 2012	+	+	+	+
Landry et al., 2014	+	+	+	
Milburn et al., 2014	+	+	+	
Namasivayam et al., 2015	+	+	+	
Scarinci et al., 2015				
Gettinger & Stoiber, 2016	+	+	+	+
Piasta et al., 2017	+		+	
Lynch, 2017			+	

Figure 1

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRIISMA) Flow Diagram



Chapter 3

Method

The purpose of this study was to examine the frequency of kindergarten educators' use of language -supportive strategies (*Modeling, Expansion, WH-questions,* and *Scaffolding)* and their associations with child language outcomes (*Expressive Vocabulary, Expressive Syntax, Receptive Vocabulary*, and *Receptive Syntax*). I examined these associations while controlling for educator-level (years of experience, level of education, and observation length) and child-level (cognitive ability and gender) covariates. Additionally, I explored the influence of educators' demographics (years of experience and level of education) on their frequency of language-supportive strategies (*Modeling, Expansion, WH-questions,* and *Scaffolding)*. I examined educators' frequency of language-supportive strategies using observational measures during instructional time in the classroom. I assessed child *Expressive Vocabulary, Expressive Syntax, Receptive Vocabulary*, and *Receptive Syntax* abilities through standardized assessments. Below I describe the participants, data collection procedures, and analyses used to produce the findings.

Participants and Setting

Educators

This study included 10 kindergarten educators from two elementary schools in a large county south of Richmond, Virginia. According to the Virginia Department of Education, both schools qualify as Title 1 and receive supplemental federal funds to support the needs of their students and to provide a fair and equal education.

Upon university Institutional Review Board (IRB) approval, I met with all 10 kindergarten educators (one meeting at each of the two elementary schools), explained and provided details about the study, and obtained signed consent forms. The forms detailed the parameters of the study and solicited their agreement to participate. Given the correlational nature of this study, the educators did not participate in an intervention and observational data collection occurred during instructional times where the educators conducted their classrooms in a business-as-usual manner. To obtain demographic information, the 10 educators a form with questions regarding their personal demographics. Table 6 shows educators' demographic characteristics.

Children

The study initially proposed to include 100 kindergarten children across two elementary schools, 10 from each educators' classroom. Upon IRB approval, I sent home opt-out consent forms to all children in each of the participating classrooms. Educators directed the children to give the opt-out forms to their legal guardians or caretakers. Guardians and caretakers had up to 10 days to sign and return the form to their child's educator if they wanted to opt out of the study. After this 10-day wait period, I collected any opt-out forms from the educators and removed those children from possible participation in the study.

After receipt of the opt-forms, I screened all participating kindergarten children across the two schools to index their language proficiency using the Clinical Evaluation of Language Fundamentals-5th Edition Screening Test (CELF-5 Screening Test; Wiig et al., 2013). I scored all CELF-5 Screening Tests, which provided language proficiency levels of below, at, or above proficiency. To decrease sample bias, I used stratified random sampling and randomly selected five children below proficiency and five children at or above proficiency for each of the 10

classrooms. This study used an *a priori* power analysis (see page 50) to estimate an adequate sample size to ensure sufficient power. At conclusion of the study, 96 children remained due to attrition. Table 7 presents the children participants' demographic characteristics.

Table 6

Educators' Demographic Characteristics

Characteristic	Sample
Gender	
Female	10 (100%)
Race	
White	9 (90%)
Hispanic/Latinx	1 (10%)
Years of Experience	
0 to 10	4 (40%)
11 to 20	4 (40%)
21+	2 (20%)
Level of Education	
Undergraduate Degree	6 (60%)
Master's Degree	4 (40%)

Table 7

Children's Demographic Characteristics

Characteristic	Sample
Gender	
Female	46 (48%)
Male	50 (52%)
Race	
White	52 (54.2%)
Black/African American	26 (27%)
Asian	2 (2.1%)
Hispanic/Latinx	9 (9.4%)
Other	7 (7.3%)

Measures

Educator Measures

We observed, transcribed, and coded educators' classroom instruction to assess the frequency of: (1) *Modeling*, (2) *WH-questions,* (3) *Expansion*, and (4) *Scaffolding.* Table 1 on page 6 provides example of these variables. I obtained educators' years of experience and level of education through a demographic form.

Modeling. To index all types of *Modeling* I examined four subcategories, direct modeling, vocabulary modeling, alphabet modeling, and route instruction modeling. General modeling is a strategy in which the educator provides an example of the desired child response. I define vocabulary modeling as a strategy in which an educator demonstrates the correct use of a

vocabulary term in a sentence. Alphabet modeling is a strategy where the educator provides an exact example of the letters and sounds of the alphabet. The educator may also provide a word that demonstrates the sound for the child. Lastly, route instruction modeling is a strategy that an educator uses to demonstrate an exact or ideal example of the task to be completed.

WH-Questions. I examined two categories of *WH-questions* in this study, open-ended and close-ended questions. An educator uses an open-ended question to request a response by asking a question that provides the child with an opportunity to responses with more than one word. I coded an utterance as open-ended if the child's response was greater than two words. A close-ended question is a strategy where the educator requests a response by asking a question that requires a simple one- or two-word answer.

Expansion. I investigated educators' use of *Expansion* in their transcripts. *Expansion* is a strategy where the educator provides a response to a child or group that extends, lengthens, or adds to the child's previous utterance. I coded an educator's utterance as *Expansion* only if the utterance increases the length of the child's utterance.

Scaffolding. To catalogue all example of *Scaffolding* I examined five scaffolding strategies. I assessed generalizing, reasoning, predicting, co-participating, and reducing strategies. According to Pentimonti et al. (2017), the following three strategies are low-support scaffolding because the educator provides lower levels of support in comparison to high-support scaffolding strategies. Generalizing is a strategy where an educator prompts a child to move the context of the lesson beyond the current scenario. An educator uses reasoning as a strategy to prompt a child to explain the "why". I defined predicting as a strategy where educators prompt a child to describe what might happen next or hypothesize an outcome. Pentimonti and colleagues defined the following two strategies as high-support scaffolding because they require the

educator to use a higher level of guidance to support the child. Co-participating is a strategy where an educator prompts the child to produce the correct answer by asking the child to verbalize their response simultaneously with the educator. Lastly, I defined reducing choices as a strategy where an educator prompts a child to produce a correct response by reducing the number of correct answers in the choice selection.

Years of Experience. This variable describes the number of years that each of the educators taught kindergarten children.

Level of Education. This variable defines educators' highest degree completed in elementary education (e.g., associate, undergraduate, master's, or doctorate). I asked for their highest degree in elementary education. If they received a higher degree in another field, it was not considered for this study.

Child Measures

I obtained child language outcomes through standardized measures. I used the Clinical Evaluation of Language Fundamentals- 5th Edition Screening Test (CELF-5 Screening Test; Wiig et al., 2013) to assess child language proficiency and the Test of Expressive Language (TEXL; Carrow-Woolfolk & Allen, 2014) and the Test for Auditory Comprehension of Language- 4th Edition (TACL-4; Carrow-Woolfolk, 2014) to examine expressive and receptive vocabulary and syntax. Additionally, each child participant completed subtests from the Wechsler Intelligence Scale for Children -5th Edition (WISC-V; Wechsler, 2014), a standardized measure to assess their cognitive ability to control for the association between cognitive and language abilities. We used standardized assessments to control for human error from an assessment perspective.

Language Risk Status. We administered the CELF-5 Screening Test, a 10-minute

standardized screening measure that helps assess child morphology, syntax, and semantic skills. The CELF-5 Screening Test is a nationally normed measure, which provided research-based diagnostic criterion scores; children scored at, above, or below proficiency. The CELF-5 Screening Test considers children who score below proficiency at risk for a language delay.

Expressive Language. The TEXL, a standardized assessment designed to examine child expressive spoken language ability. Expressive language refers to speaking, encoding, and production processes (Carrow-Woolfolk & Allen). TEXL consists of three subtests, vocabulary, grammatical morpheme, and elaborated sentences and phrases. For the purposes of this study, the child participants completed two of the three subtests, vocabulary and elaborated phrases and sentences. Because of the limited resources and time this pilot study did not assess morphological development. The vocabulary subtests examined a child's expressive ability in regard to nouns, verbs, adjectives, and adverbs that represent everyday concepts. For administration of the vocabulary subtest I presented the child with a visual stimulus and asked him/her to orally label the visual stimulus (e.g., What do we call this?). Elaborated phrases and sentences examined a child's ability to use syntactically based word relations and elaborated phrases and sentence constructions (e.g., interrogative sentences, negative sentences, active and passive voice, and direct and indirect object). During administration of the elaborated phrases and sentences subtest I provided a visual or verbal stimulus and asked the participant to orally label the stimulus or complete the remainder of the presented sentence. The TEXL manual reports high reliability and construct validity, coefficients alpha for the vocabulary subtest is 0.94 and 0.96 for the elaborated phrases and sentences subtest (Carrow-Woolfolk & Allen). I calculated internal consistency reliability between the vocabulary and elaborated phrases and sentences subtests on the TEXL. Cronbach's alpha was 0.72, which demonstrated adequate

internal consistency between the two subtests for this study's sample (Nunally & Bernstein, 1994).

Receptive Language. The TACL-4, a standardized assessment which examined children's receptive morphology, syntax, and vocabulary. Receptive language refers to listening, comprehension, and decoding processes (Carrow-Woolfolk & Allen, 2014). For the purpose of this study, the child participants completed two subtests, vocabulary and elaborated phrases and sentences. Similar to the TEXL, because of the limited resources and time this pilot study did not assess morphological development. The vocabulary subtest assessed a child's comprehension of nouns, verbs, adjectives, and adverbs that represent everyday concepts. During administration of the vocabulary subtest I delivered a verbal stimulus and asked the participant to point to the image which best depicts the stimulus, the child did provide a verbal response. Elaborated phrases and sentences assessed a child's comprehension of syntactically based word relations and elaborated phrases and sentence constructions (e.g., interrogative sentences, negative sentences, active and passive voice, and direct and indirect object). During administration of the elaborated phrases and sentences I delivered a verbal stimulus and asked the child to point to the image which best depicts the phrase of sentence stimulus provided. TACL-4 reports high reliability and construct validity. For the vocabulary subtest alpha is 0.94 and 0.96 for elaborated phrases and sentences subtest (Carrow-Woolfolk). I calculated internal consistency reliability between the vocabulary and elaborated phrases and sentences subtests on the TACL-4 for this study's sample. Cronbach's alpha was 0.60, which demonstrated adequate internal consistency for an exploratory study (Nunally & Bernstein, 1994).

Cognitive Functioning. The children participants completed two subtests from the WISC-V, a standardized assessment used to measure children's intellectual abilities. I

administered the matrix reasoning and digit span subtests of the WISC-V. These two subtests provided a general estimate of nonverbal cognitive functioning (Wechsler). The WISC-V reports high reliability and construct validity. The WISC-V reported reliability for matrix reasoning is 0.96 and 0.92 for digit span, which refers to its accuracy, consistency, and stability across situations. I calculated internal reliability of matrix reasoning and digit-span for this study's sample, and Cronbach's alpha was 0.65. According to Nunally and Bernstein (1994) this is an adequate internal consistency for an exploratory study. Matrix reasoning examined children's fluid reasoning, their ability to use reasoning to identify and apply rules. In addition to, digit span assessed children's working memory, their ability to comprehend, maintain, and use information. I selected these two subtests of the WISC-V because of their relation to children's language ability. Children require reasoning skills to support their syntactical skills and working memory to support their vocabulary ability. The purpose of this study was to assess child language ability; therefore, I controlled for children's intellectual abilities to examine children's language abilities without the influence of their intellectual abilities.

Procedures

Training Procedures

Before data collection, I trained one undergraduate research assistant on administration of assessments, data entry procedures, and transcription procedures. First, I trained her to administer two language assessments, the TEXL and the TACL-4. During training, she learned the assessment rules (e.g., rules for establishing ceiling and basal) and components of procedural fidelity (e.g., which items allow prompting; which sections allow repetition). After completion of training, she practiced administering the assessments to peers and colleagues until she was prepared to check out to assess her procedural fidelity. To complete check out, she administered

the assessment to me and checked out with 100% procedural fidelity. Second, I trained her on procedures to complete word-to-word accuracy checks for the educator transcripts. She checked the original transcripts while listening to the audio recordings. The word-to-word accuracy checks ensured I accurately transcribed the audio recordings. She practiced on two transcripts before she checked word-to-word accuracy on the 25% of transcripts used for inter-rater-reliability. I also trained a graduate research assistant on coding the transcripts after the completion of word-to -word accuracy checks. I trained him using the language-supportive strategy codebook I previously created which provided definitions and examples of each language-supportive strategy. He reviewed the coding manual, practiced coding on three transcripts, and followed up with me for questions. For check-out, he coded two transcripts and achieved 94% agreement. Upon completion of check out, he coded the same 25% of the transcripts that the first research assistant checked for word-to-word accuracy and achieved 96% agreement. He coded the same 25% that the research assistant checked for word- to -word accuracy to provide an index of overall agreement in the present study. I used these trainings to strengthen the study by reducing the likelihood of human error.

Data Collection Procedures

A research assistant and I collected data for the educator variables during the fall 2019 semester alongside collection of child language screening data. We collected the child language screening data in the fall to form my sample for the study. We assessed and collected data on child language outcomes in Spring 2020. I collected educator variables during the fall and child language variables during the spring to allow for a lapse of time to increase the likelihood of educators' use of language-supportive strategies influencing their children's language outcomes.

Child Language and Cognitive Ability Data

In spring 2020, we used the TEXL and TACL-4 to obtain scores for child *Expressive Vocabulary, Expressive Syntax, Receptive Vocabulary*, and *Receptive Syntax*. I also administered two subtests of the WISC-V to assess child cognitive ability.

Procedural Fidelity

Before data collection, I created a fidelity checklist to index, train, and monitor the quality and consistency of assessment administration. I trained one research assistant on administration of the TACL-4. She received training, practiced the assessment, and checked out with 100% procedural fidelity. During all assessment sessions, the research assistant audio recorded her sessions and uploaded them to a password- protected google drive. At completion of data collection, I randomly selected 25% of her assessment session audio recording to check for procedural fidelity. She achieved 100% procedural fidelity on the administration of the TACL-4.

Educator Observational Data

I collected observational data during instructional time to maximize the likelihood of educator engagement with her children. We audio-recorded all observation data sessions for purposes of later transcription and coding. I decided not to use live transcription due to the volume of utterances as well as the likelihood of human error. Observational sessions varied between 30 and 55 minutes in length because of factors such as of instructional time constraints and class bathroom breaks. Additionally, one of the educators left during observational data collection for maternity leave, which influenced the length of time we observed her instructional lessons.

Educator Language Samples and Inter-rater Reliability

I transcribed audio recordings from the observational sessions in Systematic Analysis of Language Transcripts (SALT; Miller & Iglesias, 2012). I completed online training modules to learn and use SALT. The SALT software training modules have built-in quizzes to ensure understanding of the content and transcription conventions. I followed their standard procedures for utterance segmentation and creating a codebook. After initial transcription, a research assistant went through 25% of the transcripts and completed a word-to-word accuracy check. The research assistant and I established 100% agreement on the word-to-word accuracy checks of 25% of the transcripts. Upon completion of the word- to -word accuracy check, I went through and coded each utterance from all transcripts using the codebook depicted in Appendix A. After I completed the first round of coding, a second research assistant who was previously trained on the coding system, coded 25% of transcripts to obtain inter rater reliability. The research assistant and I achieved 96 % agreement on the codes for 25% of transcripts, thus, no additional double coding will occur for the purposes of this study.

Preliminary Analyses and Statistical Approach

I used STATA 14 (StataCorp, 2015) to conduct all power analysis, descriptive statistics, linear regressions, and path models. I used these analyses to answer the three research questions. This section provides detailed descriptions of each analysis.

Power Analysis

I conducted a power analysis to determine an adequate sample size for the number of children participants to conduct a study with sufficient power. Power implies the chance of finding a statistically significant difference when there is one (Rabe-Hesketh & Skrondal, 2012). I conducted this power analysis before beginning the study to assess how many children participants I needed across the 10 educators. The power analysis reported that this study

required 100 children participants to obtain 68% power. The study's actual power decreased as the final sample size was 96 children participants because of attrition. The power estimate is low for the following reasons, a small sample size of 10 educators, a conservative effect size (0.5) for the association between educators' use of language-supportive strategies and child language outcomes (Pentimonti et al., 2017; Piasta et al., 2012), and a small effect size (0.2) for the associations between educator-level and child-level covariates.

Variable Transformations

First, I ran Shapiro-Wilk normality (Royston, 1992) and Shapiro-Francia (Royston, 1983) normality tests to assess whether my outcome variables were normally distributed. I found that child *Expressive Syntax* and educators' use of *Modeling, Expansion, WH-questions, and Scaffolding* were not normally distributed. All other child level variables, *Expressive Vocabulary, Receptive Vocabulary*, and *Receptive Syntax* were normally distributed. I used the syntax ladder, which searched a subset of the ladder of powers (Tukey, 1977). The syntax, ladder, searched for a transformed variable which was normally distributed. I checked for normal distribution via statistical significance and through visual representations. Specifically, I assessed the transformations' normality by histograms. Child *Expressive Syntax* converged into a normally distributed variable through the transformation of squaring the original *Expressive Syntax* variable. I created a new variable for *Expressive Syntax* and used the square transformation. Unfortunately, I was not able to identify a transformed variable that showed normality (Tukey, 1977) for the following variables, educators' use of *Modeling, Expansion, WH- questions, and Scaffolding*.

Correlations between Aggregate Variables

I ran four separate correlations to investigate the associations between the aggregate variables I created. I created aggregate variables to sustain adequate power in my regression and path analyses. I ran Spearman correlations to investigate the associations between (1) direct modeling, vocabulary modeling, alphabet modeling, and route instruction modeling (*Modeling*), (2) closed- ended questions and open-ended questions (*WH-questions),* and (3) generalizing, reasoning, predicting, reducing choices, and co-participating (*Scaffolding*). I used Spearman correlations as these variables are not normally distributed (Bishara & Hittner, 2012; Chen & Popovich, 2002).

Correlational Analyses

I ran three different correlation analyses, first to determine the associations between each of the eight child-level variables, second to assess associations between each of the 19 educator-level variables, and third to examine the associations between each of the eight child-level variables and 19 educator-level variables. I ran a Pearson correlation to investigate the associations between the eight child level variables. The Pearson correlations were acceptable because my child-level variables were normally distributed. I ran two Spearman correlations, to examine the associations between the educator-level variables and to investigate the associations between all variables involved in the study. The Spearman correlation was an effective analysis as it is a non-parametric test and does not carry assumptions about the distribution of the data, so is valuable for data that is not normally distributed (Bishara & Hittner, 2012; Chen & Popovich, 2002).

Means, Standard Deviations, and Ranges

I ran descriptive statistics to determine educators' mean frequency of the individual language-supportive strategies as well as the standard deviation. Additionally, I examined the

range of educators 'frequency of each language-supportive strategy. I also assessed educators' mean proportion of an individual strategy over their total use of language-supportive strategies as well as their standard deviation.

Regressions

I ran eight regressions; four separate models to assess educators' years of experiences as a predictor of their use of *Modeling, Expansion, WH-question,* and *Scaffolding*. The four language-supportive strategies acted as individual dependent variables in the four models. I assessed assumptions and decided to address the violated assumptions through bootstrapping. Bootstrapping is a robust resampling technique that corrects for violated assumptions (Acock, 2018). It is especially recommended when models violate nonnormality of residuals and/ or heteroskedasticity. Additionally, I ran four separate regressions to examine the association between educator's level of education and their use of *Modeling, Expansion, WH-questions,* and *Scaffolding*. I created a dummy variable for educators' level of experience and included this variable as the predictor in my four models. I coded the dummy variable with zero representing undergraduate degree and one representing master's degree. I assessed assumptions and addressed the violated assumptions through bootstrapping.

Path Models

I ran four path models which each included five covariates (observation length, educators' level of education, educators' years of experience, child gender, and child intellectual ability, one predictor (educators' frequency of *Modeling, WH-questions*, *Expansion*, or *Scaffolding*), and four outcome variables (child *Expressive Vocabulary*, *Expressive Syntax*, *Receptive Vocabulary*, *and Receptive Syntax)*. Each of the four models included a different predictor variable. In path models only the outcome variables need to be normally distributed.

The models were not influenced by the non-normal distribution of the predictor variables (educators' frequency of *Modeling, WH- questions, Expansion,* and *Scaffolding)*, but because *Expressive Syntax* served as an outcome variable, I used the transformed version of the variable in all path models. I ran path models to determine the associations between the one predictor variable (educators' frequency of *Modeling, WH- questions, Expansion,* or *Scaffolding)* and child language outcomes (*Expressive Vocabulary*, *Expressive Syntax*, *Receptive Vocabulary*, *and Receptive Syntax)* while controlling for the five covariates.

Chapter 4

Results

Correlations

First, I ran Pearson correlations and examined the eight child-level variables. Analyses included all variables with normal distribution based on the transformed variable for child *Expressive Syntax*. Table 8 shows the associations between all child-level variables. Second, I ran a Spearman correlation to assess the 19 non-normally distributed educator-level variables. Table 9 depicts the associations between the educator-level variables. Third, I ran Spearman correlations to examine the associations between each of the eight child level variables and the 19 educator-level variables. I used Spearman correlations to assess these associations because the educator-level variables were not normally distributed. Table 10 shows the associations between the child and educator variables.

Aggregate Variables

I ran Spearman correlations and examined the associations between the subgroups of three aggregate variables: *Modeling*, *WH-questions*, and *Scaffolding*. Route instruction modeling is moderately correlated to direct modeling (r=0.30), vocabulary modeling (r=-0.32), and alphabet modeling (r=-0.41) (Hemphill, 2003). The combined variable, *Modeling*, may have impacted my analyses' results because the majority of the subcategories had a low degree of association. Close-ended and open-ended questions were highly correlated (r=-0.78), providing

support for combining these two variables into an aggregate variable, *WH-questions* (Hemphill*)*. Reducing choices and generalizing were highly correlated, (*r*=-0.50) (Hemphill). Combining these variables into one aggregate variable, Scaffolding, may have impacted my analyses' results because the majority of the associations between generalizing, reasoning, reducing choices, and co-participating had a low degree of association. Table 11 shows the correlations between the subgroups of the three aggregate measures as well as their significance level.

Table 8

Pearson's Correlations between Child-level Variables

Variable	1	2	3	4	5	6	7	8
Gender	-							
Age in Months	-.03	-						
Matrix Reasoning	.19	-.04	-					
Digit Span	.08	-.05*	.50	-				
Expressive Vocabulary	-.14	-.32*	.33*	.37*	-			
Expressive Syntax	.08	-.26*	.46*	.34*	.57*	-		
Receptive Vocabulary	.16	-.29*	.36*	.30*	.54*	.49*	-	
Receptive Syntax	-.03	-.12	.39*	.41*	.49*	.50*	.43*	-

Note. *$p < .05$.

Table 9

Spearman Correlations between Educator-Level Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Years of Experience	-																		
Level of Education	-.26*	-																	
Observation Time	.36*	-.85*	-																
Direct Modeling	.01	-.43*	.10	-															
Vocabulary Modeling	.64*	-.56*	.43*	.50*	-														
Alphabet Modeling	-.01	-.49*	.73*	-.27*	-.07	-													
Route Instruction	-.18	-.34*	.32*	-.47*	-.18	.52*	-												
Expansion	.26*	-.58*	.29*	.62*	.35*	-.08	-.06	-											
Recasting	.57*	-.56*	.25*	.44*	.73*	-.17	.15	.56*	-										
Repetition	.04	.07	-.22*	.33*	.30*	-.40*	-.04	.32*	.29*	-									
Completion	.07	-.26*	-.03	.31*	.24*	-.10	.37*	.20	.63*	.52*	-								
Open-ended Questions	.06	-.49*	.09	.84*	.52*	-.16	-.32*	.57*	.49*	.09	.26*	-							
Close-ended Questions	.21*	-.71*	.36*	.87*	.68*	-.10	-.19	.82*	.66*	.27*	.26*	.84*	-						

Generalizing	.55*	-.72*	.70*	.02	.64*	.41*	.35*	.48*	.55*	-.05	-.04	.22*	.49*	-					
Reasoning	.46*	-.28*	.39*	-.03	.17	.13	-.00	.46*	.02	.28*	-.10	.00	.17	.40*	-				
Co-participating	.18	.42*	-.18	-.13	.05	.10	-.43*	-.35*	-.38*	.15	-.24*	-.04	-.30*	-.17	.20*	-			
Reducing Choices	.01	-.29*	.18	.64*	.42*	-.32*	-.39*	.55*	.23*	.39*	-.14	.29*	.65*	.19	.11	-.29*	-		
Call and Response	-.34*	-.20	-.02	.80*	.27*	-.06	-.38*	.12	.12	.16	.25*	.64*	.52*	-.26*	-.47*	.06	.39*	-	
Reading	.56*	-.23*	.48*	-.19	.42	.08	.03	-.25*	.21*	-.08	.01	-.36*	-.11	.25*	.15	-.12	.12	-.25*	-

Note. *$p < .05$.

Table 10

Spearman Correlations between Child and Educator Variables and Covariates

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Modeling	-													
Expansion	-.06	-												
WH-questions	.12	.81*	-											
Scaffolding	-.16	.12	.24*	-										
Years of Experience	-.16	.25*	.20	.30*	-									
Level of Education	-.67*	-.57*	-.71*	-.04	0.25*	-								
Observation Length	.71*	.30*	.37*	.20	.36*	-.85*	-							
Expressive Vocabulary	.03	-.01	.05	.16	.05	-.09	.12	-						
Expressive Syntax	.01	-.05	.01	.13	.07	-.03	.07	.57*	-					
Receptive Vocabulary	-.16	.01	.04	.15	.03	.07	-.11	.48*	.48*	-				
Receptive Syntax	-.15	-.12	-.12	.10	.23*	.01	-.03	.50*	.47*	.42*	-			
Child Gender	-.06	.01	-.05	-.01	.03	.04	.01	-.13	.08	.17	-.02	-		
Matrix Reasoning	-.02	.16	.13	.16	.12	-.08	.09	.32	.43	.36*	.37*	.17	-	
Digit Span	-.07	.05	.04	.28*	.24*	.00	.10	.38*	.34*	.33*	.40*	.08	.50*	-

Note. *$p < .05$.

Table 11

Correlations between Subcategories of Aggregate Variables

Variable	1	2	3	4
Modeling				
Direct Modeling	-			
Vocabulary Modeling	0.07	-		
Alphabet Modeling	-0.26*	-0.23*	-	
Route Instruction Modeling	0.30*	-0.32*	0.41*	-
WH-questions				
Close-ended	-			
Open ended	0.78*	-		
Scaffolding				
Generalizing	-			
Reasoning	0.21*	-		
Co-participating	-0.21*	0.15	-	
Reducing Choices	0.50*	-0.09*	0.23*	-

Note. *$p < .05$.

Frequency of Educators' Use of Language-Supportive Strategies

The first research question was: At what frequency do kindergarten educators use language- supportive strategies (*Modeling, WH- questions, Expansion,* and *Scaffolding*) during instructional time with children in their classroom? I calculated the raw frequency at which 10 kindergarten educators used language-supportive strategies. For the purposes of this study, I focused on four language-supportive strategies, *Modeling*, *WH- questions, Expansion*, and *Scaffolding*. Three of these variables were comprised of subcategories: (1) *Modeling* included direct modeling, vocabulary modeling, alphabet modeling, and route instruction modeling; (2) *WH-questions* included open-ended questions and close-ended questions; and (3) *Scaffolding* included generalizing, reasoning, predicting, co-participating, and reducing choices. Additionally, I coded educators' use of language-supportive strategies, to provide an overall picture of the educators' total frequency of language-supportive strategies during instructional time.

On average, research assistants and I observed the educators during instructional time for an average of 41 minutes (*SD*=7.7, range=30-54). The educators verbalized an average of 596.5 utterances (*SD*=142.7, range = 344-815) across the observational sessions (Mean=41 minutes, *SD* =7.7 minutes, and range=30-54 minutes). Educators' frequency of utterances had a significant range as one educator verbalized 344 utterances and another verbalized 815 utterance. Educators had a 471-utterance difference with only a 14-minute difference in the length of time they were observed.

The data in Table 12 shows the mean frequency, standard deviation, and range of each language-supportive strategy. Overall educators used an average of 209.8 language-supportive strategies (*SD*=57.42, range=199-322) across an average of 41 minutes (*SD*=7.7, range=30- 54).

of instructional times in the classroom. On average, the ten educators used *Modeling* most frequently (*M*= 76.94, *SD*= 41.48, range = 12-164) and *Expansion* least frequently (*M*= 4.48, *SD*=2.69, range=1-11).

Table 13 shows average proportions of an individual language supportive strategy of educators' average total frequency of language-supportive strategies. I created this proportion by dividing the average frequency of an individual language strategy by the average total frequency of language-supportive strategies. For example, on average educators' used *Modeling* with a frequency of 76.94 (*SD*=41.48, range 12-164) and educators used an average of 209.8 (*SD*= 57.42, range 199-322) language-supportive strategies. *Modeling* accounted for 35.39% (*SD*=16.28, range 10-.08-67.49) of educators' use of language-supportive strategies. These proportions provided substantial information about the average frequency educators use each individual language-supportive strategy in regard to their total use of language-supportive strategies. The percentages offered a more readily comparable number between educators' average use of each language-supportive strategy while acknowledging their total use of all observed language-supportive strategies.

Lastly, Table 14 reports educators' average proportions of an individual language-supportive strategy over educators' average total number of utterances spoken during instructional time. These average proportion differ from those shown in Table 12 as they provide a percentage of the average frequency educators use each individual language-supportive strategy in comparison to their total number of utterances spoken (e.g., language-supportive and not). The proportions in Table 14 show significantly lower percentages than those in Table 13. These data show overall how infrequently educators used each strategy in comparison with their total number of utterances. For example, on average, educators only used *Expansion* 0.75%

(*SD*=0.45, range=0.29-1.94) of their total number of utterances during an average of 41 minutes (*SD* =7.7, range = 30- 54) of instructional time. These proportions provided important information as they depicted educators' percentage of each language-supportive strategy in regard to their total number of utterances, which showed how infrequently educators used each language-supportive strategy in comparison to their use of utterances that were not language-supportive.

Table 12

Frequency Count of Educators' Use of Language-Supportive Strategies

Language-Supportive Strategy	Mean (*M*)	Standard Deviation (*SD*)	Range
Direct Modeling	10.34	11.39	0-38
Vocabulary Modeling	15.20	15.56	3-58
Alphabet Modeling	22.48	27.90	0-75
Route Instruction Modeling	28.92	27.30	1-83
Modeling Totaled	76.94	41.48	12-164
Expansion	4.48	2.69	1-11
Recasting	10.14	3.62	5-15
Repetition	16.44	7.95	3-31
Completion	5.70	5.38	0-16
Open-ended Questions	0.86	1.02	0-3
Close-ended Questions	40.20	14.97	24-69
WH-questions Totaled	41.08	15.79	24-71
Generalizing	6.61	5.11	0-19
Reasoning	1.14	1.47	0-5
Predicting	0	0	0
Co-participating	14.51	19.39	0-60
Reducing Choices	3.11	4.56	0-13
Scaffolding Totaled	25.38	21.38	3-74
Call and Response	3.32	8.21	0-27
Reading	31.04	28.99	0-85
Total Language Supportive Strategies	209.82	57.42	199-322
Total Utterances	596.52	142.67	344-815

Table 13

Proportion of Educators' Use of an Individual Language-Supportive Strategy out of Total Frequency of Language-Supportive Strategies

Language-Supportive Strategy	Mean % (*M*)	Standard Deviation (*SD*)	Range
Direct Modeling	3.73	3.23	0-11.22
Vocabulary Modeling	6.67	5.33	1.23-21.12
Alphabet Modeling	9.82	12.08	0-30.86
Route Instruction Modeling	13.80	13.64	0.56-42.4
Modeling Totaled	35.29	16.28	10.08-67.49
Expansion	2.22	1.31	0.59-4.82
Recasting	4.99	1.73	2.06-7.4
Repetition	8.13	4.08	1.78-17.22
Completion	2.76	2.52	0-7.06
Open-ended Questions	0.42	0.53	0-1.72
Close-ended Questions	19.78	6.65	11-30.26
WH-questions Totaled	20.20	7.09	11-31.61
Generalizing	2.89	1.90	0-6.93
Reasoning	0.56	0.78	0-2.87
Predicting	0	0	0
Co-participating	7.72	10.83	0-33.33
Reducing Choices	3.69	6.94	0-24.26
Scaffolding Totaled	12.58	11.91	1.76-41.11
Call and Response	1.61	4.00	0-13.17
Reading	14.49	12.73	0-37.8

Note. The proportions for this table were calculated by dividing the average strategy frequency by the average total frequency of language-supportive strategies and multiplying by 100.

Table 14

Proportion of Educators' Use of an Individual Language-Supportive Strategy out of their Total Number of Utterances

Language-Supportive Strategy	Mean % (*M*)	Standard Deviation (*SD*)	Range
Direct Modeling	1.74	1.96	0-6.7
Vocabulary Modeling	2.55	2.52	0.38-9.62
Alphabet Modeling	3.35	4.05	0-9,39
Route Instruction Modeling	5.32	6.08	0.17-20.9
Modeling Totaled	12.97	6.44	2.78-23.26
Expansion	0.75	0.45	0.29-1.94
Recasting	1.80	0.76	0.63-3.2
Repetition	2.91	1.51	0.59-5.35
Completion	1.08	1.17	0-3.49
Open-ended Questions	0.13	0.14	0-0.37
Close-ended Questions	6.58	2.57	3.5-12.19
WH-questions Totaled	7.02	2.51	3.5-12.54
Generalizing	1.07	0.83	0-3.15
Reasoning	0.17	0.19	0-0.61
Predicting	0	0	0
Co-participating	2.48	3.45	0-10.36
Reducing Choices	0.53	0.77	0-2.16
Scaffolding Totaled	4.24	3.76	0.87-12.78
Call and Response	0.52	1.25	0-4.12
Reading	5.42	4.69	0-12.14
Total Strategies	35.99	8.65	21.35-49.42

Note. The proportions of this table were calculated by dividing the average strategy frequency over the average total number of utterances spoken during the observational data collection sessions. These proportions represent the frequency educators' use each language-supportive

strategy over their total number of utterances to provide additional information on how minimal educators use language-supportive strategies in comparison to their total number of utterances spoken during instructional time in the classroom.

Educators' Demographics and their Frequency of Language-Supportive Strategies

The second research question was: Are kindergarten educators' demographic characteristics (years of experience and level of education) associated with the frequency that they use language-supportive strategies (*Modeling, WH-questions, Expansion,* and *Scaffolding*? I assessed educators' demographic variables (years of experience and level of education) with their association to educators' use of language supportive strategies during instructional time in the classroom. I included observation length as a covariate to ensure that observation length did not influence educators' frequency of the language-supportive strategy. Years of experience was a continuous variable, in which educators reported the number of years spent as an educator in kindergarten. The mean years of experience was 13.6 with a standard deviation of 6.89. The range of years of experience was four to 26 years. Level of education was a categorical variable coded as either associate degree, undergraduate degree, master's degree, or doctoral degree. Sixty percent of the 10 educators received an undergraduate degree in elementary education and 40% received as master's degree in elementary education. Because the educators' level of education fell within two categories, I created a dummy variable and used this variable in the regressions. Undergraduate degree served as the reference group (coded as 0) for the dummy variable.

Years of Experience

The data in Table 15 shows findings from four linear regressions. In the four models I examined the associations between educators' years of experience teaching kindergarten and

their frequency of *Modeling, Expansion, WH-questions*, and *Scaffolding*. The four models included the following variables, years of experience (predictor), observation length (covariate), and either *Modeling, Expansion, WH-questions* or *Scaffolding* (dependent variable). The linear regressions determined the extent to which educators' years of experience teaching Kindergarten predicted their frequency of *Modeling, Expansion, WH-questions* and *Scaffolding.* I chose to run four regressions because I wanted to investigate whether educators' years of experience independently predicted *Modeling, Expansion, WH-questions* or *Scaffolding.*

Previously, I examined whether or not my outcome variables were normally distributed, and found that *Modeling, Expansion, WH-questions*, and *Scaffolding* were not normally distributed and would not transform. I addressed the assumptions through bootstrapping, a robust resampling technique that I applied to correct the violated assumptions (Hesterberg et al., 2003). Without using bootstrapping the findings had the potential to be inaccurate because the regression models violated assumptions. Bootstrapping provided a method that does not make assumptions about the distribution of the data (Fox, 2002). Because the models with bootstrapping showed normal distribution in the histograms, I can trust the results are an accurate report of the association between educators' years of experience and their use of *Modeling, Expansion, WH-questions* or *Scaffolding.* I used 100 replications in the four bootstrapping models, the histograms of these results depicted normal distribution. I bootstrapped the regressions with 250, 500, and 1,000 replications, and the results did not alter or become more statistically significant. The literature suggests testing different amounts for the replications and selecting the lowest number at which the results stop drastically changing. For example, if you run 100 replication and then 250 replication and the results alter drastically (the significance level changes) this implies that 100 replications were too low for your model. If the results do

not significantly alter than use the lower number of replication as it is adequate for your model (Gould & Pitblado, 2015). My model did not alter the significance level after 100 replications.

In model one, I ran a linear regression to predict educators' frequency of *Modeling* based on educators' years of experience. After I ran the regression, I checked assumptions, and found two violated assumptions: residuals were not normally distributed and a functional form problem. I reported findings after bootstrapping due to violations of assumptions. The results indicated there was a significant association between educators' years of experience and frequency of *Modeling*, (β= -3.49, $p <$. 001), suggesting that educators with more years of experience used *Modeling* less frequently than their colleagues with less experience. Educators with one additional year of experience were potentially associated with educators' who on average used 3.49 less utterances with examples of *Modeling*.

In model two, I ran a linear regression to predict educators' frequency of *Expansion* based on educators' years of experience. The model violated three assumptions: heteroskedasticity problem, residuals are not normally distributed, and a functional form problem. The findings from the bootstrapped model resulted in a non-significant association between educators' years of experience and frequency of *Expansion* (β= .002, p = .93) suggesting that years of experience did not significantly predict educators' use of *Expansion*.

In model three, I ran a linear regression to predict educators' frequency of *WH-questions* based on educators' years of experience. The model violated two assumptions: residuals are not normally distributed and functional form problem. The bootstrapped findings showed a non-significant association between educators' years of experience and frequency of *WH-questions* (β= .38, p=.09), indicating that years of experience did not significantly predict educators use of *WH-questions*.

In model four, I ran a linear regression to predict educators' frequency of *Scaffolding* based on educators' years of experience. The model violated three assumptions: heteroskedasticity problem, residuals are not normally distributed and functional form problem. The results from the model after bootstrapping indicated there was a significant association between educators' years of experience and frequency of *Scaffolding*, (β=.82, $p < .001$). Years of experience was significantly and positively associated with *Scaffolding*, which suggested that educators with more years of experience used *Scaffolding* more frequently than their colleagues with less experience. Educators with one additional year of experience were potentially associated with educators' who on average used 0.82 more utterances with examples of *Scaffolding*.

Summary of Model Results

Across these four models, educators' years of experience significantly predicted their frequency of *Modeling* and *Scaffolding*. Years of experience negatively associated with educators' frequency of *Modeling* and positively associated with educators' frequency of *Scaffolding.* Educators with more years of experience are less likely to use *Modeling* than their colleagues with less experience and are more likely to use *Scaffolding* than their colleagues with less experience. Educators' years of experience did not significantly predict their use of *Expansion* and *WH-questions*. Table 14 shows the associations between educators' years of experience and their use of language-supportive strategies. The data shows regression models with bootstrapping with 100 replications, and bias-corrected confidence intervals.

Table 15

Associations between Educators' Years of Experience and their Frequency of Language-Supportive Strategies

Variable	*B*	*SE*	*z*	*p*	95% CI	
					LL	UL
			Modeling			
Years of Experience	-3.49	0.25	-13.81	.00*	-4.00	-3.07
Observation Length	5.05	0.30	16.98	.00*	4.62	5.88
Constant	-83.76	13.45	-6.23	.00*	-124.16	-64.39
			Expansion			
Years of Experience	0.00	0.02	0.09	.93	-0.05	0.04
Observation Length	0.05	0.02	2.16	.03*	0.004	0.09
Constant	2.43	1.00	2.43	.02*	0.59	4.92
			WH- questions			
Years of Experience	0.38	0.22	1.71	.09	-0.16	0.64
Observation Length	0.18	0.18	1.00	.32	-0.25	0.53
Constant	28.37	7.04	4.03	.00*	15.13	45.57
			Scaffolding			
Years of Experience	0.82	0.16	5.00	.00*	0.20	1.08
Observation Length	-0.69	0.35	-1.99	.05	-1.63	-0.10
Constant	42.55	16.83	2.53	.01*	14.22	85.19

Note. *$p < .05$.

Level of Education

Table 16 depicts the results of four linear regressions. I ran four models to examine the extent to which educators' level of education independently predicted their frequency of *Modeling, Expansion, WH-questions* or *Scaffolding* Each model included the following variables, educators' level of education (predictor), observation length (covariate), and educators' frequency of *Modeling, Expansion, WH-questions* or *Scaffolding* (dependent variable). Because the educators' level of education is categorical, I created a dummy variable, which served as an effective option because the ten educators either completed an undergraduate degree or a master's degree. I coded undergraduate degree as zero and master's degree as one; undergraduate degree acted as the reference category.

The dependent variables were not normally distributed, influencing me to use bootstrapping. I used bootstrapping and ran 100, 250, 500, and 1,000 replications to compare the outcomes. I used 100 replications in three of the models and 250 replications in the model with *Scaffolding* as the dependent variable. I used the lowest number of replications where the results converged and did not significantly change with added replications (Gould & Pitblado, 2015). *Scaffolding* required 250 replications because the results differed significantly from 100 to 250 but did not alter with 500 replications (Gould & Pitblado). The histograms of these models showed normal distribution, suggesting the results are an accurate report of the association between level of education and *Modeling, Expansion, WH-questions,* or *Scaffolding.* The confidence intervals shown in the table are bias-corrected confidence intervals.

In model one, I ran a linear regression to assess whether educators' level of education predicted their frequency of *Modeling*. The model violated two assumptions: residuals are not normally distributed and a functional form problem. Because of violations I reported the findings

after bootstrapping. Education level was not predictive of *Modeling*; suggesting educators with a master's degree did not use *Modeling* more frequently in comparison to those with an undergraduate degree, (β=-6.71, p = .44).

In model two, I ran a linear regression to investigate whether educators' level of education predicted their frequency of *Expansion*. The model violated three assumptions: heteroskedasticity problem, functional form problem, and specification problem. The results after bootstrapping suggested educators' level of education was predictive of *Expansion*. Educators with a master's degree used *Expansion* at a significantly different frequency in comparison with those with an undergraduate degree, (β=-7.11, p < .001). The model suggests that educators with a master's degree were potentially associated with educators who on average used 7.11 less utterances coded as *Expansion*.

In model three, I ran a linear regression to examine whether educators' level of education predicted their frequency of *WH-questions*. This model violated three assumptions: residuals are not normally distributed, a specification problem, and a functional form problem. The results after bootstrapping showed education level was significantly associated with educators' frequency of *WH-questions* (β=- 49.21, p < .001). The model suggests that educators with a master's degree were potentially associated with educators who on average used 49.21 less utterances coded as *WH-questions* than their colleagues with an undergraduate degree.

In model four, I ran a linear regression to investigate whether educators' level of education predicted their frequency of *Scaffolding*. This model violated two assumptions: residuals are not normally distributed and a heteroskedasticity problem. The findings from the model after bootstrapping showed education level was significantly associated with educators' average frequency of *Scaffolding* (β=16.74, p= 0.003). This model suggests that educators with a

master's degree were potentially associated with educators who on average used 16.74 more utterances coded as *Scaffolding* than their colleagues with an undergraduate degree.

Summary of Model Results

Because I fit four models with each of the strategies serving as the dependent variable, I was able to assess and analyze whether a master's degree associated with educators' frequency of *Modeling, Expansion, WH-questions,* and *Scaffolding* when controlling for observation length. The findings revealed, educators with a higher degree, used *Scaffolding* more frequently than their colleagues with an undergraduate degree. Educators with a master's degree used *Expansion* and *WH-questions* significantly less frequently than their colleagues with an undergraduate degree and there is no significant difference between the two level of educations in their use of *Modeling.* Furthermore, for these ten educators, having a master's degree does not appear to benefit their use of language-supportive strategies during instructional time in the kindergarten classroom.

Table 16

Associations between Educators' Level of Experience and their Frequency of Language-Supportive Strategies

Variable	*B*	*SE*	*z*	*p*	95% CI	
					LL	UL
Modeling						
Master's Degree	-6.71	8.66	-0.77	.44	-24.75	10.80
Observation Length	3.23	0.57	5.72	.00*	2.26	4.40
Constant	-53.91	25.32	-2.13	.03*	-104.87	-8.39
Expansion						
Master's Degree	-7.11	0.77	-9.19	.00*	-8.28	-5.27
Observation Length	-0.32	0.05	-7.06	.00*	-0.39	-0.20
Constant	20.69	2.24	9.23	.00*	14.57	23.84
Wh- questions						
Master's Degree	-49.21	1.98	-24.80	.00*	-52.11	-45.13
Observation Length	-2.25	0.17	-12.89	.00*	-2.51	-1.85
Constant	153.35	7.77	19.73	.00*	136.29	165.50
Scaffolding						
Master's Degree	16.75	5.66	2.96	.00*	4.84	26.98
Observation Length	0.54	0.36	1.48	.14	-0.38	1.04
Constant	-3.42	16.85	-0.20	0.84	-25.60	38.35

Note. * $p < .05$.

Educators' Frequency of Language-Supportive Strategies and Child Language Outcomes

My third research question was: Are the frequencies of kindergarten educators' use of language-supportive strategies (*Modeling, Expansion, WH-questions,* and *Scaffolding*) associated with child language outcomes (*Expressive Vocabulary, Expressive Syntax, Receptive Vocabulary*, and *Receptive Syntax*) when controlling for child-level (cognitive ability and gender) and teacher-level (level of education, years of experience, and observation length) covariates? The data in Table 17 shows the Spearman correlations between educators' frequency of language-supportive strategies (*Modeling, Expansion, WH-questions,* and *Scaffolding)*, child language outcomes (*Expressive Vocabulary, Expressive Syntax, Receptive Vocabulary*, and *Receptive Syntax),* and covariates (educators' years of experience, level of education, and observation length and child cognitive ability and gender). I used Spearman correlations to assess all associations between the variables and covariates mentioned above because *Modeling, Expansion, WH-questions,* and *Scaffolding* were not normally distributed (Bishara & Hittner, 2012; Chen & Popovich, 2002).

I ran four path models to examine the extent to which educators' use of *Modeling, Expansion, WH-questions,* and *Scaffolding* are associated with four child language outcomes (*Expressive Vocabulary, Expressive Syntax, Receptive Vocabulary*, and *Receptive Syntax)*. Each model included the following variables: *Modeling, Expansion, WH-questions*, or *Scaffolding* (predictor), child cognitive ability and gender and educators' level of education, years of experience, and observation length (covariates), and *Expressive Vocabulary, Expressive Syntax, Receptive Vocabulary*, and *Receptive Syntax* (dependent variables). Because child *Expressive Syntax* was not a normally distributed variable, I used the syntax, ladder, which searched a subset of the ladder of powers (Tukey, 1977) to transform the variable into a normally distributed

variable. I used the transformed variable in all four path models. I calculated the four path models with the maximum likelihood estimator (Myung, 2003) and accounted for educator-level variance by using cluster-robust standard errors (White, 1982). The data in Table 16 shows the estimates for model predictors and covariates in each of the four models.

Table 17

Path Model Depicting Relations between Educator Practices and Child Language

Model	Predictors	Covariates	Expressive Vocabulary			Expressive Syntax			Receptive Vocabulary			Receptive Syntax		
			B	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*	*B*	*SE*	*p*
1														
		Child Gender	-1.02	.47	.03*	.53	9.09	.95	.51	.53	.33	-.61	.60	.31
		Matrix Reasoning	.12	.05	.02*	3.10	.75	.00*	.15	.04	.00*	.20	.09	.02*
		Digit Span	.13	.06	.03*	1.09	.73	.14	.09	.04	.03*	.14	.07	.04*
		Years of Experience	-.05	.03	.11	.25	.60	.68	-.01	.02	.77	.07	.04	.06
		Level of Education	-.03	.61	.96	-.14	11.9	.99	-.70	.64	.28	1.17	1.06	.27
		Observation Length	.06	.04	.17	-.43	.98	.66	-.06	.04	.18	.00	.08	.96
	Modeling		-.00	.00	.59	.14	.08	.09	-.01	.01	.23	.00	.01	.90
2														
		Child Gender	-.96	.46	.04*	.19	8.72	.98	.60	.49	.23	-.54	.57	.34
		Matrix Reasoning	.12	.05	.01*	3.26	.79	.00*	.15	.04	.00*	.21	.10	.02*
		Digit Span	.13	.06	.03*	1.11	.73	.13	.09	.04	.04*	.14	.07	.05
		Years of Experience	-.04	.02	.07	-.01	.32	.98	.02	.14	.12	.09	.02	.00*
		Level of Education	-1.05	.66	.11	-27.5	7.75	.00*	-1.57	.51	.00*	-1.45	.70	.04*
		Observation Length	-.00	.04	.92	-1.08	.40	.01*	-.13	.03	.00*	-.12	.04	.00*
	Expansion		-.14	.06	.02*	-3.85	.52	.00*	-.11	.07	.09	-.36	.07	.00*
3														

		Child Gender	-.99	.46	.03*	-.67	9.11	.94	.57	.51	.26	-.61	.57	.28
		Matrix Reasoning	.12	.05	.02*	3.15	.77	.00*	.15	.04	.00*	.21	.08	.01*
		Digit Span	.13	.06	.04*	1.11	.75	.14	.09	.04	.04*	.15	.07	.04*
		Years of Experience	-.04	.02	.05	.06	.41	.88	.03	.03	.42	.15	.03	.00*
		Level of Education	-.01	1.35	.96	-18.4	16.0	.25	-1.47	1.51	.33	-4.02	1.21	.00*
		Observation Length	.04	.07	.54	-.70	.80	.39	-.13	.08	.11	-.26	.06	.00*
	WH-questions		-.00	.03	.99	-.37	.30	.22	-.01	.03	.62	-.10	.03	.00*
4														
		Child Gender	-.10	.45	.03*	-.68	9.09	.94	.57	.50	.25	-.63	.58	.28
		Matrix Reasoning	.11	.05	.02*	3.09	.77	.00*	.15	.04	.00*	.20	.09	.02*
		Digit Span	.13	.06	.04*	1.02	.74	.17	.08	.05	.07	.14	.07	.05
		Years of Experience	-.05	.02	.05	-.27	.47	.57	.01	.01	.46	.07	.02	.00*
		Level of Education	-.14	.53	.79	.04	11.2	.99	-.93	.51	.07	1.25	1.12	.27
		Observation Length	.04	.04	.24	.32	.67	.64	-.09	.03	.00*	.01	.07	.86
	Scaffolding		.01	,01	,24	.07	.12	.56	.01	.00	.00*	-.01	.01	.54

Note. *$p < .05$.

In model one, I ran a path analysis to examine the association between educators' frequency of *Modeling* and child *Expressive Vocabulary*, *Expressive Syntax*, *Receptive Vocabulary*, and *Receptive Syntax* while controlling for educators' years of experience, level of education, and observation length and children's gender and cognitive ability (see Figure 2). The results of this model showed a non-significant association between educators' frequency of *Modeling* and child *Expressive Vocabulary* (β=-0.00, p= 0.59) , *Expressive Syntax* (β=0.14, p= < .05), *Receptive Vocabulary* (β=-0.01, p <.05), and *Receptive Syntax* (β=0.00, p= 0.90).

In model two, I used the same model structure, replacing *Modeling* with *Expansion* (see Figure 3). Educators' frequency of *Expansion* was significantly associated with child *Expressive Vocabulary* (β=-0.14, p= <.05), *Expressive Syntax* (β=-3.85, p <.001), and *Receptive Syntax* (β=-.36, p >.001). The model suggested that educators who used utterances with *Expansion* more frequently were potentially associated with children who scored 0.14 points lower on *Expressive Vocabulary*, 3.85 points lower on *Expressive Syntax*, and 0.36 points lower on *Receptive Syntax* than their peers. Educators' use of *Expansion* was not associated with child *Receptive Vocabulary* (β=-0.11, p= 0.09).

In model three, I ran a path analysis to investigate the associations between educators' frequency of *WH-questions* and child E*xpressive Vocabulary*, *Expressive Syntax*, *Receptive Vocabulary*, and *Receptive Syntax* when controlling for educators' level of education, years of experience, and observation length and children's gender and cognitive ability (see Figure 4). Educators' frequency of *WH-questions* was significantly and negatively associated with child *Receptive Syntax* (β=-1.0, p <.01). The model suggested that educators who used more utterances with *WH-questions* were potentially associated with children who scored 1.0 point less on *Receptive Syntax*. Educators' frequency of *WH-questions* did not significantly associate

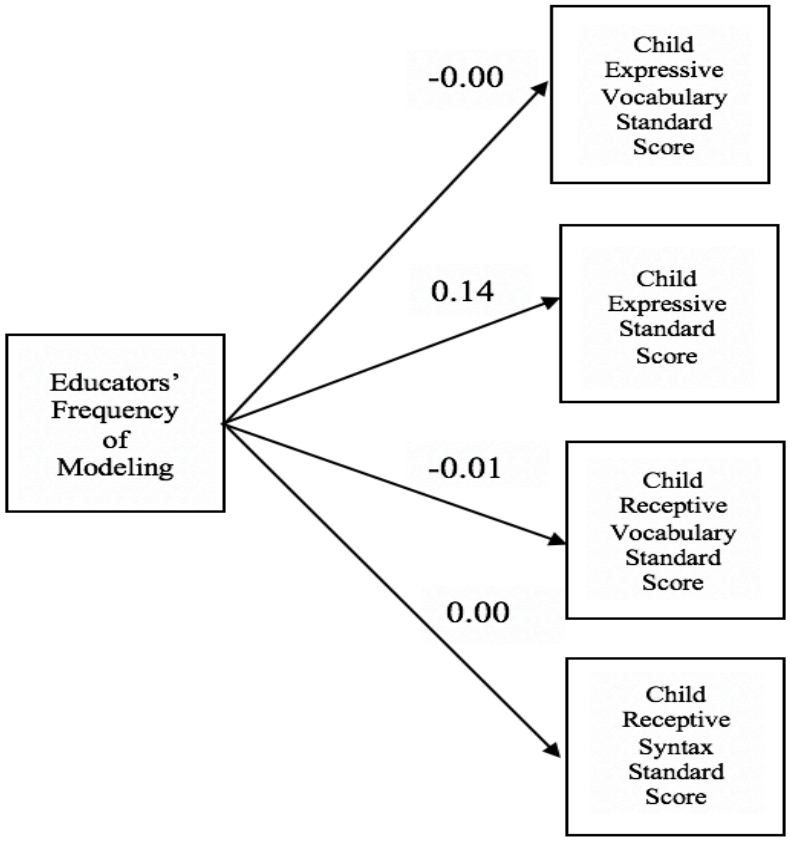
with *Expressive Vocabulary* (β=-0.00, *p*= 0.99), *Expressive Syntax* (β=-0.37, *p*= 0.22), and *Receptive Vocabulary* (β=-0.01, *p*= 0.62).

In model four, I ran a path analysis to examine the associations between educators' frequency of *Scaffolding* and child *Expressive Vocabulary*, *Expressive Syntax*, *Receptive Vocabulary*, and *Receptive Syntax* when controlling for educators' level of education, years of experience, and observation length and children's gender and cognitive ability (see Figure 5). Educators' frequency of *Scaffolding* was positively and significantly associated with child *Receptive Vocabulary* (β=0.01, *p* <.05). The model suggested that educators' who used utterances with Scaffolding more frequently were potentially associated with children who scored 0.01 points higher on their *Receptive Vocabulary*. Educators' frequency of *Scaffolding* did not significantly associate with child *Expressive Vocabulary* (β=0.01, *p*= 0.24), *Expressive Syntax* (β=0.07, *p*= 0.56), or *Receptive Syntax* (β=-0.01, *p*= 0.54).

Because I selected to run four path models, I assessed and analyzed the independent predictive values of *Modeling, Expansion, WH-questions,* and *Scaffolding* independently and their associations with four outcome variables, child *Expressive Vocabulary*, *Expressive Syntax*, *Receptive Vocabulary,* and *Receptive Syntax*. Unfortunately, educators 'frequency of *Modeling* did not predict any significant differences in child language outcomes. *Expansion* significantly and negatively predicted child *Expressive Vocabulary* and *Syntax* and *Receptive Syntax*. Additionally, educators' frequency of *WH- questions* also significantly and negatively predicted *Receptive Syntax* whereas educators' frequency of *Scaffolding* significantly and positively predicted child *Receptive Vocabulary*. The most important finding is educators' who use *Scaffolding* more frequently associated with higher child *Receptive Vocabulary* abilities.

Figure 2

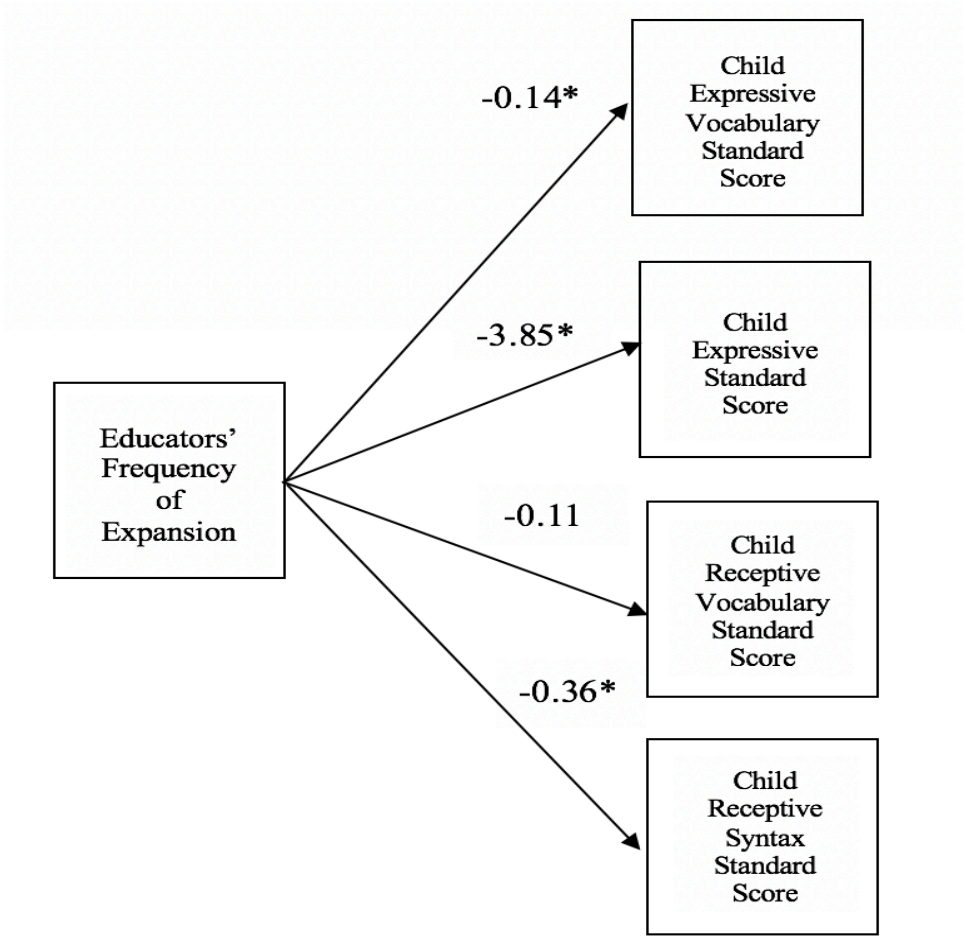
Modeling as a Predictor of Child Expressive and Receptive Vocabulary and Syntax



Note. The reported coefficients are standardized. Child *Expressive Vocabulary* and *Syntax* was measured by the TEXL and *Receptive Vocabulary* and *Syntax* was measured by the TACL-4. This model accounted for educator-level covariates (years of experiences, level of education, and observation length) and child-level covariates (cognitive ability and gender). *$p < .05$.

Figure 3

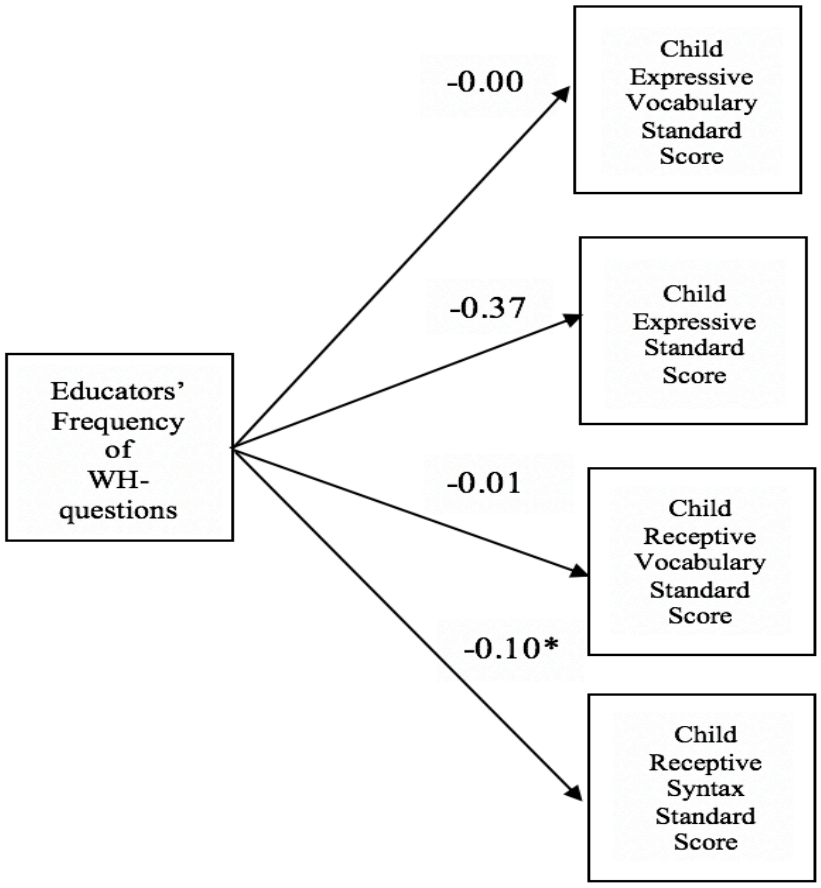
Expansion as a Predictor of Child Expressive and Receptive Vocabulary and Syntax



Note. The reported coefficients are standardized. Child *Expressive Vocabulary* and *Syntax* was measured by the TEXL and *Receptive Vocabulary* and *Syntax* was measured by the TACL-4. This model accounted for educator-level covariates (years of experiences, level of education, and observation length) and child-level covariates (cognitive ability and gender). *$p < .05$.

Figure 4

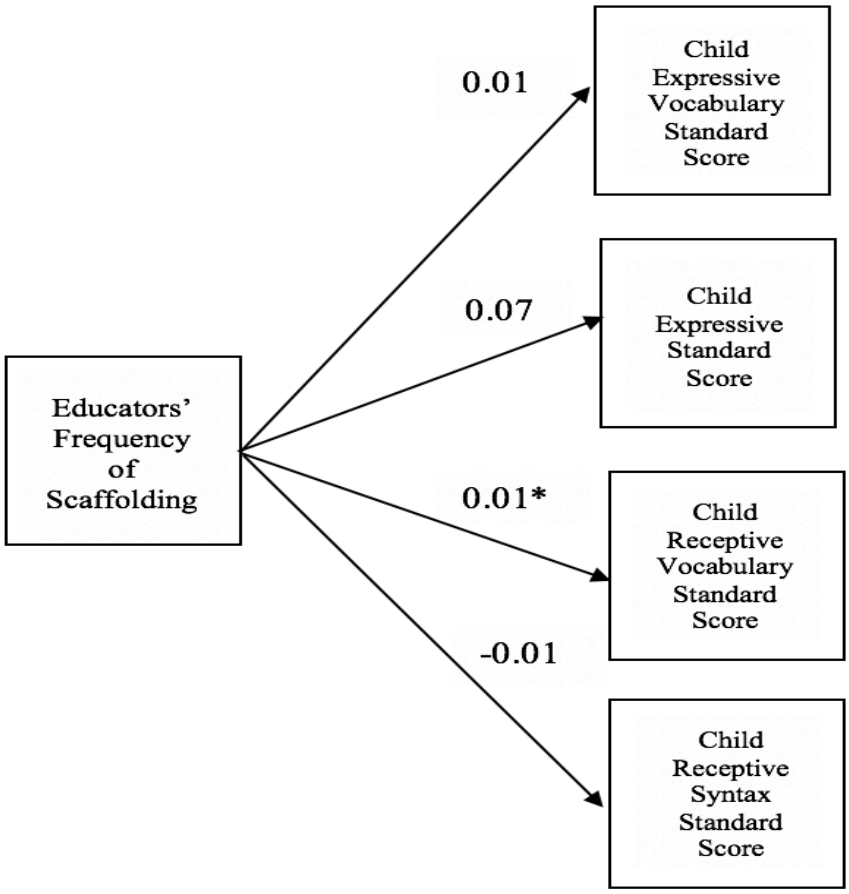
WH-questions as a Predictor of Child Expressive and Receptive Vocabulary and Syntax



Note. The reported coefficients are standardized. Child *Expressive Vocabulary* and *Syntax* was measured by the TEXL and *Receptive Vocabulary* and *Syntax* was measured by the TACL-4. This model accounted for educator-level covariates (years of experiences, level of education, and observation length) and child-level covariates (cognitive ability and gender). *$p < .05$.

Figure 5

Scaffolding as a Predictor of Child Expressive and Receptive Vocabulary and Syntax



Note. The reported coefficients are standardized. Child *Expressive Vocabulary* and *Syntax* was measured by the TEXL and *Receptive Vocabulary* and *Syntax* was measured by the TACL-4. This model accounted for educator-level covariates (years of experiences, level of education, and observation length) and child-level covariates (cognitive ability and gender). *$p < .05$.

Chapter 5

Discussion

The goal of this study was to investigate three areas regarding kindergarten educators' use of language-supportive strategies during instructional time. First, I examined kindergarten educators' frequency of language-supportive strategies through observational data. I ran correlational analyses and examined descriptive statistics (mean, standard deviation, and range) to assess educators' average frequency of individual language-supportive strategies. Second, I assessed whether kindergarten educators' years of experience and level of education predicted their frequency of *Modeling, Expansion, WH-questions*, and *Scaffolding*. I ran eight linear regressions with bootstrapping and assessed their standardized beta weights and significance levels to report associations. Third, I investigated educators' frequency of *Modeling, Expansion, WH-questions*, and *Scaffolding* and their associations with child *Expressive Vocabulary, Expressive Syntax, Receptive Vocabulary,* and *Receptive Syntax*. I ran four path analyses and examined their standardized beta weights and significance levels to report associations. This study provides preliminary results on kindergarten educators' use of language-supportive strategies as well as which strategies predicted better child language outcomes.

Frequency of Language-Supportive Strategies

Educators use of *Modeling* benefits children's language abilities because it provides children with an example of an ideal response (Hoff, 2003). Studies reported that educators' use of *Modeling* increases child comprehension, verbal expressions of higher order language, and vocabulary (Cabell et al., 2015; Justice et al., 2018). In previous literature, when researchers

defined *Modeling* they typically did not expand on the different subcategories of *Modeling,* but rather defined it broadly. In this study, I expanded on and explore educators' frequency of four different types of *Modelin*g: (1) general modeling, (2) vocabulary modeling, (3) alphabet modeling, and (4) route instruction modeling.

I coded educators' utterances and examined their frequency of general modeling, vocabulary modeling, alphabet modeling, and route instruction modeling. In addition, I combined all four types into one variable, *Modeling*, and investigated the combined frequency. Because I explored the different subcategories of *Modeling* this study has the potential to provide the field with a further examination into educators' true use of *Modeling*. I found the majority of educators' use of *Modeling* was alphabet and route instruction modeling. These two subcategories of *Modeling* are important to the kindergarten curriculum because: (1) alphabet modeling assists in alphabet awareness which is a kindergarten skill, and (2) route instruction modeling provides children a means to understand directions. However, alphabet and route instruction modeling do not provide children examples of complex syntax, derivational and inflectional morphemes, or novel vocabulary (Cabell et al., 2015; Roberts, 2003). Educators' use of general modeling and vocabulary modeling provide children with examples of ideal responses, which may include higher order language, syntactical complexity, and novel vocabulary terms (Justice et al., 2018). Because educators used alphabet and route instruction modeling more frequently there is a higher likelihood their children were not exposed to utterances with examples of novel vocabulary, complex syntax, and derivational and inflectional morphemes.

Expansion, recasting, and repetition are similar strategies in that they follow a child's utterance. For example, (1) *Expansion* elaborates on and lengthens a child's original utterance,

(2) recasting rephrases a child's utterance to ensure syntactical accuracy, and (3) repetition repeats a child's utterance (Fey et al, 1993). In this study, educators used repetition most frequently followed by recasting and then *Expansion*. Previous studies reported findings of educators' minimal use of *Expansion* during child-initiated exchanges and their increased use of less stimulating and didactic exchanges (Bratsch-Hines et al., 2019; Justice et al., 2013). Recasting and *Expansion* provide children a direct example of the differences between their language form and an adult's more complex language form (Justice et al., 2018; Proctor-Williams & Fey, 2007). Because *Expansion* provides children with a comparison, it can support both grammatical and vocabulary growth (Bratsch-Hines et al., 2019; Cabell et al.). This direct comparison is important for grammatical development because it provides children with an example of correct sentence or clause structure.

Expansion allows for the creation of a child-educator exchange or a multi-turn conversation to occur (Cabell et al., 2015). By increasing utterances with examples of *Expansion,* educators have the potential to increase the frequency of their exchanges and multi-turn conversations with children (Bratsch-Hines et al., 2019; Dickinson et al., 2006). An increase in educators' exchanges with children and utterances using *Expansion* would increase the likelihood of children's gains in vocabulary and grammar development (Cabell et al., 2015; Dickson et al.). Increasing the use of *Expansion* can, in turn, replace the use of non-language-supportive strategies (e.g., directive statements) and less stimulating comments, allowing for more child-initiated verbal exchanges.

Open-ended questions support child language development, and in turn, help establish a high-quality language learning environment (Justice et al., 2009; Pentimonti et al., 2017; Wasik et al., 2006; Wasik & Hindman, 2011). Similar to *Expansion,* an increase in educators'

utterances with examples of open-ended questions may support child vocabulary gains. This is particularly important, because open-ended questions are likely to contribute to children's vocabulary growth over any other language-supportive strategy (Dickinson & Tabors, 2001; Dickinson & Porche, 2011; Hindman et al.., 2019).

In this study, I assessed educators' frequency of both open-ended questions and close-ended questions in order to compare their use. Unfortunately, educators used close-ended questions most frequently of all language-supportive strategies. Close-ended questions do not provide the same opportunity as open-ended questions for children to talk or practice their narrative skills and complex syntax (Justice at al., 2018). Because close-ended questions require a one- or two-word response they do not provide children an opportunity to use information in a contextual sentence (Justice et al., 2018; Wasik et al, 2006).

The 10 educators used an average of 0.42 utterances with open-ended questions. This finding is problematic as open-ended questions provide children with an opportunity to talk, contribute, and even decide the direction of the conversation (Hindman et al., 2019). Increasing children's opportunities to talk and contribute also gives them the initiative to select and use their own vocabulary (Hindman et al.). My data adds to the current literature, suggesting that kindergarten educators may not be providing a sufficient language learning environment in their classrooms. This also corroborates the research in early childhood classrooms (Justice et al, 2007; Lee & Kinzie, 2011). Encouraging educators to use open-ended questions more frequently may increase the likelihood that children will engage in more exchanges with educators as well as demonstrate growth in their vocabulary development (Hindman et al.).

Previous literature defined *Scaffolding* as a dynamic process which helps children complete tasks beyond their current abilities (Bruner, 1981; Pentimonti et al., 2017). *Scaffolding*

requires educators to implement a hierarchy. They begin with high support strategies and when children's skills improve, they fade into low support strategies (Pentimonti et al., 2017; Wood et al., 1976). The following *Scaffolding* strategies were categorized as low support, generalizing, reasoning, and predicting. Low support strategies indicate educators provide less support for the child to obtain the correct answer. The following were categorized as high support, co-participating and reducing choices. High support strategies indicate educators provide more support to ensure the child's success (Pentimonti et al.). In this study, I investigated educators' average frequency of the five types and compared high and low support. Additionally, I combined all five types into one variable, *Scaffolding*.

I found educators used more high support strategies than low support strategies; my study's results were contradictory to previous studies. Previous literature reported that educators used low support strategies more frequently than high support strategies (Pentimonti et al., 2017; Pentimonti & Justice, 2010). Because I included reading as an activity that met the criteria for instructional time, I hypothesized educators' use of predicting would be higher (Pentimonti et al., 2017; Pentimonti & Justice, 2010). However, I found educators did not implement any utterances with examples of predicting. Because of this educators' overall use of low support strategies decreased. On the other hand, my decision to code reading together as co-participating increased educators' frequency of high support scaffolding.

Educators overall use of *Scaffolding* was lower than anticipated. This outcome may be explained by the following reasons. First, my decision to include reading may have influenced educators' frequency of *Scaffolding* because *Scaffolding* requires educators to provide support relative to each child's skill level and the difficulty of the task (Berk & Winsler, 1999; Pentimonti et al., 2017). Because reading is a group activity, there is a higher possibility that the

educators were not able to use *Scaffolding* strategies to adapt and accommodate individual children. Second, *Scaffolding* occurs most frequently with older children and in one-on-one settings (Rodgers 2005). The educators in this study may have shown low use of *Scaffolding* because of the younger age of the children, or because I observed during group instructional time when educators were not working in one-on-one settings (Rodgers 2005).

It is possible that early childhood and elementary educators do not receive adequate training on how to effectively use *Scaffolding* because it is not commonly implemented in whole-group settings or with younger children (Pentimonti et al., 2017; Rodgers 2005). Increasing training on *Scaffolding* may benefit educators in implementing dynamic processes (Pentimonti et al.). In addition, children may receive more specific prompts based off their current skillset rather than generic prompts that may be under or over their current abilities.

Language-Supportive Strategies and Educator Demographics

The ten educators exhibited a wide range of experience between four and 26 years with an average of 13.6 years. I found years of experience predicted educators' frequency of *Scaffolding*, where more years of experience predicted higher levels of *Scaffolding*. In contrast, I found years of experience predicted educators' frequency of *Modeling*, where more years of experience predicted lower levels of *Modeling*. Years of experience did not significantly predict frequency of *Expansion* and *WH-questions*.

Previous studies reported educators' years of experience to be unrelated to their use of language-supportive strategies (Justice et al., 2008; Piasta et al., 2012; Wasik et al, 2006). In the current study, educators with more years of experiences potentially predicted their frequency of *Modeling* and *Scaffolding* but not by a significant amount. Educators with more years of experience were found to use 3.49 less utterances with *Modeling* and 0.82 more utterances with

Scaffolding. This finding suggests years of experiences does not practically influence educators' frequency of language-supportive strategies.

Further evidence has suggested that professional developments and trainings may be a beneficial method to increase educators' frequencies of language-support strategies despite their years of experience (Hamre et al., 2012; Justice et al., 2018; Pentimonti et al., 2017). Because of these intervention studies I view the current study's findings as positive. These findings suggest that educators' years of experience may not influence their responsivity to professional developments or trainings. Therefore, professional development and training opportunities may provide all educators with a means to increase their frequency of language-supportive strategies and, thereby, promote children's language ability.

The study's sample included six educators who completed an undergraduate degree and four who completed a master's degree in elementary education. I found level of education was associated with frequency of *Scaffolding,* where a higher level of education predicted more utterances with examples of *Scaffolding*. On the other hand, I found level of education was associated with frequency of *WH-questions* and *Expansion*, where a higher level of education predicted less utterances with examples of *WH-questions* and *Expansion.* Level of education was not associated with frequency of *Modeling.* Overall these findings differ from those reported in previous research. Piasta and colleagues (2017) reported educators with higher levels of education were more likely to effectively implement strategies to create a language rich environment. However, previous studies examined preschool populations and separated their early childhood educators into two subsamples, educators with a high-school or an associate degree and educators with an undergraduate or master's degree. In contrast, my study did not include any educators with a high school or associate degree. This difference occurred because

the previous studies examined preschool populations where the minimum degree required is an associate degree (Barnett, 2003). My study included kindergarten educators where the minimum required degree is an undergraduate degree (U.S. Department of Education, 2008).

Piasta and colleagues (2017) reported educators with an undergraduate or master's degree were more likely to implement strategies to develop a high-quality language learning environment than those with an associate degree. Because I assessed kindergarten educators, I was not able to compare educators with an associate degree verse those with an undergraduate or master's degree like previous studies. There is a greater likelihood that kindergarten educators would be more likely to implement language-supportive strategies learned during a professional development or training because of their level of education (Piasta et al., 2017).

Language-Supportive Strategies and Child Language Outcomes

I found educators' frequency of *Modeling* was not associated with children's language outcomes. In order to maintain sufficient power for my analyses, I needed to use less variables, which influenced me to combine all four types of modeling (general modeling, vocabulary modeling, alphabet modeling, and route instruction modeling) into one variable, *Modeling.* Because of my decision to combine all four types of modeling into one variable I potentially influenced the outcomes of the associations. For example, the inclusion of alphabet modeling and route instruction modeling may have impacted my associations between educators' frequency of *Modeling* and child language outcomes as they do not support children's language growth (Cabell et al., 2015; Roberts, 2003).

Additionally, because educators used more utterances with alphabet modeling and route instruction modeling, it is possible their children received less exposure to novel vocabulary and complex syntax. Increasing educators' use of general and vocabulary modeling may provide

their children with more opportunities to exposure of novel vocabulary and complex syntax. Despite the lack of associations, my findings provide critical information about how frequently educators use all areas of *Modeling*. My data show that educators are not frequently using two important areas of *Modeling,* and this is essential because they are likely stronger predictors of child language outcomes (Hamre et al., 2012; Hoff 2003; Huttenlocher et al., 2002).

This finding is not congruent with previous literature conducted in preschool classrooms, where educators' use of *Modeling* was a significant predictor of language development and growth. Exposing children to utterances with examples of *Modeling* predicts increases in children's *Expressive Syntax* (Hoff 2003; Huttenlocher et al., 2002). There are several differences between the current study and previous studies, which may provide additional explanations to my findings. Hamre and colleagues (2012) observed preschool educators in their classroom during a literacy and language lesson after an intervention that targeted their use of language-supportive strategies. The researchers aimed to investigate the effectiveness of their intervention rather than educators' foundational use of language-supportive strategies. They used an aggregate measure, the Classroom Assessment Scoring System (CLASS; Pianta et al., 2007), to report educators' use of language modeling. The language modeling component of the measure included educators' use of *Modeling*, open-ended questions, and *Expansion* (Pianta et al.). Because they used an aggregate measure which combined educators' use of *Modeling*, open-ended questions, and *Expansion* the researchers cannot report the educators' true use of *Modeling*. Additionally, the CLASS is a rating scale which asks the observer to judge and rate the educators use of language-supportive strategies on a seven-point scale. In contrast, I aimed to investigate educators' baseline *Modeling* in order to show their average daily use during instructional sessions. I used a raw frequency count to evaluate educators' true use of *Modeling*

without the potential bias of a rating scale. However, Hamre and colleagues reported positive benefits from their intervention study. Preschool educators who completed the intervention demonstrated higher scores on language modeling than their colleagues in the control group (Hamre et al.). Their findings provide important information regarding the possible benefit of interventions which target language-supportive strategies.

Educators' use of *Expansion* was associated with children's language outcomes, where higher rates of *Expansion* predicted lower scores. On average, the educators' verbalized 4.48 utterances with *Expansion* out of an average of 596.52 total utterances. This finding potentially indicates that there were not enough examples of *Expansion* to show a possible association with higher scores on child language outcomes.

Previous studies reported the benefits of educators' use of *Expansion* because it exposes children to complex syntax, novel vocabulary, and provides them a direct comparison between their language and their educators' language (Proctor-Williams & Fey,2007; Roberts & Kaiser, 2015). Similar to the previous literature that examined preschool educators' use of *Modeling,* the studies which investigated preschool educators' use of *Expansion* were intervention studies. For example, Roberts and Kaiser (2015) implemented a randomized control trial in which they provided caregivers with 28 instructional sessions on how to effectively implement *Expansion.* The researchers observed the caregivers use of *Expansion* during a one-on-one play-based session in a clinic environment (Roberts & Kaiser, 2015). Their findings showed significant differences between their intervention and control groups. Caregivers from the control group used four examples of *Expansion* whereas caregivers from the experimental group used 42 examples of *Expansion* during a 20-minute play-based session.

In the current study, I evaluated kindergarten educators' baseline use of *Expansion*. On average, the kindergarten educators used 4.48 utterances with examples of *Expansion* in an average of 41 minutes. This finding is similar to that of the control group in Robert and Kaiser's study. The caregivers in their control group used four examples of *Expansion* in 20 minutes. However, Roberts and Kaiser observed the caregivers during a one-on-one play-based session. In contrast, I selected to observe the educators during whole-group instructional time. This difference may explain why the caregivers used approximately the same number of utterances with examples of *Expansion* as the educators in half the time.

Roberts and Kaiser aimed to examine the effectiveness of an intervention, which targeted caregivers' use of language-supportive strategies. The caregivers in the intervention group demonstrated more examples of *Expansion* than the caregivers in the control group. Additionally, the caregivers' use of *Expansion* in the experimental group predicted better child receptive language skills. These findings provide important information as they demonstrate the potential benefits of intervention. Based on Roberts and Kaiser's findings, there is potential with professional development, an intervention, or training that kindergarten educators may increase their frequency of *Expansion* which, in turn, may improve child language outcomes.

Educators' frequency of *WH-questions* was associated with child *Receptive Syntax,* where higher rates of *WH-questions* predicted lower scores. Although the association was significant, the coefficient showed a small change of one point in child *Receptive Syntax*. Educators who used higher rates of *WH-questions* associated with children who scored one-point lower on their Receptive Syntax standard score as measured by the TACL-4. This small difference does not provide practical evidence that educators' frequency of *WH-questions* predicts children's *Receptive Syntax*.

During this study, I assessed educators' frequency of both open-ended and close-ended questions. On average, educators used 39.34 more utterances with close-ended questions than open-ended questions. In order to maintain sufficient power, I decided to categorize open- ended questions and close-ended questions into one variable, *WH-questions.* Because I used a combined variable, I cannot report the association between educators' use of open-ended questions and child language outcomes. There is potential that educators' use of *WH-questions* was not associated to better child language outcomes because educators used more utterances with close-ended questions. Close-ended questions do not promote children's language growth in the same manner as educators' use of open-ended questions (Cabell et al., 2015). Children exposed to higher levels of open-ended questions have a greater likelihood of exposure to vocabulary and syntactical growth (Cabell et al., 2015; Justice et al., 2018) and, in turn, may produce higher scores on child language assessments.

Like the other child-level variables, this finding is not congruent with previous literature conducted in preschool classrooms, where educators' use of *WH- questions* was a significant predictor of language development and growth (Adamson et al., 2004; Cabell et al., 2015). Cabell and colleagues implemented a professional development to inform educators on how to effectively implement language-supportive strategies (open-ended questions and extension). The researchers observed educators' use of open-ended questions and extension during play-based activities in the classroom. The findings showed educators in the intervention group, who completed the professional development, increased their use of open-ended questions and extension in comparison to those in the control group. Additionally, Cabell and colleagues reported preschool educators' use of open-ended questions and extension was associated with children's vocabulary growth.

In the current study, I assessed educators' use of *WH-questions* whereas Cabell and colleagues (2015) evaluated educators' use of open-ended questions and extension. Thus, I cannot compare educators' true use of open-ended questions and their associations with child language outcomes. However, their intervention study showed that professional developments can increase educators' use of open-ended questions (Cabell et al.). Further, evidence leads me to believe with professional development or training kindergarten educators have the potential to increase their use of open-ended questions and, thereby, support child language growth in the classroom.

I found *Scaffolding* was associated with child *Receptive Vocabulary*, where higher rates of Scaffolding predicted higher scores. Pentimonti et al., (2017) reported significant associations between *Scaffolding* and vocabulary as well. A potential explanation for nonsignificant findings between educators' use of *Scaffolding* and child *Expressive Vocabulary, Expressive Syntax*, and *Receptive Syntax* is due to my decision to observe educators during whole-group instructional time. Previous literature reported educators use of *Scaffolding* occurred predominately in one-on-one settings (Roger, 2005), Additionally, Rodger reported educators used *Scaffolding* more with an older population of students. Rodgers' findings provide two possible rationales behind kindergarten educators' low use of *Scaffolding,* (1) I observed and collected data on their frequency of *Scaffolding* during whole group instruction and (2) they provide instruction to a younger population.

Pentimonti and colleagues (2017) extended work in this area by exploring preschool educators' use of six types of *Scaffolding.* The six types of *Scaffolding* included three high support strategies (co-participating, reducing choices, and eliciting), and three low support strategies (generalizing, predicting, and reasoning). Educators received professional development

on a curriculum, which targeted their use of *Scaffolding*. Pentimonti et al., observed educators' use of *Scaffolding* during their administration of the curriculum and found educators' use of *Scaffolding* predicted increases in child vocabulary (Pentimonti etl al., 2017), This study suggests two main ideas, (1) professional development benefited educators in understanding the hierarchy and sensitivity of *Scaffolding* strategies and (2) *Scaffolding* promotes better child language outcomes. I observed kindergarten educators' baseline use of *Scaffolding* and did not compare their use of high and low support strategies at three different time points throughout the year. The current study provides important information on kindergarten educators' baseline use of *Scaffolding* and associations to child language. When compared to previous literature, there is hope that with professional development kindergarten educators may increase their use of *Scaffolding* with younger populations in the classroom. Increasing educators' use of *Scaffolding* will likely increase child language outcomes as well as increase educators' ability to develop a skillset for implementing hierarchy prompting (Pentimonti et al., 2017; Wood et al., 1976).

The majority of the current literature explores preschool educators' use of language-supportive strategies post-intervention and their associations to better child language outcomes. These studies assessed and reported educators' use of language-supportive strategies during language or literacy-based sessions, play-based activities, or sessions with implementation of the targeted curriculum. In the current study, I explored educators' foundational level of language-supportive strategies during whole-group instructional time which included foundations, social studies, or literacy. Previous studies used aggregate measures to assess educators' use of language-supportive strategies (Cabell at al., 2015; Hamre et al., 2012; Pentimonti et al., 2017) whereas I used a raw frequency count to investigate educators' use of language-supportive strategies. The aggregate measure may show greater increases in educators' use of language-

supportive strategies because the strategies are combined together. In contrast, the current study's raw frequency counts remain as four separate variables, *Modeling, Expansion, WH-questions*, and *Expansion.* Because we used different means to assess educators' uses of language-supportive strategies it proves difficult to compare our outcomes and associations.

Educators' use of *Modeling, Expansion, WH-questions*, and *Expansion* did not associate to better child language outcomes in the same manner that previous literature reported. However, the current study revealed kindergarten educators' minimal use of language-supportive strategies during instructional time. This is important information as it provides support to why educators need to receive professional development, an intervention, or training on language-supportive strategies. Intervention studies provide additional support and rationale behind the potential benefits of professional developments and trainings to help educators increase their frequency of language-supportive strategies

Limitations

Several limitations should be accounted for when interpreting the results of this study. First, due to time restrictions and limited resources the small sample of 10 educators and 96 children participants reduced the power of the analyses. Originally, I proposed to include 100 children participants. However, due to attrition only 95 participants completed all portions of the study: three students withdrew from the study before the assessment phase began due to relocation, one participant was frequently absent, and one participant moved in the middle of the assessment phase. For purposes of the analyses, the study included her results on the TEXL and WISC-V.

Second, the observational data sessions varied in length. Observational session length and frequency varied per educator due to shorter periods of instructional time, interruptions in

instructional time (e.g., class bathroom breaks), and other reasons for lack of instruction such as showing of movies. In addition, one educator left in the middle of observational data collection for maternity leave. The length of sessions ranged from 30 minutes to 55 minutes in length. In an effort to minimize the influence of this limitation, I controlled for observational length in all analyses.

Third, because of a small sample size and a large number of variables I combined subcategories into one variable. For example, I categorized general modeling, vocabulary modeling, alphabet modeling, and route instructional modeling as *Modeling*, open-ended and close-ended questions as *WH- questions*, and generalizing, reasoning, predicting, co-participating, and reducing choices as *Scaffolding.* I created three combined variables to help maintain sufficient power. Despite this limitation, this study provided an initial step in analyzing educators' use of individual language-supportive strategies. I still reported individual frequencies for each strategy and did not use an aggregate measure to assess educators' overall use of language-supportive strategies.

Fourth, I created two aggregate variables, *Modeling* and *Scaffolding*, and their subgroups were not highly correlated. Direct modeling, vocabulary modeling, alphabet modeling, and route instruction modeling were not highly correlated, suggesting weak associations. These variables should not be combined into one aggregate variable, but rather they should be examined individually. In addition, generalizing, reasoning, co-participating, and reducing choices also were not highly correlated, indicating weak associations. Because these four individual variables were not associated, it is likely that there was a more appropriate grouping or aggregate variable. There is potential that the reported associations between educators' use of *Modeling* and

Scaffolding are not an accurate or true representation of these associations due to how I aggregated the variables.

Fifth, the children's demographic form did not include questions pertaining to their previous educational experiences or their caregivers' level of education. Because I did not collect data on whether or not the children participants attended preschool or an early childhood education program, I cannot account for the influence of their previous educational experiences on their current language ability. In addition, I cannot make comparisons between children who did and children who did not attend a preschool or childhood education program. The form did not ask questions with regards to the caregivers' education level. Therefore, I could not assess or discuss whether caregivers' education influenced children's language ability.

Sixth, I used norm-referenced assessments to examine child language and cognitive ability. Norm-referenced assessments may have measurement error, which includes instrumental, environmental, and observational errors. Additionally, children's results are potentially confounded because I may have assessed children on a challenging day, and I assessed children in a hallway with potential distractions. I selected to use norm-referenced assessments to decrease the likelihood of human error and bias. I used two language assessments, the TEXL and TACL- 4, which are norm- referenced off of children between the ages of three to 12;11. Because the children participants are between five and six years of age, I used the standard scores for both subtests and minimized human error. I used the WISC-V to assess children's cognitive skills, which is norm-referenced on children between the ages of six and 16. Sixty-five percent of the children participants were below six years of age, thus, I could not report the norm referenced data or convert the children's raw scores into standard scores.

Seventh, I observed educators during whole-group instructional time but did not observe during a specified subject area, which created contextual diversity in the data. Because of the diversity some educators' frequencies of an individual language-supportive strategy are higher based on the classroom activity. For example, educators who I observed during foundations are more likely to have higher frequencies of alphabet modeling, whereas those observed during book reading are likely to have higher frequencies of co-participating. Because of the variation in academic subjects and activities the results may not accurately portray an educators' typical use of a specific language-supportive strategy during instructional time. Additionally, because I did not assess educators' frequency of language-supportive strategies across different contexts, I am only able to provide a limited scope of educators' use of language-supportive strategies. I can only report educators' use of language-supportive strategies during instructional time. There is a possibility that educators may have used language-supportive strategies in higher frequencies in different contexts such as stations, small groups, or play-based lessons. If I observed kindergarten educators in a variety of contexts, my results may have been more congruent to the results reported in early childhood education literature.

Eighth, it is possible that not enough time passed for the educators' language-supportive strategies to positively or negatively influence their children's language ability. A long history of the literature reports how children's interactions and environments influence their language development and growth (Justice et al. 2018). Hoff's (2003) learning from input hypothesis discusses how properties in a child's language are dependent upon the exposure to those properties through child-directed speech. The frequency, duration, and consistency of these interactions and environments are an essential component for the child's language development

and growth. I attempted to account for this limitation by collecting educators' observational data during the fall of 2019 and administering child language assessments during the spring of 2020.

Ninth, we only double coded 25% of the transcripts for inter-rater reliability because of limited resources. The lead researcher and research assistant achieved 96% inter rater reliability but there is a possibility that bias occurred on the remaining 75% of the independently coded transcripts. The study tried to minimize this by having two speech-language pathologists code and double code the transcripts as they are most familiar with language-supportive strategies.

Lastly, I did not assess or transcribe child utterances or responses from the observational data collection periods. I solely transcribed and assessed educators' utterances. This is a limitation because I cannot report on how children responded to the educators' use of language-supportive strategies. In addition, I cannot examine details regarding educators' use of *Expansion* since this strategy required an initial child utterance. By examining child utterances, I would be able to report the average length educators increased children's utterances or how they expand on children's syntax.

Despite the limitations, this study provided an initial step in assessing educators' use of language-supportive strategies on an independent level rather than using an aggregate measure or combining to report language-supportive or not. Previous studies (e.g., Pentimonti et al., [2017]) have examined the effects of individual language- supportive strategies but did not examine multiple language-supportive strategies or report them individually. Because I assessed multiple language-supportive strategies, I was able to compare educators' frequencies of each individual strategy.

Future Research

This study provided an initial step in exploring kindergarten educators' baseline frequency of language-supportive strategies and their associations with child language outcomes. The majority of the previous literature implemented intervention studies and examined the early childhood population. The findings from this study suggest the need for future research in this area. Future research should aim to replicate this study with a larger sample size. A larger sample of educators would provide more statistical power, allowing future researchers to include more variables and separate the combined variables back into their individual subcategories. For example, instead of examining the combined variable, *Modeling*, researchers could assess educators' use of the four different types of modeling, (1) general modeling, (2) vocabulary modeling, (3) alphabet modeling, and (4) route instruction modeling.

In addition, I assessed the associations between the subgroups of *Modeling* and *Scaffolding* and revealed low correlation degrees, suggesting minimal support for combining them into aggregate variables. Future studies should examine direct modeling, vocabulary modeling, alphabet modeling, and route instruction modeling as well as generalizing, reasoning, co-participating, and reducing choices individually. Individual examination of these variables will provide more specific information on which types of *Modeling* and *Scaffolding* influence child language ability. Further, with individual examination researchers will get a more accurate and true representation of the associations between these variables and child language outcomes.

Future research should use factor analysis to make decisions about variable aggregation. Factor analysis is a statistical method that reduces a larger number of variables into fewer dimensions to simplify data (Acock, 2018). Researchers will be able to empirically determine if there is a set of underlying variables that explain the interrelations (Acock). This allows

researchers to combine underlying variables into one or more aggregate variables by showing the amount of variance that is shared among a set of variables. The factor analysis will also provide specific variance and error variance which will give information on any portion of variance that is not common amongst that set of variables (Acock). Thus, factor analysis will provide future researchers with supporting data on what variables to combine into factors and which variables to keep separate.

Future research should observe kindergarten educators in different contexts (e.g., small group, free play, small group, one-on-one, and literacy and language instruction) to obtain a more wholistic picture of their use of language-supportive strategies. Additionally, by examining a variety of contexts researchers could further compare kindergarten educators' use of language-supportive strategies to the previous preschool literature. The preschool literature observed early childhood educators primarily during play-based sessions and during literacy and language-based lessons (Cabell et al., 2015; Hamre et al., 2012; Roberts & Kaiser, 2015). Collecting observational data in a variety of contexts will allow researchers to compare across classroom contexts and report the frequencies of language -supportive strategies in each context.

Future research would benefit from conducting this study over a longer period of time. Educators' use of language-supportive strategies require time to influence child language development and growth. Future researchers should collect their educator observational data in the early fall and follow with child language assessments in late spring. By extending the length of the study researchers would allow a sufficient amount of time for a potential association to form between educators' use of language-supportive strategies and child language outcomes.

In the future, researchers should collect data pertaining to children's previous educational experiences and their caregivers' level of education. Data on children's exposure to preschool or

childhood education programs would allow researchers to control for or investigate whether previous educational exposure predicted child language outcomes. In the current study, I did not control for previous educational exposure, which may have increased bias in my findings. Additionally, researchers could provide comparisons between children with previous educational exposure and those without. Caregivers' level of education would provide data on the home environment as well as allow future researchers to assess whether caregivers' education level predicted child language outcomes.

Researchers should also examine child utterances and responses during observational data collection. This would provide researchers with more information on how children respond to educators' use of language-supportive strategies. It would also provide further information on educators' use *Expansion*. For example, how did the educator increase the child's utterance length or how to they increase the syntactical complexity.

Additionally, future researchers should include time stamps on educator and child utterances during the transcription process of their observational data. With the inclusion of time stamps researchers could investigate educators' use of wait time. In the current study, educators may have used higher rates of language-supportive strategies but did not provide enough wait time for children to respond between each strategy. Thus, suggesting an ineffective use of language-supportive strategies because they did not increase children's opportunities to talk and engage (Cabell et al., 2015). Further, wait time is an essential component to effectively implementing language-supportive strategies and needs to be further investigated in the kindergarten population.

Implications for Policy and Practice

Practice

This study provided the field with descriptive statistics on the frequencies of educators' baseline use of language-supportive strategies during instructional time, which has important implications for practice. This study provides support for the need to help kindergarten educators use language-supportive strategies during instructional time to promote children's language skills. However, creating the environment to increase their use of language-supportive strategies may not be pedagogical strategies that kindergarten educators are trained to use. Kindergarten educators do not have the appropriate training to establish a language rich environment and use a high frequency of language-supportive strategies during instructional time (Cunnignham et al., 2009).

Professional development or training opportunities for in-service educators are critical in improving kindergarten educators' use of language-supportive strategies. Early childhood intervention studies have demonstrated that professional developments can improve educators' use of language-supportive strategies and, in turn, support and improve children's language development (Cabell et al., 2015; Pentimonti et al., 2017; Roberts & Kaiser, 2015; Wasik & Hindman, 2011). The environment, curriculum, and daily routines of a preschool classroom may naturally encourage more frequent uses of language-supportive strategies. For example, a preschool classroom is more conducive to play-based learning as well as small group and one-on-one sessions. Therefore, professional developments or trainings need to accommodate the differences and provide content for kindergarten educators on how to use language-supportive strategies during instructional time and during curriculum-based learning.

Public early childhood programs tend to employ educators with limited education and experience (U.S. Department of Health and Human Services, 2016). In order to become an early childhood educator an individual must obtain an associate degree. Despite early childhood educators' minimal education and experience, professional developments and trainings have proven beneficial to increasing early childhood educators' use of language-supportive strategies (Cabell et al., 2015; Pentimonti et al., 2017; Roberts & Kaiser, 2015; Wasik & Hindman, 2011). Piasta and colleagues (2017) reported educators with higher levels of education tend to experience greater benefit from professional developments and trainings. Because kindergarten educators are required to have an undergraduate degree it is likely that they will benefit more from professional developments and trainings. Because early childhood professional developments and trainings demonstrated high success rates, I believe professional developments and trainings targeting kindergarten educators will increase their frequency of language-supportive strategies and encourage language growth in kindergarten children.

Professional developments and trainings for in-service kindergarten educators may be an important method of increasing the use language-supportive strategies. However, changes in pre-service trainings will help our future generation of kindergarten educators. Because the requirement is only an undergraduate degree, pre-service undergraduate programs need to include content on language-supportive strategies in their courses. Pre-service programs should not expect students will receive content on language-supportive strategies during their master's programs as not all students continue on to receive a master's degree before entering the field. In the current study, 60% of the educators do not hold a master's degree. It is essential to include lectures on the importance of language-supportive strategies as they support and promote child language development and growth. Further, this is of significant importance as children's

language ability is a foundational component to their success (Chow & Wehby, 2018). If undergraduate pre-service programs include content on language-supportive strategies the field can ensure all kindergarten are prepared to establish a language rich environment and support children's language.

Policy

According to national governing boards and government laws and mandates (Every Student Succeeds Act, 2014; Dickinson & Tabors, 2001; National Association for the Education of Young Children, 1998; No Child Left Behind, 2001) it is an educators' responsibility to ensure all children in their classroom succeed. To ensure educators are prepared to fulfil their responsibilities policymakers needs to support changes to educators' pre-service training. Educators' pre-service training should include content on the importance of and how to effectively implement language-supportive strategies. These changes may increase the likelihood of educators' establishment of a language rich environment, and in turn support children's language growth and their overall success.

Conclusion

In conclusion, the present study aimed to improve the field's understanding of the extent to which kindergarten educators used language-supportive strategies during instructional time. In addition to, providing information on which language-supportive strategies predicted better child language outcomes. Investigation into kindergarten educators' frequency of language-supportive strategy revealed that in comparison to their average total number of utterances educators do not frequently use language-supportive strategies during instructional time. Because of their low use of language-supportive strategies assessing associations to child language outcomes proved difficult and resulted in limited significant associations. These findings were not congruent with

previous literature conducted in preschool populations. However, the previous literature discussed throughout this paper implemented intervention studies and reported educators' use of language-supportive strategies using aggregate measures (Hamre et al., 2012; Pentimonti et al., 2017; Roberts & Kaiser, 2015). However, the intervention studies provide further evidence regarding the potential benefits to changes in pre-service training and professional developments. Thus, there is potential that with professional developments, or changes to pre-service coursework, kindergarten educators may increase their use of language-supportive strategies in a similar manner to the early childhood educators. With these recommendations there is a greater likelihood that kindergarten educators may influence positive changes in their children language development and growth.

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Appendix A

Language Supportive Strategies Codebook

Code	Definition	Examples
Modeling	Provides an exact example of the desired response.	Say We went to gym.
Alphabet Modeling	Provides an exact example of the letters and sounds of the alphabet. Additionally, will provide a word that starts with the letter/sound.	(aaaa) apple A Class repeats (bbb) bus B
Route Instruction Modeling	Demonstrates/ provides an exact or ideal example of the task to be completed. Provides an example of the task with the instructions.	I roll the dice, then match the number I rolled to the color on the worksheet. The color is blue. I colored my feather blue.
Vocabulary Modeling	Demonstrates the correct use of a vocabulary word in a sentence.	Vocabulary word long The giraffe has a long neck to reach the leaves on the tree.
Expansion	Provides a response to a child, group, or whole class that extends, lengthens, or adds to the child's previous utterance that was just said. * Must increase LENGTH of child utterance.	Child: The dog jumped. Teacher: The active dog jumped over the tall fence.
Recasting	Rewords the child's response to demonstrate the response in a grammatically correct manner. *Follows child utterance	Child: Dogs fast Teacher: Dogs are fast
Repetition	Repeating the child's utterance. *Follows child utterance	Child: He was bad Teacher: He was bad
Completion	Leaving a piece or a word of the utterance/sentence out of the complete sentence for the child to finish.	The color of the sky is...
Call and Response	Teacher requests a child, group, or whole class to engagement by using	T: 1 2 3 C: Eyes on you

	a phrase or statement that the class knows and provides a direct response. * Typically done in a sing song voice.	
Reading	The teacher is reading a book aloud to a child, group, or whole class.	Reading directly from the book.
Wh- Questions		
Open-ended questions	Requests a response by asking a question that provides the child an opportunity to respond with more than one word. *Child response is greater than one word.	Teacher: What are you doing after school? C: I am playing outside with friends.
Close- ended questions	Teacher requests a response by asking a question that asks for a simple typically one word answer. * Think test question	Teacher: Who jumped over the fence? C: The dog
Child Response Y/N	Did the child respond to the wh-question?	Mark Yes R or No R as to whether a response was provided by the child/children
SCAFFOLDING		
Low Support		
Generalizing	Prompts a child, small group, or class to take the context of the lesson beyond the current scenario (Pentimonti et al., 2017).	The book or lesson is about a Pete the cat going on vacation and the teacher states: Tell me about a vacation you have been on.
Reasoning	Prompts a child, small group, or class to explain the "why". This typically follows a statement and the teacher wants the child to explain why this occurred or will occur.	The dog ran out of the fenced in yard. Why do you think he left the yard?
Predicting	Prompts child, group, or whole class to describe what might happen next or hypothesize an outcome.	Do you think the dog will come back?
High Support		
Co-participating	Prompts a child, a group, or the whole class to produce the correct answer through the completion of their response with the teacher (Pentimonti et al., 2017).	Call out with me the word that is what utensil you use to eat cereal. Spoon! When the children and teaching are reading together and ACTIVELY engaged

Reducing Choices	Prompts a child, a group, or the whole class to produce a correct response by reducing the number of correct answers in the choice selection (Pentimonti et al., 2017).	What animal is white and lives in the cold? A polar bear or flamingo?