EARLY CHILDHOOD TEACHERS’ CHARACTERISTICS, COMPLEX TALK, AND CHILDREN’S LANGUAGE AND LITERACY DEVELOPMENT

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ABSTRACT

Wonkyung Jang: Early Childhood Teachers’ Characteristics, Complex Talk, and Children’s Language and Literacy Development
(Under the direction of Harriet Able and Margaret Burchinal)

This study used a modified mixed-method sequential explanatory design to explore how preschool teachers perceive and use complex talk within different activity settings and content areas to facilitate language and literacy skills. The combination of large-scale, quantitative data (455 children, 63 teachers) from a pre-K study and in-depth, qualitative interview data from a separate sample of 10 preschool teachers in rural North Carolina provided a holistic analysis of the phenomena of complex teacher talk.

Major findings in the current study revealed teachers modulated their use of complex talk depending on instructional context and learner variability. The analysis of quantitative and qualitative data showed: (1) Teachers’ use of complex talk was higher for large group than for small group and free choice/center time. (2) Complex teacher talk was higher for social studies and science than for math. (3) Teachers’ use of complex talk in large-group, literacy, and math activities was positively related to their emotional support. (4) The use of complex talk in large-group activities was positively related to teaching experience. (5) Black children and dual language learners experienced lower levels of complex talk in small-group activities. (6) The use of complex talk in free play and social studies was positively related to children’s shyness.

Additionally, the analysis of quantitative data revealed larger gains in picture vocabulary were positively associated with the use of complex talk in large-group and science activities,
indicating that the use of complex language in the activity in which the proportion of using complex talk was higher related to gains in children’s language skills. Also, the analysis of quantitative data demonstrated the use of complex talk within different activity contexts was not related to teachers’ attitude toward ECE and instructional orientation, while teachers qualitatively described the value of using complex talk in their classrooms.

The combination of the quantitative and qualitative analysis illustrated the complexity of teachers’ use of complex language across different activity contexts and expanded our understanding about the complex talk phenomena. Potential implications of these findings for ECE research, practice, and policy will be discussed.
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CHAPTER 1: INTRODUCTION

Background and Rationale

As biological beings with distinctive human brains, children learn language by communicating in social contexts and receiving a huge amount of linguistic input (Waxman & Gelman, 2009). Although their learning patterns may be coherent, the mechanisms accountable for their development are far from evident (Bloom, 2001). In the field of linguistics, the two main theories comprise formal and functional approaches. These approaches are based on different epistemologies, and the theories differ with respect to how they designate the locus of the learning mechanism. In general, formal theories postulate endogenous mechanisms which contribute to a uniform and universally stipulated system of rule, which resides in the child’s mental and cognitive predispositions (e.g., Chomsky, 1995). Functional theories, on the other hand, postulate that exogenous factors drive the extraction of particular linguistic forms from the child’s social interactions and lead to the development of more formal linguistic rules over time (Tomasello, 2009). Support for the endogenous mechanisms can be found in situations in which children do not acquire perfect copies of their parents’ linguistic input and thus often apparently add something substantially new based on an innate grammatical system, while the functional theorists assume that grammar is the cognitive organization of a child’s linguistic experiences (Tomasello, 2000).

The past two decades have witnessed a proliferation of different distinctive approaches to language development (Bialystok, 2001; Bloom, 2001; Cook, 2016; Grosjean, 2010; Waxman &
The singular dominance of the generative approach resulting from Chomsky’s groundbreaking retranslation of the nature of the linguistic structure and its relation to mind (Chomsky, 1995) has yielded to an array of alternative concepts whose adherents seek to remedy the weaknesses they identified in the formal theories. The wide class of functional theories contains a paradigm for understanding the process of language development that does not begin with nativist assumptions about language in mind (Langacker, 2008; MacWhinney, 1997; Tomasello, 2009). In other words, language evolves from children’s everyday experiences whereby they achieve specific cognitive, social, and communicative functions in these approaches.

Language-rich environments play a pivotal role in promoting children’s language and literacy skills (Zyzik, 2009). Specifically, linguistically rich interactions provided in early childhood classrooms have been associated with gains in vocabulary skills (Cabell et al., 2015; Justice et al., 2018), acquisition of complex syntax (Huttenlocher et al., 2002; Vasilyeva et al., 2006), and reading success (Burchinal et al., 2008; Dickinson & Porche, 2011; Goble et al., 2016; Johanson et al., 2016). In fact, the first five years of a child’s life are fundamentally important, as the development of the brain’s functional properties (i.e., its “plasticity”) is strongly related to experience or to environmental influences (Farkas & Beron, 2004; Sengpiel, 2007). Thus, the mechanism by which teacher-child language interactions influence child outcomes needs further attention (Burchinal, 2017; Chien et al., 2010; Dickinson et al., 2006; Piasta et al., 2020; Wasik & Hindman, 2011).

Current trends in early language and literacy research encourage teachers to use academic language (Barnes & Dickinson, 2017). In particular, as states have started to implement the Common Core Standards, more emphasis is put on the use of academic language (Neuman &
Wright, 2013; van Lier & Walqui, 2012). Academic language is defined as “the specialized language, both oral and written, of academic settings facilitating communication and thinking about disciplinary content” (Nagy & Townsend, 2012, p. 92). Examples of academic language include the extensive use of specific discourse functions such as expansion, recast, and decontextualized talk, each of which requires drawing on more complex lexical and syntactic resources and abstract ideas (Barnes et al., 2016; Uccelli et al., 2019). Research demonstrates that children’s proficiency in academic language relates to their comprehension of content area textbooks, which may promote success in elementary school and beyond (Dickinson et al., 2014; Townsend et al., 2012; Uccelli et al., 2015).

Children enter school with differing levels of understanding of academic language based on their home experiences (Schleppegrell, 2004). Some children learn academic language through shared book reading experiences at home (Aarts et al., 2016). However, many children experience language input different from the input to which they will be exposed in school. For instance, dual language learners (DLLs) may particularly have a great deal of variability in their experiences with English academic language (Barnes et al., 2016). Even though DLLs are knowledgeable and fluent in colloquial language, their comprehension and use of academic language are less developed than their English monolingual peers (Cummings, 2000; Hur et al., 2020; Lonigan et al., 2013; Street & Hornberger, 2008). Accordingly, this study explored how children with specific characteristics elicited different opportunities for facilitative language use from their teachers.

Academic language is a register (i.e., a set of phonological, grammatical, semantic, and functional linguistic components) including specific linguistic properties that may vary in terms of context and purpose (Schleppegrell, 2001). In particular, academic language in early
childhood classrooms is characterized by questioning, explanation, elaboration, discussion, and argument (Barnes et al., 2016). Each features linguistic norms, specific discourse functions, and decontextualized language (i.e., language removed from the here-and-now) (Schleppegrell, 2013). Preschool teachers may teach academic language through curriculum contents (e.g., literacy, math, science, social studies) as well as through activity settings (e.g., large-group, small-group, free choice/center time). And these activity contexts may include different materials and language learning opportunities that children need to improve academic language skills, with each context contributing in varying ways (Barnes et al., 2016; Dickinson et al., 2014; Nagy & Townsend, 2012). Hence, this study investigated variations in the effectiveness and use of complex talk across activity contexts. The current study builds on previous research demonstrating that more frequent complex talk in general and less time in large-group settings within the preschool curriculum related to larger gains in vocabulary skills (Burchinal et al., 2021). This research particularly focuses on the proportion of complex talk within each type of activity setting and content area. Although time in large-group activities may be more detrimental for preschoolers, complex teacher talk in large group would benefit children’s language skills.

Despite years of research into the language-learning environment of preschool classrooms, teachers generally engage in less stimulating language exchanges, and much of children’s time is spent with little or no language interactions with teachers (Justice et al., 2013; Peisner-Feinberg & Burchinal, 1997; Pianta et al., 2005; Turnbull et al., 2009; Winton & Buysse, 2005). A response to studies demonstrating the low quality and quantity of linguistic-based instructions in early childhood classrooms has been to research teacher characteristics to understand insight with respect to how to improve teaching effectiveness (Markussen-Brown et
al., 2017). Specifically, teachers’ beliefs and practices are theoretically related to instruction, and both have been empirically investigated in efforts to learn more about how these result in instructions (Pianta et al., 2020; Piasta et al., 2017). Evidence also suggests years of teaching make a difference in the quality of teaching (Graham et al., 2020; Schachter et al., 2016).

Since teachers’ beliefs, practices, and teaching experience are malleable elements of teacher education in which researchers and policymakers can intervene to improve instruction, it’s crucial to research more about these relations (Gerde & Powell, 2009; Pianta et al., 2005). However, these studies haven’t explicitly revealed the relations between teachers’ characteristics and the use and instruction of academic language promoting language and literacy development. In sum, the findings across research studies reveal significant gaps in the literature regarding teacher-child language interactions (Pianta et al., 2020; Schachter et al., 2016). Therefore, the purpose of this study was to better understand how teachers’ characteristics were associated with how much they engaged children in conversational feedback loops and offered advanced language models within different activity settings and content areas.

**Research Questions**

The current study explored how teachers perceived and used complex language to facilitate language and literacy skills. Specifically, this study focused on three components of academic language promoting language and literacy skills (i.e., complex talk): elaboration and extension (Dickinson & Porche, 2011), decontextualized talk (Rowe, 2013), and back-and-forth conversation (Uccelli et al., 2018). Since teachers talk differently in different activity contexts and each context has affordances and constraints for fostering academic language (Dickinson et al., 2014; Halliday, 1993; Nagy & Townsend, 2012; Schleppegrell, 2012), this study illustrated
the complexity of teachers’ use of complex language within different activity contexts and expanded our understanding about the complex talk phenomena. The mechanism by which the combination of teacher and child characteristics was related to complex teacher talk across activity contexts was also explored.

The overall research purpose was to determine: “How do teachers perceive and use complex language to facilitate language and literacy skills?” The specific research questions addressed in this mixed-method research were:

1. How do teachers perceive their use of complex talk influencing children’s language and literacy skills in their classrooms? How do they describe their use of complex talk?
2. Do children show larger gains in language and literacy development when teachers engage in more complex talk?
3. Does complex teacher talk vary across activity contexts? How and why do teachers talk differently in different activity contexts?
4. How do teacher and child characteristics relate to complex teacher talk?

To fully capture the details of complex teacher talk, both quantitative and qualitative data were integrated using a modified sequential explanatory design (Creswell, 2005; Tashakkori & Teddlie, 2003). In the quantitative portion, this study used the year one (i.e., pre-K) sample from Early Learning Network (ELN), an IES-funded longitudinal pre-K to third grade study. This longitudinal research randomly selected and recruited 63 pre-K classrooms in 6 rural counties in North Carolina and recruited up to 6 children per classroom to follow from pre-K through third grade. There were 63 pre-K teachers and 455 children in the sample. The quantitative analyses used descriptive statistics and Hierarchical Linear Models (HLMs) to address the main research questions.
In the qualitative portion, a separate sample of 10 preschool teachers (i.e., not from the original IES study) was selected from teachers in rural North Carolina. This study used in-depth semi-structured interviews lasting 45-60 minutes each. The development of the qualitative data collection protocols (e.g., interview questions) was based on the findings from the quantitative phase to study those findings in more depth. Thematic analyses involved an iterative process of understanding, coding, and analyzing the interview transcripts. Consensus coding was used to verify the stability of responses to multiple coders. The findings from the two sources of data not only confirmed the results of the other but also expanded insights of the complex talk phenomena in different activity contexts within preschool classrooms.

Findings

Major findings in the study revealed teachers modulated their use of complex talk depending on instructional context and learner variability. First, the analysis of quantitative data showed the use of complex talk was higher for large group than for small group and free choice/center time. Teachers qualitatively described using systematic, explicit and purposeful instructions to provide children with more complex language opportunities during large-group activities; adjusting complex talk for children in need of additional support towards mastery during small-group activities; and listening to children’s thoughts and feelings instead of interrupting during free choice/center time. Second, the analysis of quantitative data demonstrated teacher’s use of complex talk was higher for social studies and science than for math. Teachers qualitatively explained how complex talk capitalized on authentic experience opportunities supportive of social system and social concept learning such as providing topics of study focusing on children’s interest, social context, and real-world problems during social studies activities. They also shared they encouraged children to go into details by using
elaborative conversations during science activities and talked elaboratively about past or future
events when children conduct science experiments. On the contrary, they reported using
prescribed instructional guidelines and rote instructions during math activities since a discrete
math task required a single response. Third, the analysis of quantitative data revealed larger gains
in picture vocabulary were positively associated with the use of complex talk in large-group and
science activities, indicating that the use of complex language in the activity in which the
proportion of complex talk was higher related to gains in children’s language skills.

Additionally, findings illustrated the mechanism by which the combination of teacher and
child characteristics was related to instructional practices across activity contexts. First, the
analysis of quantitative data showed the use of complex talk within activity settings and content
areas was not related to teachers’ attitude toward ECE and instructional orientation. In contrast,
teachers qualitatively described the value of using complex talk in their classrooms. One
potential reason for the discordance was that teachers’ beliefs about the importance of providing
high-quality language input didn’t align with their actual practice. Second, the analysis of
quantitative data demonstrated the use of complex talk in large-group, literacy, and math
activities was positively related to their emotional support. Teachers qualitatively explained the
importance of providing more emotional support during large-group, literacy, and math
activities, given that some children were embarrassed when engaging in complex conversations
during these activities. Third, the analysis of quantitative data revealed that the use of complex
talk in large-group activities was positively related to teaching experience. Teachers qualitatively
noted they became increasingly adept at understanding children’s needs, adapting complex talk
to their interests and level of understanding, and aligning curriculum, activity, and assessment
with complex talk. Fourth, the analysis of quantitative data indicated that Black children and dual
language learners experienced lower proportions of complex talk in small-group activities; and the use of complex talk in free play and social studies was positively related to children’s shyness. Teachers qualitatively described they were likely to use simple talk with DLLs or children with low English proficiency because of a belief that it’s difficult for them to understand complex language. They also explained asking complex questions in large-group activities was not as beneficial for shy children since they were uncomfortable speaking in front of a group; instead, free choice/center time was more conducive to utilizing complex talk with shy children because they felt more comfortable having private conversations during free play.

Conclusion

While many of the components of complex talk perceived by teachers to be useful and effective fell into clear alignment with previous research highlighting the importance of academic language, the effectiveness and use of complex talk depended substantially on context and learner variability. In this study, the combination of the quantitative and qualitative analyses illustrated the complexity of teachers’ use of complex language within different activity contexts and expanded our understanding about the complex talk phenomena.

This research contributes to the existing literature by offering a contemporary, in-depth examination of language learning experiences provided to preschoolers in their classrooms in light of curriculum and intervention planning, professional development, policies, and research findings. The most effective method to foster children’s language and literacy skills is to explicitly target the specific, proximal processes culminating in high-quality, extended conversations among caregivers and children. In this regard, curriculum guidance combined with practice-based coaching may enable teachers to use complex talk in ways that are context-
sensitive. However, preschool teachers are often expected to adapt their practice simultaneously across activity contexts, leading to minimal change in their teaching performance. Professional development efforts could be adapted to capitalize on the natural variation in effectiveness occurring across activity settings and content areas. Offering context-specific, targeted professional development that prioritizes areas of relative teacher strength in effectiveness of complex talk may lead to greater adoption of teaching strategies.
CHAPTER 2: LITERATURE REVIEW

The purpose of this chapter is to provide an overview of the research regarding early childhood teachers’ characteristics, complex talk, and young children’s (ages 3-4) language and literacy development. First, a brief overview of the theoretical framework guiding this study is provided. Second, relevant literature on the dimensions of teacher talk is reviewed. Third, a review of research regarding the factors associated with teacher talk is provided. Specifically, a review of research examining how child, teacher, and contextual characteristics relate to teacher talk is detailed. Finally, this chapter concludes with the justification for the mixed-method research and its implications for early childhood education/intervention and professional development.

Theoretical Background

Three primary theoretical models best provide support for the exploration of factors influencing teacher-child interactions in early childhood classrooms as well as children’s language and literacy development. These include (1) Bioecological Systems Theory (Bronfenbrenner & Morris, 1998), (2) Emergentist Coalition Model (ECM; Hirsh-Pasek et al., 2004), and (3) Systemic Linguistics Approach (SLA; Halliday, 1993). In this section, each dimension of the theoretical framework and its relevance to the topic of this research are detailed.

Bioecological systems theory. The bioecological systems theory is intended to explain how the mechanism of child development is affected by the varied environmental contexts in
which children live (Bronfenbrenner & Morris, 1998). This theory offers a theoretical model that explains why high-quality teacher-child interactions foster children’s language and literacy development. The model highlights adult-child interactions within a series of larger systemic influences, from more proximal levels of influence (e.g., teachers, family, peers, other members of the community, materials) to more distal levels of influence (e.g., schools, media, culture, policy). These systemic factors have both direct and indirect effects on children’s development and learning (Bronfenbrenner & Ceci, 1994).

The key concept of “proximal processes” particularly provides an enlightening viewpoint on teacher-child interactions. Proximal processes are characterized as the everyday activities and interactions between an individual child and the persons, objects, or symbols in her immediate environment. These proximal processes are so critical that Bronfenbrenner and Morris (2006) named them the “engines of development” (p. 798). In order for the child to develop intellectually, socially, and emotionally, proximal processes must involve “participation in progressively more complex activities, on a regular basis over an extended period of time in the child’s life” (Bronfenbrenner, 1989, p. 5) with one or more individuals with whom the child establishes a trustful relationship.

Bronfenbrenner also emphasized the complex interrelations of process, person, context, and time (i.e., process-person-context-time (PPCT) model), indicating that the transactions and synergies of these are more crucial than the various ecological systems per se. He contended not only that “environments change people (the external is internalized and transacted)” but that “people change environments (the internal is externalized and transacted)” (Bronfenbrenner & Ceci, 1994). Time constitutes the fourth factor and Bronfenbrenner indicates data must be
obtained over time during proximal processes themselves (exploring the nature of the interactions) as well as longitudinally (concentrating on their frequency and consistency).

**Emergentist coalition model.** The Emergentist Coalition Model (ECM; Hirsh-Pasek et al., 2004) is intended to explain the role of experience in promoting children’s language and literacy development. Based on the developmental lexical principles framework, the ECM highlights the effects of global attention mechanisms, cognitive constraints related to children’s linguistic experiences, and socio-pragmatic elements (Hollich et al., 2000). The model was developed to describe parent-child interactions, but its language development mechanism has been extended to early childhood settings (Golinkoff & Hirsh-Pasek, 2006).

The ECM also places three sets of cues (perceptual, social, and linguistic cues) within a child’s developmental trajectory (Hirsh-Pasek et al., 2004). Children use multiple sources of linguistic inputs over time and different weights are assigned to these inputs over time (Golinkoff & Hirsh-Pasek, 2000). Specifically, the model suggests that children begin as “associationists” and become “social sophisticates” (Golinkoff & Hirsh-Pasek, 2006). First, children start to learn language by attending to salient perceptual cues and attaching a novel label to a novel referent (i.e., associationists). At this stage, children are conservative word learners in that they do not easily extend a label to a (potentially new) conceptual category of objects. Second, as children develop, they use knowledge of the speaker’s focus of attention and intentions (i.e., social cues). At this stage, they are increasingly able to take the speaker’s viewpoint into account and follow the speaker’s gaze to determine the referent for the label (i.e., social sophisticates). Third, during early childhood, children begin to use linguistic cues, including grammatical, semantic, phonological, and pragmatic features. At this stage, the overlap of all three sets of cues supports young children, as the different forms of input help them construct and test competing
hypotheses. Furthermore, children learn that words do not necessarily refer to a single item but rather to groups of objects, and they weave the words together to develop their conceptual understanding of a topic. In sum, children rely on some combination of perceptual, social, and linguistic cues to develop conceptual representations (Golinkoff & Hirsh-Pasek, 2000, 2006; Hirsh-Pasek et al., 2004; Hollich et al., 2000).

In this regard, adults’ instructional practices may be used differentially by children with different levels of language proficiency (Golinkoff & Hirsh-Pasek, 2006). The ECM suggests that one-on-one conversations would be more beneficial to language development in early childhood classrooms. In individualized instruction, all three sets of cues can be used efficiently (Hollich et al., 2000; Hirsh-Pasek & Burchinal, 2006). Adults can also modify the information they offer about vocabularies based on a subconscious estimation of the probability that children understand the words they use (Hall et al., 2003; Weizman & Snow, 2001). Evidence suggests that such semantically contingent and responsive interactions (e.g., adults are focused on and responsive to what children are saying) promote language and literacy development (Landry et al., 2006; Nelson, 1989).

**Systemic linguistics approach.** According to the Systemic Linguistics Approach (SLA; Halliday, 1993; Schleppegrell, 2001, 2012), the use of language is the product of social forces. Language is shaped by social norms and values set by communities, and many aspects of language use are linked to their identities (Gee, 2008). Thus, children in each community learn language as they become socialized into the norms and values of their communities (Halliday, 1993).

The notion of language registers, setting-specific features of linguistic competence, and content of interaction is a main construct in SLA (Dickinson et al., 2014; Snow & Ucelli, 2009).
Registers refer to sets of phonological, grammatical, semantic, and functional linguistic components, and people use different registers for different intellectual and social pursuits (Halliday, 1993). Additionally, these features are context-based and reflect role relationships and the mechanism through which they are enacted (Schleppegrell, 2001, 2012). To illustrate, when children enter an early childhood classroom, they encounter their first novel cluster of socially formed registers, such as academic language registers (Barnes et al., 2016), which comprise collections of linguistic features varying across activity settings and content areas (Dickinson et al., 2014; Snow, 2010).

**Summary.** This study drew on the bioecological systems theory and explored how more specific language-based theories such as the Emergent Coalition Model (ECM) and the Systemic Linguistics Approach (SLA) can help conceptualize teachers’ complex talk in their early childhood classrooms. These theories describe how language is used across preschool activity contexts and what elements are related to its use.

First, the bioecological systems theory was extended to explain teacher-child interactions as the most essential or significant proximal processes influencing children’s development and learning within the classroom context (e.g., Hamre et al., 2013). Bronfenbrenner (1995) states that “the form, power, content, and direction of the proximal processes affecting development vary systematically as a joint function of the characteristics of the developing person” (p. 621). In this regard, the child’s development as well as the effectiveness of teacher-child interactions are jointly influenced by the characteristics of the child and their environment (Tudge et al., 2017). For example, the mechanisms behind sensitivity, warmth, organization, and cognitive stimulation are influenced by systemic factors (Early et al., 2007; Hamre & Pianta, 2010). Based
on this framework, the present study examined how the combination of individual child and teacher characteristics is related to complex talk across activity contexts.

Second, according to the ECM, teacher-child interaction is an experience incorporating perceptual, social, and linguistic cues (Golinkoff & Hirsh-Pasek, 2006). For instance, social interactions play a critical role in children’s language and literacy development (Hall et al., 2003; Hollich et al., 2000). Teachers may use the children’s eye gaze, repeat one or more exact words used by children, provide contextual cues about objects or actions, ask information and elicit verbal or nonverbal responses from children (Golinkoff & Hirsh-Pasek, 2006; Hirsh-Pasek et al., 2004). In this study, the ECM supports a hypothesis that young children elicit different opportunities for facilitative language use from caregivers and that linguistically responsive behaviors (i.e., when adults are sensitive to and reflective of children’s interests and/or utterances) are related to children’s language and literacy development.

Third, according to the SLA (Halliday, 1993), language not only acts upon but also is constrained by social context. Given the nature of social interactions, people use different sets of phonological, grammatical, semantic, and functional linguistic elements for different purposes. Based on the SLA, the present study explored how teachers’ talk and its relation to children’s language and literacy development vary by activity setting (large-group, small-group, free choice/center time) and content area (literacy, math, science, social studies).

Given the above theories, there is a need to explore the specific dimensions of teacher-child language interactions that may potentially relate to children’s language and literacy growth over time. Below, relevant literature on the distinctiveness of those dimensions of children’s linguistic environments and the unique contribution of each dimension to children’s language and literacy development is reviewed.
Dimensions of Teacher Talk

Evidence demonstrates beneficial effects of high-quality, center-based early childhood education (ECE) on children’s cognitive and social-emotional development (Burchinal et al., 2016; Campbell et al., 2012; Curby et al., 2009; Mashburn et al., 2008; NICHD ECCRN, 2002; NICHD ECCRN & Duncan, 2003; Weiland et al., 2013). ECE quality is generally characterized by structural and process characteristics (Burchinal, 2018; Howes et al., 2008). Structural quality refers to distal and malleable aspects of ECE, such as teachers’ educational levels and wages, teacher-child ratio, group size, leadership and administration, family involvement, inclusion of children with disabilities, and inclusion of home language and culture (Thomason & La Paro, 2009). Process quality refers to children’s daily experiences in ECE settings and includes physical, instructional, social, and emotional aspects of children’s interactions with teachers, peers, and environments (Pianta et al., 2005). Typically, the level of emotional and instructional support and the quality of classroom management are considered to foster children’s cognitive and socio-emotional development (Hamre, 2014).

Currently, teacher-child interactions (i.e., process quality) are at the center of ECE quality (Burchinal, 2018; Howes et al., 2008; Meisels, 2006). Research indicates that child outcomes are affected directly by process quality and indirectly by structural quality (e.g., Burchinal et al., 2015, 2016; NICHD ECCRN, 2002). And structural quality is considered as necessary, but insufficient, for higher process quality (Cryer et al., 1999; Philips et al., 2000; Pianta et al., 2005; Vandell et al., 2010).

Situating the research on teacher-child interactions within a bioecological systems theory model (Bronfenbrenner & Morris, 1998) provides a starting point for conceptualizing domains of teacher-child interactions. In this model, adult-child interactions are dyadic systems based on the
complex interrelations of process, person, context, and time (i.e., process-person-context-time (PPCT) model). In particular, proximal processes, characterized as the everyday activities and interactions between an individual and the persons, objects, or symbols in her immediate environment, serve as primary mechanisms through which children develop intellectually, emotionally, and socially (i.e., “engines of development”; Bronfenbrenner & Morris, 2006, p. 798). Here, interactions involve behavioral exchanges where knowledge and experience are transmitted between teacher and child through bidirectional and transactional relationships (e.g., teachers influence how children use language and children influence how teachers talk) (Justice et al., 2013; Sroufe, 2005).

The PPCT model particularly suggests context affects the “form, power, content, and direction” of proximal processes (Bronfenbrenner, 1995, p. 621). And proximal processes occurring in more effective contexts have greater impact on children’s development and learning, while these processes occurring in more disadvantaged and unstable environments show “corresponding disruptive effects on psychological functioning” (Bronfenbrenner, 1995, p. 640). As noted previously, however, contextual aspects of classroom experience including activity settings (large-group activity, small-group activity, free choice/center time) and content areas (literacy, math, science, social studies) are often overlooked by ECE quality research (Burchinal et al., 2021; Cabell et al., 2013; Rimm-Kaufman et al., 2005). Specifically, much remains unknown about the degree to which the effectiveness of teachers’ instructional practices differs in relation to particular classroom contexts (Cote, 2001; Dickinson et al., 2014; Fuligni et al., 2012; Massey et al., 2008).

Over the past several decades, numerous studies have found there is substantial variability in teacher-child interactions that children experience prior to formal schooling, and
this variability tends to have implications for children’s language and literacy development (Burchinal et al., 2010; Dickinson & Smith, 1994; Howes et al., 2008; Justice et al., 2013; Pianta et al., 2005; Yoder & Warren, 1999). In particular, evidence suggests teachers plan the daily classroom schedule (e.g., activities, instructional interactions) in varying ways and spend different amounts of time engaging children in certain activity settings and content areas (Bratsch-Hines et al., 2019; Chien et al., 2010; Dickinson et al., 2008; Early et al., 2010; Winton & Buysse, 2005). This work has investigated a variety of dimensions of teacher-child interactions in early childhood classrooms, including characteristics of the systems-level general environment, linguistic responsivity, and decontextualized language. In this section, each dimension is detailed.

**Systems-level general quality.** The first dimension of teacher-child interaction is the systems-level, general quality (Hamre et al., 2014). Current literature on the general quality of teacher-child interactions builds on the Teaching Through Interactions conceptual framework (Hamre & Pianta, 2007) and the observational measure corresponding to this framework, the Classroom Assessment Scoring System (CLASS; Pianta et al., 2008), which organizes teacher-child interactions into three broad domains – emotional support, classroom organization, and instructional support. Emotional Support reflects the degree to which teachers support the emotional and social functioning of the classroom (i.e., classroom climate) and teachers are responsive to children’s needs. Classroom Organization reflects the teachers’ management of student behavior, time, and attention. Instructional Support reflects the degree to which teachers foster higher-order thinking skills as opposed to rote learning, facilitate children’s use of complex language, and use feedback to broaden and deepen their understanding of concepts (La Paro et al., 2004; Pianta & Hamre, 2009; Pianta et al., 2008; NICHD ECCRN, 2000).
Researchers have shown these domains of teacher-child interactions are associated with cognitive and socio-emotional development (Downer et al., 2010; Gordon & Peng, 2020; Pianta et al., 2020; Williford et al., 2013). Specifically, effective teacher-child interactions perform two main functions: promoting children’s basic task-related skills (e.g., attention, communication skills) and motivation in approaching tasks in a structured manner; and serving an instructional function (e.g., intentional teaching practices, increasingly drawing children’s attention to pertinent knowledge and skills) (Curby et al., 2009; Hamre & Pianta, 2001; Pianta et al., 2020; Whittaker et al., 2015).

However, recent research on teacher-child interactions using the CLASS has substantial limitations. Generally, effect sizes are small (Burchinal et al., 2010; Keys et al., 2013; Mashburn et al., 2008). Although the three-factor model has been demonstrated to be the best fitting model in many studies, its fit indices are less than optimal (Hamre et al., 2013). Additionally, most research using the CLASS shows very strong correlations among the three domains, restricting our ability to investigate how individual domains of teacher-child interactions relate to particular developmental domains (Rudasill et al., 2010). These challenges suggest it is important to explore alternative conceptual and methodological approaches to understanding classroom processes influencing child outcomes. This is especially true because the CLASS is widely used in research and practice (Burchinal, 2018).

The Teaching Through Interactions can be refined using the Systemic Linguistic Approach (SLA; Halliday, 1993) in which context-specific features of language interactions (e.g., activity settings, content areas) are a main construct (Dickinson et al., 2014; Snow & Ucelli, 2009). While the CLASS measures quality of teacher-child interactions by observing a whole classroom (Hamre, 2014), behavior counts often include multiple cycles of iteratively
observing individual children for a short amount of time each and record the types of interactions they experience with teachers, the time spent in different activity settings and content areas (Burchinal et al., 2021; Howes et al., 2008). In this regard, this study used the Language Interaction Snapshot (LISn; Atkins-Burnett et al., 2010), a behavior count system focusing on language exchanges, and investigated variations in the effectiveness and use of complex talk across activity contexts.

In addition, according to the process-person-context-time (PPCT) model (Bronfenbrenner, 1995), caregivers’ belief systems can either increase or decrease the effectiveness of proximal processes. Although research connecting beliefs to practices indicates teachers tend to report beliefs and instructional orientations supporting evidence-based practices, the mechanism by which these pedagogical beliefs are related to instructional practices across activity settings and content areas is unclear (Desimone, 2009; Hamre et al., 2012; Hindman & Wasik, 2008). Hence, this study explored how teachers’ characteristics related to their use of complex talk within different activity contexts.

**Linguistic responsivity.** The second dimension of teacher-child interaction is linguistic responsivity, which is observed when caregivers are sensitive to and reflective of children’s interests and/or utterances during interactions (Girolametto & Weitzman, 2002). Linguistically responsive behaviors can be divided into two categories: communication-facilitating behaviors (i.e., facilitating children’s engagement in communication routines) and language-developing behaviors (i.e., providing advanced linguistic forms) (Girolametto et al., 1996; Girolametto & Weitzman, 2002; Justice et al., 2018; Piasta et al., 2012).

The Emergentist Coalition Model (ECM; Hirsh-Pasek et al., 2004) is crucial for understanding the substantial empirical evidence suggesting that teachers’ use of
communication-facilitating and language-developing behaviors during conversations relates to children’s language and literacy growth over time (e.g., Burchinal et al., 2021; Justice et al., 2018). According to the ECM, adults modify their perceptual, social, and linguistic input based on children’s levels of language proficiency (Golinkoff & Hirsh-Pasek, 2006). And such linguistically contingent and responsive behaviors, especially the use of open-ended questions, expansions, and recasts, promote children’s language and literacy development (Barnes et al., 2016; Dickinson & Porche, 2011; Rowe, 2013; Uccelli et al., 2018). Each dimension of the linguistically responsive behaviors is outlined below.

**Communication-facilitating behaviors.** Communication-facilitating behaviors are particular behaviors used to initiate and sustain children’s engagement in multi-turn conversations and time spent in joint engagement (Haden, 2010; Justice et al., 2018). When caregivers engage in longer periods of interactions with children, they often need to play an active role in sustaining the conversation, like looking expectantly at the child and waiting for her response or encouraging the child to use expressive language (e.g., requesting new information from children, offering information to extend the conversation, asking open-ended questions) (Adamson et al., 2004; McCabe & Peterson, 1991; Reese et al., 1993).

Communication-facilitating behaviors help children sustain their attention, hence increasing the allocation of cognitive resources to their attentional allocation (Landry et al., 2006). These responsive behaviors also help children better understand the intentional nature of communication (e.g., talking to another person draws his or her attention and engagement), motivating the child to talk more (Yoder & Warren, 1999). Researchers demonstrated the degree to which teachers use these behaviors is associated with the complexity of children’s talk during
conversations (Girolametto & Weitzman, 2002), vocabulary skills (Cabell et al., 2015; Justice et al., 2018), and memory (Boland et al., 2003; Ornstein et al., 2004).

In particular, questions improve children’s language and literacy skills by providing experience with organizing and verbalizing their thoughts and feelings, clarifying misunderstandings, and negotiating meanings (Kuchirko et al., 2016; Roseberry et al., 2014; van Kleeck et al., 1997). In fact, asking questions results in more substantial interactions with children than making comments, requests, or directives (Massey et al., 2008). Specifically, wh-questions (e.g., who, what, when, where, why, how) encourage children to reply with more than one word, employ reasoning, and engage in discussion. In contrast, closed-ended questions (e.g., is this milk?) can be answered with yes/no or one-word responses and are more common to repetitive conversational strategies (i.e., repeating or rephrasing of information without further elaboration), which are less effective than elaborative conversational strategies (Haden, 2010; McCabe & Peterson, 1991; Reese, Haden, & Fivush, 1993; Zucker et al., 2010).

*Language-developing behaviors.* Language-developing behaviors are responsivity behaviors seeking to model for children advanced linguistic forms (Justice et al., 2018). Through verbal exchanges with more experienced speakers, children compare and contrast between the child’s form and the adult’s more abstract form and develop language skills (Proctor-Williams & Fey, 2007). In particular, children are prone to learn new words and grammatical structures when a more experienced speaker responds to a child’s utterance with a more syntactically (recast) or semantically complex (expansion) form that is slightly advanced of (and hence responsive to) children’s language abilities and fits within the context of the child’s ongoing activities (Fey et al., 1993; Justice et al., 2018; Nelson & Welsh, 1998). For example, when adults read a picture book with their child, they can be linguistically sensitive by extending the child’s utterance (e.g.,
if the child says, “milk” and the adult says, “Milk is white,” or “Do you like milk?”) rather than misdirecting the child’s attention to something else in the book (e.g., if the child says “cat” and the adult says “look at this dog!”) (Landry et al., 2001, 2006; Tamis-LeMonda et al., 2001). Adults also foster children’s language development by remaining on a topic and helping children elaborate their thoughts (Hoff-Ginsberg, 1991). Topic elaboration allows children to use their grammatical and semantic knowledge to generate more complicated structures and provides caregivers with opportunities to implement tailored practices (Dickinson & Porche, 2011; Nelson, 1989). These characteristics of contingency, moderate challenge, and reponsivity to a child’s interests and/or utterances increase motivation and decrease processing demands (Cabell et al., 2015; Gest et al., 2006; Snow, 1983; Weizman & Snow, 2001).

Similarly, Justice and McGinty (2009) used the notion of scaffolding to describe the mechanism by which caregivers use language-developing strategies in order to help children complete a task or activity that is slightly beyond their current language skills. Scaffolding is based on the Vygotsky’s sociocultural theory highlighting the importance of a child’s zone of proximal development (ZPD) that refers to “the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peer” (Vygotsky, 1978, p. 86). Successful scaffolding requires that the activities assigned to a child are at the appropriate level within the child’s ZPD (Pentimonti & Justice, 2010; Pressley et al., 1996).

In this regard, the proper level within the child’s ZPD is unique for each child and a function of activity setting and content area (Bodrova & Leong, 2007; Pentimonti & Justice, 2010). Scaffolding strategies particularly span a continuum of low to high support strategies
(Wood et al., 1976). Low levels of support are offered when a child is reaching maturation in a specific area of development (e.g., generalizing (i.e., extending the activity beyond the activity itself – to past or future experiences), reasoning (explaining why something occurred or will occur), and predicting (describing what might occur next) (O’Connor et al., 2005; Pentimonti & Justice, 2010). High levels of support are offered when a child is just starting to demonstrate a skill and needs a great amount of support to finish a task (e.g., showing an exact model of an ideal response, decreasing the number of choices of correct answers) (Norris & Hoffman, 1990; Pentimonti et al., 2017).

Evidence suggests that teachers’ use of scaffolding strategies in early childhood classrooms is positively related to children’s learning and literacy development (Henderson et al., 2002; Pentimonti et al., 2017; Rodgers, 2005). Nonetheless, studies have also demonstrated the complexities involved in teachers’ roles in the scaffolding process. For the scaffolding strategies to be effective, teachers need to have a clear understanding of curriculum and their children’s individual needs and determine what level of support is appropriate (Pentimonti & Justice, 2010; Pressley et al., 1996; Wood et al., 1976).

**Decontextualized language.** The third dimension of teacher-child interaction is decontextualized language. During infancy and toddlerhood, children’s interactions are prone to be limited to the “here and now” (i.e., talk about people, objects, concepts, or events that are present in the immediate physical surrounding) (Rowe, 2013). Specifically, conversations depend mainly on the physical context and nonverbal cues (e.g., gestures), and comprehension and production are marginally achieved via language *per se* (Uccelli et al., 2018). On the other hand, during early childhood, children start to make extended discourse focused on the “there and then,” and hence removed from the immediate environment (Rowe, 2013). They begin to
engage in the co-construction of narratives about past/future or fictional events and pretend play (Nelson, 2000; Ninio & Snow, 1996; Rowe, 2013).

Research shows that caregivers’ decontextualized language features lexical diversity and morphosyntactic complexity and rises dramatically between 14 and 42 months compared to contextualized talk (Rowe, 2012). Parents’ and teachers’ use of decontextualized language are positively associated with children’s language and literacy development (Dickinson & Tabors, 2001; Demir et al., 2015; Rowe, 2013; Snow, 1991). Exposure to this form of abstract language particularly helps equip children to use the form of language often used in school settings, like prediction and reasoning (Massey et al., 2008; Uccelli et al., 2018).

**Contexts matter.** Previous research has indicated that large-group, science, and social studies activities are more conducive to using complex language than other activity contexts (Barnes et al., 2016; Cabell et al., 2013; Chien et al., 2010; Dickinson et al., 2014; Gest et al., 2006; McKeown & Beck, 2003). First, teachers consider large-group settings as a crucial instructional time for which they plan formal lessons, and are likely to use varied and sophisticated vocabulary, complex syntax, conceptual and metalinguistic conversation, and decontextualized and analytic talk (Early et al., 2010; Snow & Uccelli, 2009; Turnbull et al., 2009; Winton & Buysse, 2005). Also, this setting is typically highly predictable and routinized, offering a systematic context helping young children learn how to engage in language and literacy events (Sulzby & Teale, 1996). Among many large-group activities, book reading particularly has the richest mixture of academic language elements (Dickinson et al., 2014; Massey et al., 2008; Uscianowski et al., 2020), given that answering more abstract questions requires that children incorporate their knowledge and experience into textual information to draw inferences about the story (van Kleeck et al., 2006).
Second, science and social studies activities can provide a context where teachers efficiently engage in higher-quality instructional practices (e.g., promoting higher-order cognitive skills, engaging in feedback loops, modeling advanced linguistic forms) (Cabell et al., 2013; Fuccillo, 2011). While teachers are prone to teach basic skills (e.g., rote instruction) during literacy and math activities, conceptual talk is more frequent when science and social studies-related content is discussed (Dickinson et al., 2014; Ginsburg, 2009; Pentimonti et al., 2010). This research contributes to the existing literature by providing a contemporary, in-depth investigation of how and why teachers’ use of complex language varies across activity settings and content areas.

**Factors Associated With Early Language Experiences**

There is substantial variability in linguistic environment that children experience prior to formal schooling (Burchinal et al., 2005; Dickinson & Smith, 1994; Howes et al., 2008; Justice et al., 2013; Pianta et al., 2005; Yoder & Warren, 1999). This variability has important implications for children’s language and literacy development. In this section, three important factors accounting for this variability (child, teacher, and contextual characteristics) are detailed.

**Child characteristics.** High-quality teacher-child language interactions have a great impact on children’s language and literacy development (Justice et al., 2018). However, research has primarily focused on teacher instruction and classroom quality, overlooking children’s first-person experiences within their classrooms (Gerde & Powell, 2009; Sawyer et al., 2018). In this subsection, four essential child-level factors that have emerged in the literature surrounding teacher-child interactions are detailed: (1) language proficiency, (2) shyness, (3) gender, and (4) socioeconomic status.
**Language proficiency.** Teachers adapt the use of language based on their perceptions of children’s language proficiencies (Chaparro-Moreno et al., 2019; Turnbull et al., 2009; Wasik & Hindman, 2014). For example, teachers are reluctant to use decontextualized language with children who have minimal English proficiency (Sawyer et al., 2018). Additionally, language proficiencies of individual children affect their verbal participation (Gerde & Powell, 2009). Specifically, some children may not be prepared to speak the word they have learned because they are not equipped to answer when asked questions (Highscope, 2018). Accordingly, the ability to adjust input to children’s levels of language proficiency may play a key role in supporting children’s language and literacy growth.

**Shyness.** Shyness is defined as a “temperamental trait characterized by wariness, fear, and self-consciousness in social situations” (Kalutskaya et al., 2015, p. 149). Child shyness is related to a variety of academic, social, emotional, and behavioral challenges, such as academic adjustment problems (e.g., lower classroom engagement), negative peer experiences (e.g., exclusion), and internalizing problems (e.g., anxiety) (Rubin et al., 2009). Specifically, in early childhood settings, shy children are likely to engage in group activities by only observing others and talk less in general (Asendorpf & Meier, 1993; Coplan et al., 2004; Kalutskaya et al., 2015). Language skills have a protective role in intellectual and socioemotional functioning in their classrooms (Coplan & Armer, 2005).

Many studies have emphasized the importance of teachers in promoting shy children’s development (Kalutskaya et al., 2015). Teachers can encourage shy children’s verbal participation by providing emotional support and making personal comments (Coplan & Prakash, 2003; Coplan et al., 2010; Curby et al., 2011; Evans & Bienert, 1992). In particular, to sustain academic, social, and behavioral engagement in their classrooms, shy children require
additional conversational feedback and teacher support (Curby et al., 2011). Of note, individualized instruction maximizes shy children’s learning while minimizing their antisocial behavior and anxiety (Kalutskaya et al., 2015). For instance, teachers are expected to interact with shy children during free choice/center settings since they are prone to engage in more nonsocial play (Coplan & Prakash, 2003).

**Gender.** Evidence suggests teacher-child interactions differ by gender (Ewing & Taylor, 2009). Girls learn language earlier than boys and show greater gains in vocabulary skills during early childhood (Gleason & Ely, 2002; Huttenlocher et al., 1991). Girls are also more talkative than boys (Leaper & Smith, 2004), more nurturant and cooperative in their interactions (Maccoby, 1998), and spend more time on language and literacy activities during free play (Chapman, 2016; Early et al., 2010; Tonyan & Howes, 2003). Furthermore, teachers have closer and more dependent relationships with girls than boys (Baker, 2006; Birch & Ladd, 1998; Howes et al., 2000).

**Socioeconomic status.** Children from low-income families typically receive less language input at home than children from middle-income families (Hoff, 2003). And these children perform worse in literacy skills and academic knowledge (Dodd & Carr, 2003). Thus, home linguistic environment (e.g., book reading frequency, access to books) mediates the relation between socioeconomic status and language and literacy development (Luo et al., 2021). Research on language development also highlights the strong compensatory benefits of high-quality linguistic input from early childhood teachers. Bradley et al. (2011) found classroom experiences in Head Start classrooms compensated for inadequacies in the home and community environments. Similarly, Nelson et al. (1993) demonstrated, despite relatively low-input home
environments, deaf children who experienced high-quality input from expert signers showed significant gains in language skills.

**Teacher characteristics.** In addition to the child characteristics associated with teacher-child language interactions, teacher’s individual characteristics are important as well. Teachers have their own styles of teaching formed by personal and pedagogical histories influencing the ways in which they interact with children (Castle et al., 2016). In particular, the use of academic language elements may relate to teachers’ beliefs, educational levels, and teaching experience. These teacher characteristics may be associated with teachers providing pedagogical practices that evidence suggests are supportive of children’s language and literacy skills. In this subsection, three essential teacher characteristics related to teacher-child language interactions are detailed: (1) beliefs, (2) educational levels, and (3) teaching experience.

**Beliefs.** Researchers have theorized teachers’ beliefs are linked to their instructional practices (Clark & Peterson, 1984; Guskey, 2002; Nespor, 1987; Pajares, 1992). This abstract concept has been measured in many ways in the field of early childhood education, with equivocal findings about whether or not teachers’ beliefs are associated with instruction (Han & Neuharth-Pritchett, 2010).

Evidence suggests early childhood teachers’ beliefs are related to instructional practices (LaParo et al., 2009; Pianta et al., 2005; Stipek & Byler, 1997). Children in didactic programs are likely to spend more time in large-group, teacher-directed, and skill-based activities (Smith & Shepard, 1988; Stipek et al., 1995; Pianta et al., 2005). On the other hand, teachers with more child-centered views are more sensitive to and reflective of children’s interests and provide more cognitively stimulating experiences (Clarke-Stewart et al., 2002; Justice et al., 2008).
However, previous research has indicated teachers’ beliefs are not associated with teaching practices. According to Sandvik et al. (2014), teachers spend very little time in high-quality language and literacy practices despite their strong beliefs about child development. There is also evidence indicating that there is no association between teachers’ beliefs and child outcomes. Cash et al. (2015) found teachers’ beliefs about what children need to learn are not related to children’s developmental outcomes.

**Beliefs about language and literacy development.** It is crucial to know what early childhood teachers believe about language and literacy development. Previous research has explored teachers’ beliefs about how children learn language and literacy, what children should learn, and how teachers need to intervene in children’s language and literacy learning (e.g., Wasik & Hindman, 2008). Specifically, preschool teachers typically view language skills (e.g., conceptual talk, storytelling) as more critical than skill-based literacy skills (e.g., alphabet knowledge, writing letters or words) (Burgess et al., 2001). Similarly, preschool teachers believe that providing various learning opportunities by employing instructional practices such as book reading and oral language/vocabulary activities is more important than the use of structured literacy instructional practices (Hindman & Wasik, 2008).

Teachers’ beliefs about language and literacy development are amenable to intervention (Cunningham et al., 2009; Dickinson & Caswell, 2007). Teachers reap benefits from professional development programs which narrow the focus from broader ideas concerning (in)appropriate beliefs and practices to more specific constructs, such as beliefs concerning implementing meaning-based language practices (e.g., concepts, narrative, social pragmatics) versus code-based literacy practices (e.g., decoding, alphabet knowledge, print awareness) (Gallagher et al., 2000; Hammill, 2004; Hindman & Wasik, 2008; Justice & Ezell, 2002; Schatschneider et al.,
2004; Storch & Whitehurst, 2002). Byrnes (2001) found teachers have more procedural than conceptual knowledge or beliefs about children’s language and literacy development. Although procedural knowledge or beliefs (i.e., what is learned about learning strategies) are essential, teachers can improve their language and literacy practices by understanding the conceptual framework behind these processes (Mishra & Koehler, 2006).

**Educational levels and teaching experience.** Educational levels and years of teaching are proxies for their knowledge and beliefs about language and literacy practices, because these background experiences are linked to the development of these constructs directly or indirectly (Han & Neuharth-Pritchett, 2010; Nelson, 2015). Early childhood teachers with higher educational levels demonstrate greater procedural and conceptual knowledge and beliefs about language and literacy practices (e.g., Hindman & Wasik, 2011) and highlight the value of language/vocabulary activities in their classrooms to a greater extent than teachers with lower educational levels (Burgess et al., 2001). Furthermore, evidence suggests teachers’ educational levels are positively associated with the overall quality of their classrooms (Barnett, 1995; Campbell et al., 2002; Reynolds et al., 2002). Teachers with ECE-related degrees particularly employed more evidence-based language and literacy practices (Gerde & Powell, 2009; Pianta et al., 2005). Similarly, early childhood-specific coursework changed teachers’ beliefs about play-based instruction, which in turn influenced their intended use of the practice (Jung & Jin, 2014). On the other hand, some researchers have suggested preschool teachers’ educational levels are not related to their beliefs about language and literacy instruction (Smith & Shepard, 1988), general instructional practices (Early et al., 2007), and the quality of classroom interactions (Fuligni et al., 2009).
The existing evidence also suggests teaching experience enhances instructional quality (Berliner, 1986; Rivkin et al., 2005). Previous research indicates teachers’ instructional practices improve around their fifth year of teaching and then plateau or decrease over time (Palmer et al., 2005; Rivkin et al., 2005). Spear-Swerling and Zibulsky (2014) also reported more years of teaching experience relate to less planned oral language activities and more teacher-directed instructions. However, LoCasale-Crouch et al. (2007) demonstrated teaching experience is positively related to classroom quality, indicating the potential role of teaching experience in the development of teachers’ knowledge and beliefs about language and literacy instruction. Other researchers have demonstrated teaching experience is only marginally related to teaching practices (Guarino et al., 2006). In sum, there have been mixed findings concerning the effects of teachers’ background experiences. Such equivocal findings support the need for further work in this area.

**Contextual characteristics.** The third factor associated with teacher-child interaction and children’s language and literacy development is contextual characteristics of classroom environment. Activity settings (e.g., large group, small group, free choice/center) and content areas (e.g., literacy, math, science, social studies) which children are exposed to during the day are aspects of classroom experience often overlooked in early childhood research (Winton & Buysse, 2005). Large-scale studies have shown early childhood teachers organize the daily classroom schedule in varying ways and spend different amounts of time involving children in specific activity contexts (Bratsch-Hines et al., 2019; Chien et al., 2010; Early et al., 2010; Fuligni et al., 2012). In particular, the degree to which the effectiveness of teacher-child interactions differs as a result of activity settings and content areas remains unclear (Cabell et al., 2013). Indeed, evidence suggests that some activity contexts are more conducive to using rich,
cognitively stimulating experiences than others (Barnes et al., 2016; Dickinson et al., 2014; Nores et al., 2022; Turnbull et al., 2009). In this subsection, two contextual constraints related to teachers’ conversational roles and teacher-child interaction patterns are detailed: activity settings (large-group activity, small-group activity, and free choice/center time) and content areas (literacy, math, science, and social studies).

Activity setting. Different types of grouping of children during teacher-child interaction are particularly critical for fostering language and literacy skills (Dickinson et al., 2014). This study focuses on (1) large-group activity, (2) small-group activity, and (3) free choice/center setting because these contexts constitute universal components of early childhood classrooms and account for half of the typical day on average (Chien et al., 2010; Sawyer et al., 2017).

Large-group activity. In general, large-group activities include at least half or all of the children in early childhood classrooms. An example of such activities is daily circle time in which a teacher involves children in thematic content, picture-book reading, academic language, and social interactions (Bratsch-Hines, 2019). Preschool children spent at least a quarter of their day in these activities on average (Ansari & Purtell, 2017; Booren et al., 2012; Cabell et al., 2013; Chien et al., 2010).

Large-group settings are often viewed as a teacher-directed instructional opportunity to improve children’s knowledge and skills (Cabell et al., 2013). And children are exposed to more print materials (e.g., book reading), oral language (e.g., story-telling, singing), literacy (e.g., sound-focused activities), rich vocabulary, and decontextualized language (Barnes et al., 2016), during large-group activities. Since teachers consider the time as instructional in nature, instructional interactions tend to be effective in large-group settings (Early et al., 2010; Winton & Buysse, 2005).
Teachers demonstrate unique patterns of language interaction during large-group activities. (Turnbull et al., 2009). Evidence suggests teachers employ richer vocabulary and more open-ended questions, provide more advanced linguistic forms, and are more sensitive to children’s utterances in teacher-directed settings (Pence et al., 2009). Additionally, the conceptually oriented conversations often take place during large-group activities, which create a crucial context for promoting children’s language and literacy skills (Snow et al., 1998; Teale, 2003). For example, children’s participation in large-group discussions involving active engagement through inquiring into concepts is positively associated with children’s conceptual understanding and vocabulary development (Walsh & Blewitt, 2006).

Researchers have also explored the relationships between teacher talk during large-group activities and child outcomes. Specifically, classrooms characterized by a high proportion of time spent in teacher-directed large-group activities are associated with larger gains in print knowledge and phonological awareness (Goble & Pianta, 2017). Similarly, teachers’ attention-getting utterances in large-group activities are positively related to later reading comprehension (Dickinson & Porch, 2011). Furthermore, early childhood teachers often incorporate literacy instruction into whole-group activities (e.g., alphabet instruction during circle time) (Cabell et al., 2013). Children’s engagement with literacy during these activities is linked to expressive vocabulary and decoding skills (Baroody & Diamond, 2016; Justice & Ezell, 2002).

In particular, large-group activities are a substantially socialized setting, hence offering an interactive context where children learn and apply their knowledge and skills (Dickinson & Tabors, 2001; Neuman, 1996; Sulzby & Teale, 1996). This setting is also a highly predictable and routinized context and enables children to learn how to engage in language and literacy events by providing a systematic context (Neuman, 1996; Sulzby & Teale, 1996). Furthermore,
teachers view this setting as a crucial instructional time for which they plan formal lessons and do not frequently and consistently interact with children during other settings (Cabell et al., 2013; Winton & Buysse, 2005). Moreover, there are similarities between picture-book reading during large-group activities and literacy events children will experience in school settings (Heath, 1983). Accordingly, exposure to diverse texts during large-group activities prepares children for future social interactions during literacy activities.

Nonetheless, according to Powell, Burchinal, File, and Kontos (2008), children are less likely to be actively engaged during large-group activities than small-group, solitary, and peer group settings. Specifically, children tend to listen/watch (i.e., attentive) than talk/act (actively engaged) in large group. These findings support concerns of early childhood stakeholders that large-group activities promote passive modes of child participation in classroom activities (Powell et al., 2008).

*Small-group activity.* Small-group activities, in general, involve teacher-led activities conducted with a smaller number of children, such as structured projects associated with art, craft, cooking, or science (Barnes et al., 2016). Teachers are also prone to keep track of how well children perform discrete tasks (e.g., phoneme segmentation) – therefore, small-group settings may be related to gains in specific language and literacy skills (Early et al., 2010). Furthermore, teachers can foster language skills through scaffolding their use of language during small-group activities (Bratsch-Hines, 2019).

However, researchers have shown that, in small-group activities, preschoolers spend a small proportion of the day interacting with teachers (Farran et al., 2017). Specifically, estimates vary from 3.5% (Cabell et al., 2013) to 13% of cycles (Sawyer et al., 2017). According to Farley
et al. (2017), preschool teachers spent less than 12 minutes per day engaging in small-group literacy activities.

Despite the small proportion of the day, small-group activities are an important element of ECE fostering children’s language and literacy skills (Camilli et al., 2010; Early et al., 2010). Professional development efforts aimed at improving teachers’ language and literacy intervention demonstrated that teachers can foster children’s language and literacy skills when they administer the interventions during small-group activities (Phillips et al., 2021; Piasta & Wagner, 2010). Also, teachers’ use of syntactically complex forms during small-group activities promotes children’s language development (Justice et al., 2013). Furthermore, children involved in equal proportions of child-centered (e.g., free choice/center) and teacher-directed activities (e.g., small groups) showed larger gains in receptive language (Fuligni et al., 2012).

*Free choice/center time.* In free choice/center settings, children can select their own activities among a variety of classroom materials and centers (e.g., art, nature/science, blocks, music/movement, dramatic play, library, writing, manipulatives, games) (Goble & Pianta, 2017; Turnbull et al., 2009). Children may or may not interact with teachers and may play by themselves or with peers (Booren et al., 2012). Teachers can involve children in one-on-one conversations about various topics as they move between activities (Dickinson et al., 2014). Free choice/center settings have been regarded as an essential part of the early childhood experience. Children spend nearly 33% of the day in free choice/center setting on average. These estimates range from 28% to 32% of cycles (Cabell et al., 2013; Chien et al., 2010; Sawyer et al., 2017).

Despite the relatively higher proportion of free choice/center time, children experience fewer language interactions with their teachers during center time, although teachers are present (Booren et al., 2012). Evidence suggests teachers do not consistently benefit from this
opportunity to engage children in meaningful interactions (Winton & Buysse, 2005). In this regard, studies have shown that lower language and literacy gains are associated with more time spent in free choice/center settings (Chien et al., 2010). However, children show higher vocabulary gains when teachers design and implement greater instructional support during free play (Goble & Pianta, 2017).

Free choice/center settings have the potential to facilitate rich, one-on-one interactions in which teachers can extend and elaborate children’s thinking (Winton & Buysse, 2005). Specifically, teachers can use role-playing effectively to engage children in conversational interactions (Gest et al., 2006). In addition, teachers can embed literacy tools into classroom centers to foster literacy-related interactions (Roskos & Neuman, 2001). Nonetheless, teachers often have a hard time promoting children’s conceptual understanding during free choice/center time than large-group activities, because free play lacks a curricular structure and requires teachers to engage children in real time (Cabell et al., 2013).

Recent research indicates the need for more intentional and targeted interaction in free choice/center settings to improve children’s language and literacy skills (Bohart et al., 2015; Burchinal, 2017; Ginsburg, 2007; Massey et al., 2008). Cognitively stimulating experiences in free choice/center settings (e.g., extended conversations) foster children’s language skills (Dickinson, 2001). Similarly, Dickinson and Porch (2011) found teachers’ use of complex vocabulary during free choice/center time predicts fourth-grade decoding skills and reading comprehension, with effects mediated by kindergarten language and literacy skills.

Additionally, previous research has explored different roles teachers assume during free choice/center time (Dickinson, 2001; Kontos, 1999). Some teachers use language as a tool to extend children’s imaginative play (e.g., pretend talk) since they often take the role of improving
or joining in pretend play (Katz, 2001; Kontos, 1999). Other teachers who talk less tend to be responsive and help children extend their thinking, which may in turn establish closer teacher-child relations and promote later academic achievement (Densmore et al., 1995; Howes et al., 2008; Pianta, 1999). The mechanism by which teachers’ perceived roles influence complex language use and child outcomes needs further attention.

**Content area.** Four major content areas that have emerged in the teacher-child interaction literature are detailed: (1) literacy, (2) math, (3) science, and (4) social studies. Early childhood teachers involve children in diverse content areas designed to foster learning, such as literacy, math, science, and social studies. The National Center for Early Development and Learning (NCEDL) multi-state pre-K study (Winton & Buysse, 2005) found the proportion of time teachers engaged children in content areas is highest for social studies (13%), followed by large-group activities (11%), shared reading and literacy activities (9%), esthetics (9%), science (8%), and math (6%). Interestingly, teachers didn’t offer any form of activity content for a large proportion of the day (44%). However, variations in the type of language used and the effectiveness of teacher-child interactions across content areas have gotten much less attention than the variations across activity settings (Cabell et al., 2013).

**Literacy.** The features of literacy activities in early childhood classrooms must be distinguished from the responsive and conversational features of language practices (Justice et al., 2018). Literacy activities include systematic, explicit, and purposeful instruction about code-based skills (e.g., phonological awareness, alphabet knowledge) (International Reading Association, 2010; Jordan et al., 2018). These activities involve relatively teacher-directed instruction to ensure systematic interactions (i.e., teachers’ organization and sequencing of lessons), explicitness (i.e., teachers’ use of clear terminology), and purposefulness (i.e., teachers’
attempts to connect decontextualized code-based features to meaning and comprehension) (Adams, 2002; Byrne & Fielding-Barnsley, 1989; Justice et al., 2003; Ukrainetz, 2005; van Kleeck et al., 1998).

Evidence suggests classroom-based literacy activities characterized by systematic, explicit, and purposeful experiences promote children’s language and literacy development (Howes et al., 2008; Justice et al., 2003, 2018; van Kleeck et al., 1998; Whitehurst et al., 1988). However, despite the fact that literacy activities occur in various activity settings, the frequency of these activities in pre-K classrooms is likely to be small (Bratsch-Hines et al., 2019). Code-based activities were observed during 15% of classroom observations (Farran et al., 2017). Children spent 5% of the observed time in reading, 4% in letter-sound activities, and 3% in pre-reading activities (Chien et al., 2010).

Math. Research suggests young children can learn math, are curious about mathematical concepts, and acquire them naturally during their daily activities (Clements et al., 1999; NAEYC, 2002; NCTM, 2002; Seo & Ginsburg, 2004). Math activities in early childhood classrooms feature number and arithmetic, spatial and geometric reasoning, measurement, and pre-algebraic pattern knowledge (Ginsburg et al., 1998; Griffin & Case, 1997; Starkey & Klein, 2008; Verdine et al., 2013).

Individual variations in math abilities arise early and are closely linked to later math outcomes (Jordan et al., 2006; Priniotta et al., 2006). However, apart from displaying the lack of knowledge and skills, early childhood teachers generally do not put a great emphasis on teaching math, feel uncomfortable about teaching the subject, and aren’t confident in their abilities to teach the content effectively (Hart, 2002; Yesil-Dagli et al., 2010). This is apparent in teachers’ classroom teaching where their math practices are likely to be rote and mainly based on more
basic skills (e.g., counting) rather than more complex concepts (e.g., spatial sense, geometry, measurement) (Ginsburg, 2009; Rudd et al., 2008). Math activities were observed during 8% of classroom time (Early et al., 2010).

Science. Young children have the ability to observe, explore, and discover the world around them and the capacity to develop conceptual understanding (National Research Association, 2007, 2012). And science practices in the early years can foster children’s curiosity and enjoyment in “doing science” and “thinking scientifically” (e.g., inquiry, reasoning) and offer important opportunities to acquire basic understandings of the natural phenomena and foundational science process skills (Eshach & Fried, 2005; Gallenstein, 2003). There are two main characteristics that distinguish scientific thinking. First, the content comprises various domain-specific topics (e.g., physics, chemistry, biology, earth sciences) as well as a smaller range of domain-general concepts (e.g., equilibrium, time, causality). Second, processes include basic processes (e.g., observing, inferring, measuring, classifying, predicting, communicating) and integrated processes (e.g., formulating hypotheses, designing investigations, collecting and analyzing data, formulating models) (National Research Council, 2007; Padilla, 1990).

Evidence suggests science education in early childhood is crucial for multiple developmental domains and sets the groundwork for a progression of science learning in their entire lives (Ginsburg & Golbeck, 2004; The National Science Teachers Association, 2002; Trundle et al., 2017; Watters et al., 2000). Specifically, adult-child conversations about scientific concepts have been shown to improve children’s scientific discourse (e.g., argumentation based on scientific evidence, causal explanation) and reasoning skills (Canfield & Ganea, 2014; Crowley et al., 2001; Marin & Bang, 2018; McClain & Zimmerman, 2019). In particular, adults’ science talk including elaborative features (e.g., wh-questions, connections to previous
experiences) are related to more sustained conversations, improved memory and recall of the scientific principles, and better scientific discourse (Benjamin et al., 2010; Callanan et al., 2017; Eberbach & Crowley, 2017; Haden et al., 2014; Hedrick et al., 2009; Leech et al., 2020). Furthermore, when adults offer explanations elucidating abstract, unobservable scientific mechanisms, children are more prone to ask follow-up questions or engage in extended discussions (e.g., causal justifications for possibility judgments) (Frazier et al., 2009; Nolan-Reyes et al., 2016; Willard et al., 2019).

However, science is a domain where early childhood teachers often struggle (Klahr et al., 2011). Teachers’ knowledge of science content is limited. They typically are not aware of their lack of science content knowledge and how this can affect their ability to offer children opportunities to experience science (Garbett, 2003). Similarly, early childhood teachers are not confident in their science knowledge and pedagogical skills (Fensham, 1991). They often focus on displays of science materials or art projects incorporating science and rarely engage children in relevant inquiry during science activities (National Research Council, 2005). Like math, science gets little attention in early childhood classrooms (11%) (Early et al., 2010). Teachers are least likely to visit science center during free choice/center time (Nayfeld et al., 2012).

Science activities in early childhood classrooms (e.g., growing plants, exploring light and color, sink or float experiments) create naturally stimulating and nurturing environments (Cabell et al., 2013). Teachers can effectively engage children in discussions about abstract concepts and conversational feedback loops, pose open-ended questions, introduce new vocabulary words, provide advanced linguistic forms, and connect new information to their prior experiences (Cabell et al., 2013; Corriveau & Harris, 2015; Fuccillo, 2011; Ginsburg & Golbeck, 2004; Harris et al., 2006; Snow & Kurland, 1996; Tenenbaum et al., 2005; Trundle et al., 2017).
Similarly, Cabell et al. (2013) showed that, within large-group and free choice/center settings during science activities, early childhood teachers demonstrate the most effective instructional interactions. Science was the only activity during which teachers, on average, scored at or above the minimum threshold of enhancing children’s development and learning (3.25; Burchinal et al., 2010). Large-group science activities are contexts where teachers effectively engage children in meaningful interactions, as teachers often use books to explain scientific concepts (Cabell et al., 2013). Specifically, almost one-third of all large-group science activities contained book reading. However, large-group science was found to be one of the least effective contexts for promoting literacy development. Although it is feasible to embed literacy instruction in science activities (e.g., journal writing), teachers do not consider this activity as ideal for literacy instruction.

**Social studies.** Social studies is defined as “…the integrated study of the social sciences and humanities to promote civic competence” (National Council for the Social Studies, 1994, p. 3). Social studies draws on several disciplines, like anthropology, ecology, geography, history, law, religion, and sociology (National Council for the Social Studies, 1994). While these subjects seem abstract as applied to young children, many examples demonstrate children have the potential to deal with them in concrete ways (Gronlund, 2006; Seefeldt et al., 2010) and think critically and share their opinions to solve problems when interacting with others to achieve common goals (Ardalan, 2017; Krechevsky et al., 2015; Mardell & Carpenter, 2012).

For instance, children aged 4 to 7 years develop a sense of time and understand the concepts of past, present, and future (Flavell, 1994). By about age 6 or 7, rudimentary discriminations of clock and calendar skills start to appear (Thorton & Vukelich, 1988). In this context, history education in early childhood focuses on the sequence of events, as children become more able to remember the past and predict the future (Skjæveland, 2017). Geography at
this age is about geographical concepts (e.g., location, direction, and distance) and the relations between people (Epstein, 2014). Ecology highlights ecological diversity and the dependence of every form of life on other living things and on natural resources, and young children learn to understand how organisms interact with their environment by observing, noticing, and responding to changes (e.g., caring for plants, animals, and insects) (Casey et al., 2019). Children engage in democratic processes by making decisions collaboratively with peers and explore similarities and differences among people from diverse backgrounds during social studies activities (Gartrell, 2012; Mindes, 2005).

Unfortunately, as a result of curricular trends prioritizing literacy and math skills, social studies instruction has been marginalized in ECE (Bolick et al., 2010; Fitchett et al., 2014; Pace, 2007). Some early childhood teachers believe abstract social studies concepts can overwhelm young children (Seefelt et al., 2014) and lack confidence in their knowledge about social studies education pedagogy (Neill, 2015).

Despite these sentiments, social studies activities have the potential to promote effective conversational interactions and provide opportunities to engage in cognitively stimulating activities fostering higher-order thinking skills (National Council for the Social Studies, 2019). Specifically, during social studies activities, children explore and pose questions about social systems and the abstract social norms and beliefs influencing interpersonal relations in daily lives (Seefelt et al., 2014). Teachers can also create responsive and developmentally appropriate environments by providing topics relevant to children’s interests, social contexts, and real-world problems (e.g., self, family, classroom or school, local community) to connect learning to authentic experiences (Copple & Bredekamp, 2009; Katz et al., 2014). Similarly, teachers can offer opportunities to share and discuss children’s understanding of social contexts through
representing things they learn (i.e., learning artifacts) in diverse ways, like drawing, writing, dramatic play, music, and movement (Mindes, 2015; National Council for the Social Studies, 2019).

**Conclusion**

Teacher-child interactions are characterized as a process quality that has a direct impact on children’s development and learning (Burchinal, 2018; Howes et al., 2008; NICHD ECCRN, 2002). However, when teachers interact directly with children, they typically engage in less stimulating language exchanges (Justice et al., 2013; Peisner-Feinberg & Burchinal, 1997; Pianta et al., 2005; Turnbull et al., 2009; Winton & Buysse, 2005). Additionally, regardless of the quality of teacher-child interactions, much of children’s time is spent with little or no verbal exchanges with teachers (Chien et al., 2010). In this context, researchers have suggested the need for further research on what factors relate to rich, cognitively stimulating teacher-child interactions (Dickinson et al., 2008; Justice et al., 2018).

Researchers have theorized the mechanism by which teachers’ beliefs and practices relate to their interactions with young children (Desimone, 2009; Piasta et al., 2020). However, there is mixed evidence about the relations between teachers’ characteristics and their instructional practices (Cunningham et al., 2009; McCutchen et al., 2002; Pianta et al., 2014; Stipek & Byler, 1997). This study used larger, more diverse samples that allow for variability in these teachers’ characteristics and their associations with complex language use.

This study particularly focused on three dimensions of teacher talk: communication-facilitating behaviors (i.e., using responsive conversational input), language-developing behaviors (i.e., providing advanced linguistic models that are just slightly beyond the child’s current skills), and decontextualized language (i.e., language removed from the “here and now”).
These dimensions represent academic language constructs that are both theoretically and empirically associated with children’s language and literacy development (Barnes et al., 2016; Chapman, 2000; Dickinson, 2006; Huttenlocher et al., 2002; Mashburn et al., 2008; McKeown & Beck, 2006; National Early Literacy Panel, 2008; Nelson, 1977; Pianta & Hamre, 2009; Snow, 1991; Wasik & Hindman, 2011; Yoder et al., 1995).

Beyond these general properties of language interactions, prior research has also demonstrated differences by activity settings and content areas (Barnes et al., 2016; Booren et al., 2012; Cabell et al., 2013; Dickinson & Tabors, 2001; Fuccillo, 2011; Sawyer et al., 2017). However, the existing literature doesn’t provide a solid foundation for expecting variations in academic language constructs in different activity contexts (Dickinson et al., 2014). The goal of this study was to clarify the shared and unique characteristics of teacher-child language interactions in three activity settings (large-group activity, small-group activity, free choice/center setting) and four content areas (literacy, math, science, social studies) and investigate the extent to which the use and effectiveness of complex talk vary across activity contexts. Importantly, the strengths in instructional effectiveness across contexts need to be viewed as relative rather than absolute, because the overall degree of instructional effectiveness across teachers is low (Justice et al., 2008; LoCasale-Crouch et al., 2007).

This study has potential implications for further research, curriculum and intervention planning, and professional development. Understanding how teachers perceive and use complex language to facilitate language and literacy skills is crucial to understand how to help teachers improve these language practices in targeted ways that best fulfill children’s needs. The next chapter details how this study used a mixed-method research design to fully capture the details of teachers’ use of complex talk in early childhood classrooms.
A modified mixed-method sequential explanatory design which involved collecting and analyzing quantitative data and then qualitative data in two consecutive phases was used (Creswell & Creswell, 2017). The combination of large-scale, quantitative data (455 children, 63 teachers) from a pre-K study and in-depth, qualitative interview data from a separate sample of 10 preschool teachers in rural North Carolina provided a holistic analysis of the phenomena of teachers’ use of complex talk in early childhood classrooms. Once each of the two elements was analyzed, the two outcomes were integrated to explore the convergence and divergence of research findings.

The first research question is how teachers perceive their use of complex talk influencing children’s language and literacy skills in their early childhood classrooms. Complex talk is a socially constructed concept, subjective in nature and grounded on beliefs, values, and interests. And this is contextualized in relation to time, place, and culture (Wardhaugh & Fuller, 2021). The semi-structured interview protocol conducted with teachers focused on questions regarding teachers’ perceptions of complex talk (e.g., How do you perceive your complex language use influencing children’s language and literacy skills?) and how they used complex talk to facilitate children’s language and literacy skills.

The second research question is whether children show larger gains in language and literacy development when teachers engage in more complex talk. A set of hierarchical linear
models (HLMs) examined gains in children’s language and literacy outcomes in relation to their exposure to complex teacher talk within different activity settings (large-group, small-group, free choice/center time) and content areas (literacy, math, science, social studies) while controlling for children’s gender, age, race, home language, maternal education, CLASS Emotional Support, and time spent in each type of activity.

The third research question is whether complex talk differs across activity settings and content areas, given that each context has affordances and constraints for fostering academic language. In the quantitative portion, Hierarchical Linear Modeling (HLM) was used to compare the values of the proportion of complex talk within different activity contexts. In the qualitative portion, the semi-structured interview focused on the practical, day-to-day realities linked to teachers’ use of complex talk, with an emphasis on teachers’ perceived differences across activity contexts. An example of an important guiding question was: “How do you talk to your children in different activity settings? In what activity setting do you frequently use decontextualized talk? How and why?”

The fourth research question is how teachers and child characteristics relate to complex teacher talk within each type of activity context. According to the bioecological systems theory (Bronfenbrenner & Ceci, 1994), knowledge and experience are transmitted between adults and children through bidirectional and transactional relationships. Based on this framework, in the quantitative portion, Hierarchical Linear Modeling (HLM) was used to investigate the mechanism by which the combination of individual child and teacher characteristics is related to complex talk across activity contexts. In the qualitative portion, several open-ended questions explored the role of teacher characteristics (e.g., teachers’ beliefs, years of teaching) and child
characteristics (e.g., DLL status, shyness) as related to their use of complex talk. The semi-structured interview focused on questions regarding teachers’ pedagogical beliefs (e.g., “What do you expect teaching to be like?”) and deciding factors or events that led them to talk in certain ways (e.g., “Do you think your teaching experience are associated with this phenomenon? How and why?”).

Why Mixed-Method Research?

Recently, a growing number of social science researchers have used mixed-method designs (Cresswell & Cresswell, 2017; Creswell et al., 2003). Mixed methods research is an “approach to inquiry involving collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks” (Cresswell & Cresswell, 2017, p. 4). The rationale for combining both quantitative and qualitative methods is that they have complementary strengths and fewer weaknesses than using either method alone (Green & Caracelli 1997; Johnson & Onwuegbuzie, 2004; Miles & Huberman 1994; Tashakkori & Teddlie 1998; Turner, 2003).

The current study began with the quantitative method in which the relations among teacher/child characteristics, complex talk, and children’s language and literacy development were tested, followed by the qualitative method involved detailed exploration with a few teachers. The main strengths of the quantitative portion are inclusion of a wide set of child- and classroom-level variables, strong external validity, and broad generalizability. The main limitation of the quantitative portion is the lack of a detailed account of how preschool teachers perceive and use complex language to facilitate language and literacy skills. Regarding the qualitative portion, the main strength is the ability to obtain teachers’ specific language and voices about the complex talk phenomena (e.g., “how” and “why” they did “what” they did). The
main limitations of the qualitative component are small sample sizes and a lack of
generalizability and objectivity. In sum, either the quantitative or qualitative portion by itself is
inadequate to best understand the complex language phenomena, and the strengths of both
quantitative and qualitative components can offer the best understanding (Cresswell &
Cresswell, 2017). Having described the reasoning for using a mixed-method design, an
explanation of the specific mixed-method approach follows.

**Mixed-Method Sequential Explanatory Design**

The mixed-method sequential explanatory design is widely used among social science
researchers and involves “collecting and analyzing first quantitative and then qualitative data in
two consecutive phases within one study” (Ivankova et al., 2006, p. 4). This design is typically
used to help explain the quantitative results obtained in the first phase by collecting and
analyzing follow-up qualitative (text) data (Cresswell & Cresswell, 2017). In the current study,
the large-scale, quantitative data (455 children, 63 teachers) from an IES-funded longitudinal
pre-K study was first analyzed. In the second qualitative phase, the qualitative data (a separate
sample of 10 preschool teachers in rural North Carolina) was collected and analyzed to help
explain why estimated relations manifest themselves (e.g., why certain child- and teacher-level
characteristics relate to teachers’ use of complex talk within each type of activity context). Then
the quantitative and qualitative phases were connected (Cresswell & Cresswell, 2017; Ivankova
et al., 2006). The specific design of the current study is detailed below.

**Quantitative Phase**

In the quantitative phase of the study, the goal was to identify the associations among
teacher and child characteristics, their use of complex talk, and children’s language and literacy
development. To explore relations among these teacher-, classroom-, and child-level variables,
three specific questions are addressed: (1) Do children show larger gains in language and literacy development when teachers engage in more complex talk?; (2) Does complex teacher talk vary across activity settings and content areas?; and (3) How do teacher and child characteristics relate to complex teacher talk?

Additionally, teacher-child language interactions are unique for each child as well as a function of context (Justice et al., 2013). Language interactions are bidirectional: children may vary in ways they elicit linguistic input from adults they interact with, and teachers may also tailor their scaffoldings to fulfill children’s individual needs (Bowers & Vasilyeva, 2011; Pelatti et al., 2014). Accordingly, this study hypothesizes that there are differences in how English-speaking children and dual language learners (DLLs) benefit from teachers’ talk. To explore individual differences, a specific question is addressed: How do child characteristics relate to complex teacher talk?

**Participants.** In the quantitative portion, this study used the year one (i.e., preschool) sample from the UNC site of the Early Learning Network (ELN), a longitudinal pre-K to third grade study. This longitudinal study involved randomly selecting and recruiting 63 pre-K classrooms in 6 rural counties in North Carolina as well as recruiting up to 6 children per classroom to observe from pre-K through third grade. Researchers paid special attention to oversampling Spanish–English dual language learners (DLLs) in the classrooms (29% DLLs). There were 63 pre-K teachers and 455 children in the sample.

**Procedures.** Individual assessments were administered to children in the fall and/or spring. Classrooms were observed during a one-day visit in the winter (January through March). Data collectors scheduled classroom observations during the morning hours (a 3-hour period in each classroom) when children and teachers tended to be engaged in language and instructional
activities. Teachers completed the spring surveys online, with a response rate among pre-K teachers of 92%. Parents completed surveys in the fall and spring of pre-K.

**Measures.**

**Teacher survey.** This study employed survey items derived from the Early Childhood Longitudinal Study (ECLS). First, teachers were asked to report the degree to which they covered skills in language and comprehension (Tourangeau et al., 2019). Individual survey items listed 17 discrete language skills. Example items contained “Drawing connections between a story and children’s lives” and “Making predictions about what might happen in a story.” For each item, response options contained: (1) Not taught because the skill is too basic, (2) not taught because the skill is too advanced, (3) taught in general instruction and is a major focus, (4) taught in general instruction and is a minor focus, (5) taught only to selected students who are struggling, and (6) taught only to selected students who are advanced (Cohen-Vogel et al., 2021) (see Appendix I).

Second, this study used the shortened Modernity Scale (Schaefer & Edgerton, 1985). This measurement tool assesses adults’ attitudes about early care and education. Each of 9 statements reflects authoritarian and conformist attitudes (e.g., “Children should always obey the teacher”, “In order to be fair, a teacher must treat all children alike”, “Children’s learning results mainly from being presented basic information again and again”) and is rated on a 5-point scale (1 = strongly disagree, 5 = strongly agree) (see Appendix J).

**Classroom characteristics.** Trained data collectors administered classroom assessments in the winter on the measures below.

**Classroom Assessment Scoring System (CLASS).** CLASS (Pianta, LaParo, & Hamre, 2008) is an observational assessment of the quality of teacher-child interactions in preschool,
kindergarten, and early elementary school. Its ten dimensions are organized into three domains, Emotional Support (4 dimensions), Classroom Organization (3 dimensions), and Instructional Support (3 dimensions). Data collectors observed classrooms for 4 to 6 cycles of observation for 20 minutes followed by 10 minutes of scoring, rating each dimension from 1 to 7, with higher scores indicating higher quality. The developer certified all data collectors as being reliable using their criteria for reliability. Inter-rater reliability was collected on 20% of the sample; within-one agreement exceeded .95, weighted kappas ranged from .48 to .76 across dimensions, and intra-class correlations ranged from .83 to .97 across domains. A total score was computed as the mean of the three domain scores because of the large correlations among the domain scores, \(0.59 < r < 0.91\).

**Language Interaction Snapshot (LISn).** LISn (Sprachman, Caspe, & Atkins-Burnett, 2009) describes language exchanges between the teacher and target child in English and Spanish and the activity settings and content areas in which the target child engages. A target child was observed for 30 seconds to record language exchanges, and these 30-second cycles were repeated 10 times, for a total of 5 minutes of observation (i.e., “snapshots”). Trained data collectors marked the presence of each type of language interaction occurring during a 30-second cycle of observation for each target child.

At the end of the 5-minute snapshot, the data collector recorded all of the settings (e.g., small group, whole group, free choice/centers) and types of activities (e.g., reading, math, science, social studies, art, transitions) observed during the 5-minute snapshot. After observing one target child for the 5-minute snapshot, the data collector then observed the next child until all target children were observed (6 children per classroom). Once all target children were observed, the data collector observed the first target child again. Four cycles per target child were
collected, for a total of 20 minutes per child and 2 hours per classroom (see Appendix L). Interrater reliability was computed for 20% of the classroom observations, with an exact agreement mean of .99 and kappa mean of .71.

Teacher-child language exchanges. A composite variable was created to capture teachers’ use of complex talk. The composite, complex teacher talk, was comprised of three variables computed at the 30-second cycle level to represent an individual child’s experiences in the classroom: (1) elaborates, (2) provides or elicits information (i.e., decontextualized talk), and (3) engages in multi-turn conversations. Elaborates was coded when the teacher responded to what the target child said by building on the child’s comment in terms of content. Provides or elicits information was coded when the teacher gave or requested information from the target child based on decontextualized cues (e.g., talk about people, objects, concepts, or events that are not present in the immediate physical surrounding). Engages in multi-turn conversations were coded when the target child and teacher engaged in three or more conversational turns about the same theme or topic. That is, both the target child and the adult would have contributed to the conversation about the same topic at least two times during a 5-minute snapshot. Summary scores were computed at the child-level and the classroom-level by computing within-child and within-classroom means. Cronbach’s alpha for the composite of teacher-child language interactions was α = 0.82.

Time in content-specific instruction. At the end of each 5-minute snapshot, trained data collectors completed a context form, marking one or more types of instructional activities where each target child participated. Four variables were included in analyses: literacy (sound, writing, print-related activities), math, science, and social studies activities. The means of all 5-minute
snapshots for each content area were computed for each target child. Cohen’s kappa coefficient for codes capturing each type of content-specific instruction was calculated as $k = 0.93$.

Type of grouping. At the end of each 5-minute snapshot, data collectors also marked one or more groupings where each selected child participated on the context form. The full list of activity settings contained time spent in whole group, small group, individual time, free choice/centers, routines, and meals/snacks. This study retained whole group, small group, and free choice/centers. The means of all 5-minute snapshots for each activity setting were computed for each target child. Cohen’s kappa coefficient for codes capturing each type of grouping was calculated as $k = 0.91$ (See Appendix K).

**Child outcomes.** The targeted child’s language and literacy skills were measured in the fall and spring. The following measures were used.

**Woodcock Johnson III Tests of Achievement (WJ).** WJ (Woodcock, McGrew, & Mather, 2001) is a battery with co-normed tests measuring general scholastic aptitude, oral language, and academic achievement. WJ subtests measured receptive language using Picture Vocabulary (PV) and reading skills (e.g., recognizing letters, reading words) using Letter-Word Identification (LW). WJ is normed for ages 2 to 90 years. Reliability estimates for individual subtests range from .69 to .99. Age-standardized scores (norming mean = 100, standard deviation = 15) and calibrated growth scores using w scores were used in the analyses.

**Expressive One-Word Picture Vocabulary Test (EOW).** EOW (Brownell, 2000) is a language assessment measuring children’s ability to comprehend the meaning of spoken words and to name depictions of images without context. Individuals were asked to name objects, actions, and concepts using one word when viewing color images. EOW measures English and
<table>
<thead>
<tr>
<th>Research Question</th>
<th>Type of Data</th>
<th>Data</th>
<th>Analysis Method</th>
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<tbody>
<tr>
<td>1. How do teachers perceive their use of complex talk influencing children’s language and literacy skills in their classrooms?</td>
<td>Qualitative Data</td>
<td>Semi-structured Interviews</td>
<td>Thematic analyses of the text data</td>
</tr>
<tr>
<td>2. Do children show larger gains in language and literacy development when teachers engage in more complex talk?</td>
<td>Quantitative Data</td>
<td>Child Demographics Characteristics; Language Interaction Snapshot; Classroom Assessment Scoring System; Woodcock Johnson III Tests of Achievement; Expressive One-Word Picture Vocabulary Test; Dynamic Indicators of Basic Early Literacy Skills</td>
<td>Descriptive Statistics; Hierarchical Linear Modeling (HLM)</td>
</tr>
<tr>
<td></td>
<td>Semi-structured Interviews</td>
<td></td>
<td>Thematic analyses of the text data</td>
</tr>
<tr>
<td>4. How do teacher and child characteristics relate to complex teacher talk?</td>
<td>Quantitative and Qualitative Data</td>
<td>Child and Teacher Demographics Characteristics; Language Interaction Snapshot; Classroom Assessment Scoring System; Instructional Orientations Questionnaire; Modernity Scale; Teaching Experience</td>
<td>Descriptive Statistics; Hierarchical Linear Modeling (HLM)</td>
</tr>
<tr>
<td></td>
<td>Semi-structured Interviews</td>
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<td>Thematic analyses of the text data</td>
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</table>
Spanish/bilingual skills for 2-70 year-olds with norm-referenced scores. Reliability estimates range from .94 to .98. Based on parent and teacher reports, an English version of EOW was administered if English was the child’s first language, and a bilingual version of EOW was administered if Spanish was the child’s first language. This study combined spring standardized scores for the English and bilingual versions for analyses.

*Shyness.* The Teacher-Child Rating Scale (TCRS, Hightower et al., 1986) is an individually-administered, norm-referenced assessment rating children’s social skills on a 1- to 5-point scale ranging from “Not at All” to “Very Well.” The scale’s 38 items are divided into 7 subscales: acting out (e.g., disruptive in class), assertive social skills, frustration tolerance, learning problems, peer social skills, shyness/anxiety, and task orientation. The scores from this measure showed strong internal validity (> .90). In this study, shyness/anxiety scores were used to measure temperamental features characterized by wariness, fear, and self-consciousness in social situations.

*Covariates.* This study controlled for important covariates demonstrated through research to be related to the variability in linguistic environments and language and literacy skills (e.g., Cabell et al., 2013; Dickinson et al., 2008; Early et al., 2010; Fuligni et al., 2012; Gerde & Powell, 2009; Hoff, 2003; Sawyer et al., 2018; Turnbull et al., 2009; Wasik & Hindman, 2014; Winton & Buysse, 2005): children’s demographic characteristics (e.g., race, gender, date of birth (calculated with date of testing as child age), mother’s (or primary caregiver’s) education, language used in the home, initial English language proficiency) and various measures of classroom practices (e.g., quality of emotional support, time spent in content-specific instruction and type of grouping).
Analytic strategies. The quantitative analyses used descriptive statistics and Hierarchical Linear Models (HLMs) to address the main research questions. Each analysis tool is outlined below.

Descriptive analyses. Descriptive analyses included describing the sample, calculating the gain scores from fall and spring outcome scores, describing the child-, teacher- and classroom-level characteristics, and computing correlations among those variables. Standardized scores were reported in descriptive statistics tables for the child outcomes to offer information that is easier to interpret, but the raw or w scores were used in inferential analyses.

Hierarchical linear models (HLM). This study examined if children showed larger gains in language and literacy development when teachers engaged in more complex talk; if complex teacher talk varied across activity contexts; and if teacher and child characteristics related to complex teacher talk.

First, a set of two-level HLMs tested the extent to which gains in children’s language and literacy skills were associated with the proportion of complex talk in specific type of grouping (Model 1) and content-specific instruction (Model 2). Each model contains a random intercept for each classroom (Level 2) to account for nesting of children (Level 1) within classrooms. The outcome variables are the fall-to-spring gain scores on w scores for the WJ and raw scores for the other measures. The conditional HLM models expanded the unconditional models to add variables from the LISn classroom observations, child covariates at Level 1 (race, gender, age, maternal education, and home language), and classroom practices at Level 2. In the Model 1, the Level 1 and Level 2 equations are as follows: Level 1 (child level) model:
\[ \text{Gain}_{ij} = \beta_{0j} + \beta_{1j} Black_{ij} + \beta_{2j} Male_{ij} + \beta_{3j} Age_{ij} + \beta_{4j} Maternal\_Education_{ij} + \beta_{5j} DLL_{ij} + e_{ij} \]

Level 2 (classroom level) model:

\[ \beta_{0j} = \gamma_{00} + \gamma_{01} \text{Emotional\_Support}_j + \gamma_{02} \text{Time\_Teachers\_Speak\_Spanish}_j + \gamma_{03} \text{Time\_in\_Language\_activities}_j + \gamma_{04} \text{Portion\_of\_Use\_of\_Complex\_Talk\_in\_Whole\_Group}_j + \gamma_{05} \text{Portion\_of\_Use\_of\_Complex\_Talk\_in\_Small\_Group}_j + \gamma_{06} \text{Portion\_of\_Use\_of\_Complex\_Talk\_in\_Free\_Play}_j + \gamma_{07} \text{Portion\_of\_Use\_of\_Complex\_Talk\_in\_Whole\_Group}^2_j + \gamma_{08} \text{Portion\_of\_Use\_of\_Complex\_Talk\_in\_Small\_Group}^2_j + \gamma_{09} \text{Portion\_of\_Use\_of\_Complex\_Talk\_in\_Free\_Play}^2_j + u_{0j} \]

\[ \begin{align*}
\beta_{1j} &= \gamma_{10} \\
\beta_{2j} &= \gamma_{20} \\
\beta_{3j} &= \gamma_{30} \\
\beta_{4j} &= \gamma_{40} \\
\beta_{5j} &= \gamma_{50}
\end{align*} \]

where \( \text{Gain}_{ij} \) is the gain score for a given outcome for the i-th child in the j-th class, \( \beta_{0j} \) is the random intercept for the j-th classroom, and the level-1 random effect, \( e_{ij} \), and level-2 random effect, \( u_{0j} \), are independent. \( \gamma_{00} \) is a Level 2 coefficient; \( \gamma_{10}, \gamma_{20}, \gamma_{30}, \gamma_{40}, \) and \( \gamma_{50} \) are coefficients of the Level 1 variables. In the Model 2, since the values of the proportion of complex talk within different content areas are highly correlated (i.e., multicollinearity occurs), four separate sub-models are built for each content area. In the Model 2, the Level 1 and Level 2 equations are as follows:

Level 1 (child level) model:

\[ \text{Gain}_{ij} = \beta_{0j} + \beta_{1j} Black_{ij} + \beta_{2j} Male_{ij} + \beta_{3j} Age_{ij} + \beta_{4j} Maternal\_Education_{ij} + \beta_{5j} DLL_{ij} + e_{ij} \]
Level 2 (classroom level) model:

\[ \beta_{0j} = \gamma_{00} + \gamma_{01} Emotional Support_j + \gamma_{02} Time Teachers Speak Spanish_j \\
+ \gamma_{03} Time in Content Instruction_j \\
+ \gamma_{04} Proportion of Use of Complex Talk in Content Instruction_j + u_{0j} \]

\[ \beta_{1j} = \gamma_{10} \]
\[ \beta_{2j} = \gamma_{20} \]
\[ \beta_{3j} = \gamma_{30} \]
\[ \beta_{4j} = \gamma_{40} \]
\[ \beta_{5j} = \gamma_{50} \]

Second, a set of two-level HLMs was used to compare the values of the proportion of complex talk within different activity settings (Model 3) and content areas (Model 4). Each model contains a random intercept and random slopes for each classroom (Level 2) to account for nesting of contexts (Level 1) within classrooms. In the Model 3, the Level 1 and Level 2 equations are as follows:

Level 1 (repeated-measures level) model:

Proportion of Use of Complex Talk\(_{ij}\) = \(\beta_{0j} + \beta_{1j} Small\_Group_{ij} + \beta_{2j} Free\_Play_{ij} + e_{ij}\)

where \(\beta_{0j}\) is the estimated proportion of complex talk score for the j-th classroom during large-group activities when \(Small\_Group_{ij}\) and \(Free\_Play_{ij}\) (dummy variables) are equal to 0. \(\beta_{1j}\) and \(\beta_{2j}\) are the average changes in the proportion of complex talk for the j-th classroom in small-group and free choice/center settings. \(e_{ij}\) is the within-classroom random error with variance equal \(\sigma^2\) which captures the within-classroom variation (i.e., \(e_{ij} \sim N(0, \sigma^2)\)).

Level 2 (classroom level) model:

\[ \beta_{0j} = \gamma_{00} + u_{0j} \]
\[ \beta_{1j} = \gamma_{10} + u_{1j} \]
\[ \beta_{2j} = \gamma_{20} + u_{2j} \]
where $\gamma_{00}$ is the average score of the proportion of complex talk in large-group settings and $\gamma_{10}$ and $\gamma_{20}$ are the average changes in the proportion of complex talk in small-group and free choice/center settings. $u_{0j}$, $u_{1j}$, and $u_{2j}$ are the between-classroom random effects and assumed to be normally distributed. The same rule holds for the Model 4:

Level 1 (repeated-measures level) model:

$$\text{Proportion of Use of Complex Talk}_{ij} = \beta_{0j} + \beta_{1j}Math_{ij} + \beta_{2j}Science_{ij} + \beta_{3j}Social\_Studies_{ij} + e_{ij}$$

Level 2 (classroom level) model:

$$\beta_{0j} = \gamma_{00} + u_{0j}$$
$$\beta_{1j} = \gamma_{10} + u_{1j}$$
$$\beta_{2j} = \gamma_{20} + u_{2j}$$
$$\beta_{2j} = \gamma_{30} + u_{3j}$$

Third, a set of two-level HLMs tested the extent to which teacher and child characteristics were associated with the proportion of complex talk in specific type of grouping (Model 5) and content-specific instruction (Model 6). The outcome variables are the proportion of complex talk within each type of activity setting and content area. The conditional HLM models expanded the unconditional models to add variables from the LISn classroom observations, child covariates at Level 1 (race, gender, age, maternal education, home language, and shyness), and teacher characteristics at Level 2. In the Model 5, the Level 1 and Level 2 equations are as follows:

Level 1 (child level) model:
Proportion of Use of Complex Talk Within Activity Setting \( i_j \)

\[
= \beta_{0j} + \beta_{1j}\text{Black}_{ij} + \beta_{2j}\text{Male}_{ij} + \beta_{3j}\text{Age}_{ij} + \beta_{4j}\text{Maternal\_Education}_{ij} + \beta_{5j}\text{DLL}_{ij} + \beta_{6j}\text{Shyness}_{ij} + e_{ij}
\]

Level 2 (classroom level) model:

\[
\begin{align*}
\beta_{0j} &= \gamma_{00} + \gamma_{01}\text{Belief}_{j} + \gamma_{02}\text{Instructional\_Orientation}_{j} + \gamma_{03}\text{Emotional\_Support}_{j} + \gamma_{04}\text{Teaching\_Experience}_{j} + \gamma_{05}\text{Time\_Teachers\_Speak\_Spanish}_{j} + u_{ij} \\
\beta_{ij} &= \gamma_{10} \\
\beta_{2j} &= \gamma_{20} \\
\beta_{3j} &= \gamma_{30} \\
\beta_{4j} &= \gamma_{40} \\
\beta_{5j} &= \gamma_{50} \\
\beta_{6j} &= \gamma_{60}
\end{align*}
\]

where Proportion of Use of Complex Talk Within Activity Setting \( i_j \) is the proportion of complex talk within each type of activity setting for the \( i \)-th child in the \( j \)-th class, \( \beta_{0j} \) is the random intercept for the \( j \)-th classroom, and the level-1 random effect, \( e_{ij} \), and level-2 random effect, \( u_{0j} \), are independent. \( \gamma_{00} \) is a Level 2 coefficient; \( \gamma_{10}, \gamma_{20}, \gamma_{30}, \gamma_{40}, \gamma_{50} \), and \( \gamma_{60} \) are coefficients of the Level 1 variables. Similarly, in the Model 6, the Level 1 and Level 2 equations are as follows:

Level 1 (child level) model:

Proportion of Use of Complex Talk Within Content Area \( i_j \)

\[
= \beta_{0j} + \beta_{1j}\text{Black}_{ij} + \beta_{2j}\text{Male}_{ij} + \beta_{3j}\text{Age}_{ij} + \beta_{4j}\text{Maternal\_Education}_{ij} + \beta_{5j}\text{DLL}_{ij} + \beta_{6j}\text{Shyness}_{ij} + e_{ij}
\]

Level 2 (classroom level) model:
\[ \beta_{0j} = \gamma_{00} + \gamma_{01}\text{Belief}_j + \gamma_{02}\text{Instructional Orientation}_j + \gamma_{03}\text{Emotional Support}_j + \gamma_{04}\text{Teaching Experience}_j + \gamma_{05}\text{Time Teachers Speak Spanish}_j + u_{0j} \]

\[ \beta_{1j} = \gamma_{10} \]

\[ \beta_{2j} = \gamma_{20} \]

\[ \beta_{3j} = \gamma_{30} \]

\[ \beta_{4j} = \gamma_{40} \]

\[ \beta_{5j} = \gamma_{50} \]

\[ \beta_{6j} = \gamma_{60} \]

**Qualitative Phase**

The qualitative portion of this study drew upon interview data with early childhood (preschool) teachers in rural North Carolina. Qualitative research aligns with the purpose of this study to understand the realities of teachers’ use of complex talk in various classroom activity contexts and supports sharing their authentic voices (Patton, 2015). A separate sample of 10 preschool teachers (i.e., not from the original IES study) was selected from teachers in rural North Carolina. The specific interview protocol was designed based on the quantitative results from the first phase (Creswell et al., 2003).

**Procedures.** This study used convenience sampling to identify current preschool teachers. To obtain participants’ names, this study first sought the school system’s or early childhood agency’s permission to reach out to program directors in area schools. The program directors sent an initial email to preschool teachers inviting them to consider participating. Once the preschool teacher(s) indicated their willingness to be contacted by the student investigator, the researcher provided study contact information to ensure that privacy and confidentiality were protected in each file. For being in this study, each participant received a $50 Amazon gift card and an annotated list of curriculum resources to help facilitate language and literacy in their
classrooms. The study’s results were shared with them once data collection and analysis were completed.

This study used in-depth semi-structured interviews lasting 45-60 minutes each. The online interviews included a short list of guiding questions supplemented by follow-up and probing questions to explore teachers’ ideas in more detail (Cresswell & Cresswell, 2017; Miles & Huberman, 1994). Since the purpose of the qualitative portion was to elaborate on the findings from the quantitative portion, an interview protocol was created based on the preliminary analysis of the quantitative results (Creswell et al., 2003).

The interview protocol was pilot tested on two early childhood teachers. Based on the pilot interviews, the order of the protocol questions was revised with additional probing questions. Interviews mainly focused on questions regarding teachers’ perceptions of complex talk and the practical, day-to-day realities associated with teachers’ use of complex talk in their classrooms, with an emphasis on differences across activity contexts. Additionally, this study sought to understand why certain teacher and child characteristics were related differently to teachers’ use of complex talk. Several open-ended questions explored the role of teachers’ beliefs, practices, and years of teaching as related to their complex talk in early childhood classrooms. Their important role in teacher-child interactions was reported in numerous studies (e.g., Early et al., 2007).

The semi-structured interview was conducted as a conversation rather than a series of questions and answers (Creswell, 2013). First, the interview focused on teachers’ use of complex talk in general and within each type of activity context (e.g., “How do you talk to your children in different activity settings (large-group activity, small-group activity, and free choice/center time)?”) and a certain type of teacher talk (e.g., “In what activity setting (among large-group
activity, small-group activity, and free choice/center time) do you frequently use complex talk? How and why?”). Second, the interview focused on deciding factors or events that led them to talk in those ways (e.g., “Why was so much complex talk associated with language and literacy skills involved in large-group activities?”, “What makes it easier (or harder) to have more frequent language interactions in large-group activities?”). Third, the interview focused on teachers’ perceptions of complex talk (e.g., “How do you perceive your complex language use influencing children’s language and literacy skills?”, “What do you see as the benefits and challenges of these types of talk across activity contexts?”).

At the completion of each interview, a Post-Interaction Form (PIFs) was completed to summarize initial findings and reflections on an interview (Cohen-Vogel & Harrison, 2013; Miles & Huberman, 1994). The PIF consisted of two major sections. In the first section, the interview procedure and protocol itself were reflected to determine if the interview items needed modification for subsequent interviews. The second section of the PIF was used to prompt reflection on emergent themes and findings. Along with the transcribed interview text, these forms were coded and analyzed.

Additionally, to offer the richness and the depth of the qualitative data collection and analysis (Stake, 1995; Creswell, 1998), this study used multiple sources for collecting the data. Those sources included: (1) in-depth semi-structured interviews with 10 preschool teachers; (2) reflection notes on each teacher’s reported beliefs and practices; and (3) member checks in which teachers reviewed their own interview transcripts and provided additional or revised information if needed.

**Analytic strategies.** This study used thematic analyses of the text data to find patterns and themes at two levels, within each case and across the cases (Coffey & Atkinson, 1996;
Creswell & Clark, 2011; Heydarian, 2016). Based on the constant comparative method, the researcher moved back and forth among the data and gradually advanced from coding to conceptual categories (Lichtman, 2012), and thence to understand the realities of teachers’ use of complex talk in various classroom activity contexts.

First, the researcher pre-coded by circling, highlighting, bolding, underlining, or coloring significant teacher quotes or passages (Saldana, 2012). Second, open coding was conducted, through which the researcher named events and actions in the data and constantly compared them with one another to determine which belonged together, culminating in collapsing the original number of first-cycle codes into a smaller number (Harry et al., 2005). Here, the interviewer’s questions, prompts, and comments were not coded, because the utterances were more functional than substantive in these particular cases and didn’t merit a code (Saldana, 2012). Third, the discrete codes were grouped according to conceptual categories reflecting a pattern, which is “repetitive, regular, or consistent occurrences of action/data” (Saldana, 2012, p. 9). Strauss and Corbin (1998) defined this as “axial coding,” reflecting the idea of “clustering the open codes around specific “axes” or points of intersection” (Harry et al., 2005, p. 5), through a combination of inductive and deductive reasoning. This coding paradigm was used to include categories related to (1) complex talk phenomena, (2) conditions related to the complex talk phenomena, (3) actions and interactional strategies directed at handling the complex talk phenomena, and (4) consequences of the actions/interactions associated with the complex talk phenomena (Creswell & Creswell, 2017; Saldana, 2012).

Consensus coding was used to verify the stability of responses to multiple coders. The author and two research assistants (RAs) coded and analyzed ten interview transcripts. The author served as the first coder, and the two RAs were recruited for consensus coding. The RAs
were undergraduate students majoring in Human Development and Family Studies with a background in early childhood development and education.

The author first trained the RAs to discuss terms and definitions related to complex teacher talk. The RAs also transcribed and read each transcript to become familiar with interview data as a whole. The author and RAs then summarized and organized the findings iteratively under emergent themes and subthemes. Specifically, they developed codes and assigned them to quotations from individual interviews using a combination of deductive and inductive coding. Individual coding assignments were compared, and disagreements were discussed until consensus was achieved (Creswell, 2014).

A finalized codebook was developed to include specified definitions for codes, subthemes, and main themes identified through the iterative coding process. Codes were broadly categorized into nine groups in alignment with the research questions: (1) Teachers’ Perceptions of Complex Talk; (2) Using More Complex Talk in Large Group Than Other Settings; (3) Using More Complex Talk in Science and Social Studies Than Math; (4) Content Integration; (5) Importance of Teachers’ Emotional Support in Complex Talk; (6) Refinement of Teaching Skills; (7) Age and Development Status; (8) Dual Language Learners; and (9) Shyness.

The verification processes involved member checking, consensus coding, triangulating different sources of information, and review of the themes and related codes with the dissertation advisor (Creswell & Creswell, 2017; Miles & Huberman, 1994; Stake, 1995).

Integration

Integration is the stage or stages in the research process in which the quantitative and qualitative methods are mixed or integrated (Creswell & Creswell, 2017; Tashakkori & Teddlie, 1998). In this study, as noted previously, the quantitative analysis results informed the
development of the interview protocol to investigate the outcomes in more depth. Interview questions regarding teachers’ use of complex talk within each type of activity context, deciding factors or events leading them to talk in those ways, and their perceptions of complex talk were explored. In the final analysis, the results from the quantitative and qualitative phases were integrated to answer the following questions:

1. How do teachers perceive their use of complex talk influencing children’s language and literacy skills in their classrooms? How do they describe their use of complex talk?
2. Do children show larger gains in language and literacy development when teachers engage in more complex talk?
3. Does complex teacher talk vary across activity contexts? How and why do teachers talk differently in different activity contexts?
4. How do teacher and child characteristics relate to complex teacher talk?

The integrative joint display table was used at the interpretation stage to gain a better understanding of the complex talk phenomena in early childhood classrooms. An integrative joint display table arrayed qualitative and quantitative results next to each other, organized by the research questions. Then the “fit” between (or the coherence of) the qualitative and quantitative results (confirmation, expansion, discordance) was examined (Guetterman et al., 2021). Confirmation occurs when the findings from both the quantitative and qualitative data reinforce the results from the other. Expansion occurs when the findings from both types of data diverge and expand insights of the phenomenon by addressing different (or complementary) aspects of the phenomenon. Discordance occurs when the findings from the two datasets are inconsistent, conflict, and disagree with each other (Fetters et al., 2013). The integrative joint display table was used to visualize the fit of the quantitative and qualitative data.
Summary

In this study, both quantitative and qualitative data were integrated using a modified sequential explanatory design (Creswell, 2005; Tashakkori & Teddlie, 2003). In the quantitative portion, this study used the year one (i.e., pre-K) sample from Early Learning Network (ELN), an IES-funded longitudinal pre-K to third grade study. In the qualitative portion, this study used a different sample of preschool teachers in rural North Carolina for the qualitative analysis. The quantitative and qualitative phases were connected in the intermediate phase (Hanson et al., 2005) (see Figure 3.1). The development of the qualitative data collection protocols (e.g., interview questions) was based on the findings from the quantitative phase to study those findings in more depth (Creswell et al. 2003). For example, this study collected and analyzed the qualitative data to help understand why certain teacher and child characteristics, tested in the quantitative phase, were significantly or not significantly associated with teachers’ use of complex talk. The outcomes from both types of data were combined to develop a more robust and holistic picture of the complex talk phenomena (Green et al., 1989; Creswell et al., 2003).
Figure 3.1.
*Mixed-Method Sequential Explanatory Design Procedures*

**Sequential Explanatory Design Procedures**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Procedure</th>
<th>Product</th>
</tr>
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<td>Quantitative Data Collection</td>
<td>• IES-funded Early Learning Network data</td>
<td>• Numeric data</td>
</tr>
<tr>
<td></td>
<td>(455 children, 63 pre-K teachers)</td>
<td></td>
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<tr>
<td>Quantitative Data Analysis</td>
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<td>• Tables and graphs</td>
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<td></td>
<td>• Hierarchical Linear Modeling</td>
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<tr>
<td>Connecting Quantitative and Qualitative Phases</td>
<td>• Developing interview questions</td>
<td>• Interview protocol</td>
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<tr>
<td>Qualitative Data Collection</td>
<td>• Online interviews with 8-10 preschool teachers</td>
<td>• Text data (interview</td>
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<td></td>
<td>• Reflection notes</td>
<td>transcripts)</td>
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<td></td>
<td>• Member checks</td>
<td>• Post Interaction Forms</td>
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<td></td>
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<td>(PIF) analytic memos and matrices</td>
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<tr>
<td>Qualitative Data Analysis</td>
<td>• Coding and thematic analysis</td>
<td>• Visual model of multiple interview analysis</td>
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<tr>
<td></td>
<td>• Within-case and across-case theme development</td>
<td>• Codes and themes</td>
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<td></td>
<td>• Cross-thematic analysis</td>
<td>• Similar and different</td>
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<td></td>
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<td>themes and categories</td>
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<tr>
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<td>• Cross-thematic matrix</td>
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<td>Integration of the Quantitative and</td>
<td>• Interpretation and explanation of the</td>
<td>• Joint Display Table</td>
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<td>Qualitative Results</td>
<td>quantitative and qualitative results</td>
<td>• Conclusion</td>
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<td></td>
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<td>• Discussion/Implication</td>
</tr>
</tbody>
</table>
CHAPTER 4: RESULTS

This chapter presents the results from analyses addressing each of the four research questions. Results from the first research question “How do teachers perceive their use of complex talk influencing children’s language and literacy skills in their classrooms? How do they describe their use of complex talk?” are based on the qualitative data analysis. Results from the second research question “Do children show larger gains in language and literacy development when teachers engage in more complex talk?” are based on the quantitative data analysis. Results from the third research question “Does complex teacher talk vary across activity contexts? How and why do teachers talk differently in different activity contexts?” and the fourth research question “How do teacher and child characteristics relate to complex teacher talk?” are based on the quantitative and qualitative data analysis. In the section addressing results regarding each of the research questions, quantitative results are presented first, qualitative results second, and then triangulation of the data is presented last.

RQ 1: Teachers’ Perceptions of Complex Talk

In this first section, the participant interviews are analyzed to answer research question #1 (“How do teachers perceive their use of complex talk influencing children’s language and literacy skills in their classrooms? How do they describe their use of complex talk?”). As previously mentioned, the ten interviews were recorded, transcribed, and coded. Each teacher participant was assigned a pseudonym for confidentiality. Brief profiles of each teacher are shown in Table 4.1.
Table 4.1.  
Qualitative Portion: Sample Characteristics (n = 10)

<table>
<thead>
<tr>
<th>Name</th>
<th>Years of Teaching</th>
<th>Educational Level</th>
<th>Race/Ethnicity</th>
<th># of Children in Classroom</th>
<th># of Dual Language Learners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jennifer</td>
<td>6-10</td>
<td>Bachelor’s</td>
<td>White</td>
<td>15-17</td>
<td>4-6</td>
</tr>
<tr>
<td>Ashley</td>
<td>11-15</td>
<td>Bachelor’s</td>
<td>White</td>
<td>15-17</td>
<td>1-3</td>
</tr>
<tr>
<td>Stephanie</td>
<td>16-20</td>
<td>Bachelor’s</td>
<td>Hispanic</td>
<td>18-20</td>
<td>&gt;6</td>
</tr>
<tr>
<td>Melissa</td>
<td>1-3</td>
<td>Bachelor’s</td>
<td>White</td>
<td>15-17</td>
<td>1-3</td>
</tr>
<tr>
<td>Nicole</td>
<td>21-25</td>
<td>Bachelor’s</td>
<td>Black</td>
<td>&lt;15</td>
<td>4-6</td>
</tr>
<tr>
<td>Katherine</td>
<td>26-30</td>
<td>Bachelor’s</td>
<td>Black</td>
<td>18-20</td>
<td>1-3</td>
</tr>
<tr>
<td>Jamie</td>
<td>31-35</td>
<td>Bachelor’s</td>
<td>White</td>
<td>18-20</td>
<td>4-6</td>
</tr>
<tr>
<td>Erica</td>
<td>6-10</td>
<td>Master’s</td>
<td>White</td>
<td>15-17</td>
<td>1-3</td>
</tr>
<tr>
<td>Kristen</td>
<td>16-20</td>
<td>Master’s</td>
<td>Black</td>
<td>15-17</td>
<td>4-6</td>
</tr>
<tr>
<td>Shannon</td>
<td>11-15</td>
<td>Bachelor’s</td>
<td>White</td>
<td>15-17</td>
<td>4-6</td>
</tr>
</tbody>
</table>

Teachers reported using complex talk as helpful for students and an efficient means for them to instruct, but they modulated their use of complex talk depending on the instructional context and student skill level and engagement. The overall purpose of using complex language is discussed below.

**The purpose of complex talk.** Three main themes emerged describing why teachers used complex talk with their students: (1) preparing children for school talk; (2) checking for student understanding; and (3) transferring of learning. All themes and subthemes with definitions and sample quotes are presented in Table 4.2. Each theme and subtheme are described below related to research question #1.

**Preparing children for school talk.** Participants described how they prepared children for school by using complex talk. Two subthemes emerged from interviews to describe this theme:
(a) broadening and deepening children’s understanding of concepts; and (b) helping them understand and use specific discourse functions common in school.

**Broadening and deepening children’s understanding of concepts.** The majority of teachers reported they asked complex questions to challenge children to “go deeper” as they expressed ideas. They noted children need to be able to do much more than repeat a list of facts: they need to make sense of information, analyze, make inferences, and generate higher-order thinking skills. Katherine, a preschool teacher for 26-30 years, said:

> “Just to make sure they don’t get stuck with knowing simple things … Not just knowing what an apple is, but where it comes from or what you do with it … Not just knowing what an animal is, but what family it came from, what animals it’s related to. It’s just a matter of broadening their minds so that they know they can tell you a whole lot about that one particular thing … think better … problem solve better.”

In this statement, she described how complex talk broadened and deepened children’s understanding of concepts by encouraging thinking in new and different ways.

In a similar vein, a few teachers spoke about ways in which complex talk promoted the type of vocabulary common in school talk. They connected new words to children’s own experiences and interests for building their vocabulary. Melissa, who has taught pre-K for 1-3 years, said:

> “To promote acquisition of vocabulary … Encouraging students to think about and respond to topics that interest them or topics that are relevant to them, and that they can make connections. But we really want to focus on vocabulary building and getting those language skills ready for when they move up to kindergarten.”

This teacher highlighted that complex talk is useful for children’s ongoing vocabulary development.

**Helping children understand and use specific discourse functions required in school talk.**

Several teachers reported complex talk prepares children for “school talk,” which is quite
different from the type of language children hear during everyday life at home (i.e., “casual talk”). Nicole, who has taught preschool for 21-25 years, shared:

“When children leave my class, they’re going to know how to hold a better conversation with the next teacher … If I don't use complex talk … If I just ask them closed questions … Guess what? That child is just... Yes, no, yes, no … That’s nothing. Give them more ways to elaborate, to express themselves, to communicate with people.”

This comment reflected the teacher’s understanding of the importance of having complex conversations with children to promote communication skills required in school talk.

**Checking for student understanding.** Some teachers shared complex talk helps effectively gather objective evidence and detailed data regarding children’s receptive language skills. They reported complex talk helps document child progress and understand where children are in terms of learning so they can plan next steps. For example, Nicole, a veteran preschool teacher for 21-25 years, commented, “You ask those complex questions … You can have more documentation to help your child promote their developmental stages … You got to be able to ask more questions to get more information.” This teacher reported the importance of using complex talk to gauge children’s understanding of language.

**Transferring of learning.** In the following excerpt, Katherine, a veteran preschool teacher for 26-30 years, described how she encouraged children to become more interested in applying what they learned about complex talk to other situations inside and outside of school:

“I may find them using them (complex talk) in small areas as they’re interacting with their friends, once we’re done with a large group. I may have them tell their parents or other friends outside or other teachers, so that lets me know they are learning through this complex language. And it is something that is actually catching their attention enough that they want to continue to talk about. It’s something that spikes their interest, so they want to continue to learn about, you know, the complex language or the new words they haven’t been introduced to or something like that.”

This teacher described the significant role of using complex talk by emphasizing the importance of motivating children to apply knowledge and skills in complex talk in real-world contexts.
Table 4.2.  
*Theme and Subtheme Table: The Purpose of Complex Talk*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Subtheme</th>
<th>Definition</th>
<th>Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparing children for school talk</td>
<td>Broadening and deepening children’s understanding of concepts</td>
<td>Challenging children to “go deeper” by encouraging thinking in new and different ways</td>
<td>“When we collect leaves … We talk about what season it is, even though that’s a sort of an abstract concept … We can describe the colors of the leaves and talk about how they’re the same and how they are different.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“You want … give ideas of things that are really going to help them out in the long run when they go to school.”</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Helping children understand and use specific discourse functions required in school</td>
<td>Preparing children for school by asking open-ended questions and having complex conversations to promote their communication skills</td>
<td>“They’re at home … They don’t hear that kind of talk … It’ll take them a little while to be able to elaborate … The end of the school year … they’re able to elaborate on what’s going on in the classroom.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“It all begins … in the classroom … If a child can’t communicate … it’s so frustrating … They still have needs and wants … They can communicate to us … It’s a passion of mine to make sure that everybody’s voice is heard.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checking for student understanding</td>
<td>Using complex talk for assessment</td>
<td>Teachers understand where children are in terms of learning so they can plan next steps</td>
<td>“To influence their talk, I’m using my assessment data, and that gives me an opportunity to help me understand how much elaboration I can do with that particular student … I can ask them … small questions and see how they relate to them and how they elaborate. Then that way, I have an idea of how much information can be fed.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Having teachers facilitate that (complex) language to extend it further to get more information about their ideas.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Seeing how much information I can get out of my students depending on what we’re talking about, see how much they have learned.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transferring of learning</td>
<td>Motivating children to apply knowledge and skills in complex talk in real-world contexts</td>
<td>Encouraging children to become more interested in applying what they learn about complex talk to other situations inside and outside of school</td>
<td>“We’re just enjoying our time together … Like recalling … Try to get them more accustomed to having those questions and thinking about … “What was it that I did yesterday?” or “What have I done at home that is similar to what I’m doing right now? What is something that reminds me of that?” … So try to think about other times that are similar to what’s going on … How can we bring those experiences together to make them think about that?”</td>
</tr>
</tbody>
</table>
Contextual factors influencing complex talk. Although the majority of teachers agreed complex talk components are helpful in leading to improved outcomes for their children, some teachers emphasized that the use and effectiveness of complex talk may depend substantially on context and learner variability. The contextual factors found to be the most influential were: (1) aligning curriculum, activity, and assessment with complex talk; (2) adapting to the audience; and (3) between- and within-year changes in complex talk.

Aligning curriculum, activity, and assessment with complex talk. The purpose of curriculum, activity, and assessment emerged as a contextual factor influencing teachers’ use of complex talk. First, a few teachers believed that it is fundamental to make curriculum, assessment, and complex talk work toward the same ends. Erica, who has taught pre-K for 6-10 years and holds a Master’s degree, stated, “It’s a big mix of what we might get … We have teaching strategies, but we also have a pacing guide that’s thematic, so that’s kind of separate, so we mesh the two together.” She described how the curriculum was used as a pacing guide for instruction.

Second, several teachers shared that their use of complex talk was directly related to assessments based on learning objectives/outcomes. Erica, a pre-K teacher for 6-10 years, commented:

“Sometimes it (complex talk) does have to do with our assessments that we have to do, and there’s certain wording in one of our assessments because it’s a finite-type assessment … I’ll try to use some of that verbiage that I might hear in there, so they’re accustomed to hearing those words.”
This teacher illustrated the importance of using assessment practices to inform what children should know and adjust instruction and complex talk to meet student needs and accelerate learning.

Third, most teachers mentioned they provided more or less instruction depending on the purpose of activity. For instance, Jamie, a veteran preschool teacher for 31-35 years, stated:

“Sometimes with science, I’ll give directions … Sometimes I’ll put it out there and see what they are thinking. I want to see if they know what to do with it or what they will do with it. And then we’ll come in, and I can show them some other ways to use it to try to extend. Like with a scale … they were doing it and making it go up and down. And then I came with it and said, “Okay, let’s put this in here, and we’re using different sized pom-poms … Let’s put this big pom-pom in this one. All right, let’s see how many of the medium-sized pom-poms it takes to move it, or to make it equal, make it the same.” So it’s different ways. Sometimes it’s very direct, but then sometimes it’s that open-ended, trying to expand that thought process, or see what they can do with it and then expand with it.”

This teacher reported giving verbal directions in some science activities and asking open-ended questions in other science activities.

Adapting to the audience. Nearly all participants described how complex talk was adapted for varied audiences. They emphasized the value of understanding children and adapting complex talk to their interests and level of understanding. Katherine, a veteran teacher who has taught preschool for 26-30 years, explained:

“Just gives you an understanding as well as remembering that the group that you’re talking to, the audience that you’re talking to, you have to make it understandable for them. You can’t use all big words and things they can’t spell, they can’t pronounce, just remembering the audience and the age group and the age-appropriateness that you’re delivering your message to.”

She talked about how she found out what children knew and used their developmental stages as a guide to starting complex talk.

Between- and within-year changes in complex talk. Some teachers highlighted the importance of time as it relates to their use of complex talk. In this theme, two subthemes
emerged: (a) variations in complex talk based on classroom climate and (b) variations in complex talk based on time of year.

Variations in complex talk based on classroom climate. Several teachers discussed annual variations in complex talk based on classroom climate. They explained every class had a different climate which regulated the circulation and construction of knowledge. Jamie, a veteran preschool teacher for 31-35 years, noted:

“Every year, every class has a different personality … Depending on that class’s interests and their experiences and… we always have different levels in there… But you have some classes that click, and they mesh really good, and they take care of each other, so you might have more conversation, even though we stress, you know, we’re a classroom family... And then other classes, it doesn’t.”

She shared how variations in classroom climate, such as the prevailing mood, attitudes, and tone they and their children felt in their classroom, influenced their use of complex talk.

Variations in complex talk based on time of year. Teachers talked about how complex talk changed across the school year. First, a few teachers highlighted that, as the academic year progressed, teachers and children had more natural conversations and asked more questions. Jamie, who has taught preschool for 31-35 years, said:

“You start asking lots of questions because you’re trying to learn those children … And they’re trying to learn you, so they’re asking you a lot of questions. And you’re trying to encourage that conversation. And now, the conversation at this point in the year is a more natural type thing. So we have more, I hate to even say relax, but it’s a more natural flow with everything.”

This teacher recognized complex conversations went more smoothly and naturally as they got to know each other better.

Second, several teachers also described how complex talk in large-group activities changed across the school year. Jamie, a preschool teacher for 31-35 years, reported she often
used directional talk to establish a foundation for new environments at the beginning of the year.

She stated:

“At the beginning of the year, when they come in, so many of our children have never been in a group setting. They’re coming from being home, and that’s in a regular year, not just with COVID going on. So it’s very overwhelming when they come in, and there’s a lot of directions, you know, just to explain some of the simplest things. They have their own cubbies. “What’s that for? What does that mean?” That’s their personal space, just to start the routines, get those routines going … Direction seems to be like the foundation of it.”

Furthermore, Jamie shared she used more complex talk before/after holidays and special days.

She mentioned:

“Christmas and Thanksgiving were really good times … When we came back, asking a lot of questions - “what did you do while you were out of school?” And some of them celebrate Christmas … you talk about what they got for Christmas. Or if they took a trip. And that’s really kind of gotten the ball rolling with that recall and talking about those past experiences.”

This teacher asked more open-ended questions and helped children recall past/future events before and after holidays and special days.

Third, some teachers discussed how complex talk during social studies activities changed across the school year. Jamie, a preschool teacher for 31-35 years, gave an example of using more complex talk at the beginning of the school year, saying:

“Social studies … Especially the beginning of the year, that’s such a big thing … Because learning so much about them and their families … We’ll ask a lot of questions. We’ll ask them to bring … want that family input too. So we’ll send assignments home for them to send back. Like one of the first assignments, I have a book called Me on a Map, and it starts with a child in their bedroom. And they draw a map of their bedroom … Then they draw a blueprint of their house, and it goes to the neighborhood, and it ends up with the whole world. So they were able to bring it back to school, and they could talk about it. And we could all ask questions about it, and they could explain.”

This teacher described how she asked more questions to learn about children and their families through social studies activities at the beginning of the school year.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Subtheme</th>
<th>Definition</th>
<th>Quote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aligning curriculum, activity, and assessment with complex talk</td>
<td>Changing complex talk based on the purpose of curriculum, activity, and assessment</td>
<td>Teachers use their curriculum as a pacing guide for instruction; and activities and assessments to inform what children should know</td>
<td>Based on the purpose of curriculum: “Some of the curriculum is ready, the language is all ready. You just read a script … On the lesson plan … we have our focus questions, then we have our vocabulary.” “Within the context of creative curriculum … teachers are more likely to use complex talk in large-group setting because they have some prescribed instructions for that.” Based on the purpose of assessment: “That (decontextualized talk) is actually one of our assessments … That is something I am looking for. I’ve gotten in a better habit about looking for it... My documentation is better on it now... All the time because that is one of those things you can miss so easily.”</td>
</tr>
<tr>
<td>Audience adaptation</td>
<td>Adapting complex talk for varied audiences</td>
<td>Understanding children and adapting complex talk to their interests and level of understanding</td>
<td>“I feel like every child is different. Every child has a different background … Every child comes to school with a different set of skills … For me, to use complex talk, that’s a little bit more expansive on some children … Just meeting their needs, where they are.” “It depends on each child. One child might go quicker than the other. Each child is different, they learn differently … With a child that’s not shy, you can ask as many complex questions … It just depends on a child’s temperament, a child’s mood, their personality, and their developmental state that they’re in.”</td>
</tr>
<tr>
<td>Between- and within-year changes in complex talk</td>
<td>Variations in complex talk based on classroom climate</td>
<td>Every year, every class has a different climate and regulates the circulation and construction of knowledge differently</td>
<td>“Some teachers that are in their years that just want to teach, what they’re asked to teach … Some dual language learners, their parents are illiterate … So I have to do videos instead of notes … They can’t read, even in their home language. Or I have to go to the house, and do a home visit, and teach the parent what the homework is before they help the child. I think that’s really the drive of the teacher … What they want their atmosphere and what they want their language to be is what is really crucial.” “When they came to me last year, they could count objects up to 30. And they already knew how to rote count … But my class is a whole lot different this year, because I'm having to learn how to break my time up to meet the needs.”</td>
</tr>
</tbody>
</table>
RQ 2: Relations Between Complex Talk Within Each Type of Activity Context and Children’s Language and Literacy Development

In this second section, the quantitative observational data of research question #2 (Do children show larger gains in language and literacy development when teachers engage in more complex talk?”) is examined using descriptive and inferential analyses.

**Descriptive statistics.** Table 4.4 shows descriptive information for study variables. Of the sample, 51% were boys and 49% were girls. Parents chose one or more racial/ethnic groups for their child, and the sample contained 34% African American/non-Hispanic, 43% Hispanic/Latino children, 45% White/non-Hispanic, and 4% other racial/ethnic group. Of the participating children, about one-third spoke Spanish at home as their primary language. Maternal education ranged from less than a high school degree (24%) to a bachelor’s degree or higher (12%), with about half of the mothers reporting a high school degree or equivalent.

Table 4.5 includes w or raw scores used in analyses. Children’s fall, spring, and gain scores are presented. Paired t-tests were performed to decide if gains were significantly different from zero. It was found that children showed significant gains in all language and literacy outcomes.

**Table 4.4.**
*Child and Family Characteristics*

<table>
<thead>
<tr>
<th>Child and Family Characteristics</th>
<th>N</th>
<th>%</th>
<th>M (SE)</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>225</td>
<td>51%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>216</td>
<td>49%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age at Entry to Pre-K</strong></td>
<td>441</td>
<td></td>
<td>4.5 (0.3)</td>
<td>2.95</td>
<td>5.35</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>148</td>
<td>34%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>191</td>
<td>43%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>197</td>
<td>45%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4.5.  
Pre-K Child Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Fall</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>M (SE)</td>
<td>N</td>
<td>M (SE)</td>
<td>N</td>
<td>M (SE)</td>
<td></td>
</tr>
<tr>
<td>WJ Picture Vocabulary (W)</td>
<td>444</td>
<td>450.64 (22.48)</td>
<td>432</td>
<td>459.01 (16.51)</td>
<td>431</td>
<td>8.19*** (11.32)</td>
<td></td>
</tr>
<tr>
<td>Expressive One Word PVT (Raw)</td>
<td>439</td>
<td>47.11 (15.73)</td>
<td>426</td>
<td>53.45 (16.36)</td>
<td>424</td>
<td>6.22*** (11.67)</td>
<td></td>
</tr>
<tr>
<td>WJ Letter-Word Identification (W)</td>
<td>445</td>
<td>317.08 (24.31)</td>
<td>432</td>
<td>338.77 (24.03)</td>
<td>432</td>
<td>21.45*** (20.59)</td>
<td></td>
</tr>
</tbody>
</table>

Note: * p < .05; ** p < .01; *** p < .001; WJ = Woodcock Johnson, III

Table 4.6 describes the observations of classrooms using the LISn. The proportion of teachers’ use of complex talk within each type of activity context and the time spent in specific type of grouping and content-specific instruction were tallied at the classroom level. Here, the proportion of time a teacher was talking in an activity context that involved complex talk was calculated by dividing “the number of 30-second cycles with complex talk by a teacher in an activity context” by “the number of 30-second cycles in that activity context in which a teacher talked,” an approach consistent with what other researchers employing a language-intensive method have used (Dickinson et al., 2014; Dickinson & Porch, 2011; Massey et al., 2008).

The proportion of use of complex talk was highest for large-group activities (11%), followed by small-group activities (7%) and free choice/center time (6%). The proportion of use of complex talk was highest for science activities (13%), followed by social studies activities.
(12%), literacy activities (10%), and math activities (9%). Children were observed in literacy-related learning activities most frequently (23%), followed by oral social studies activities (22%), math activities (16%), and science activities (14%). Children were observed in free choice/center time most frequently (47%), followed by large group (37%), and small group (8%) (see Figure 4.1).

Table 4.6. Variables of Interest for Pre-K Classrooms

<table>
<thead>
<tr>
<th>Classroom Characteristics</th>
<th>N</th>
<th>M (SE)</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS Emotional Support</td>
<td>62</td>
<td>5.32 (0.67)</td>
<td>3.50</td>
<td>6.31</td>
</tr>
<tr>
<td>LISn Complex Talk (Proportion)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>61</td>
<td>0.10 (0.07)</td>
<td>0.00</td>
<td>0.33</td>
</tr>
<tr>
<td>Activity Setting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large Group</td>
<td>61</td>
<td>0.11 (0.10)</td>
<td>0.00</td>
<td>0.41</td>
</tr>
<tr>
<td>Small Group</td>
<td>35</td>
<td>0.07 (0.11)</td>
<td>0.00</td>
<td>0.39</td>
</tr>
<tr>
<td>Free Choice/Center</td>
<td>61</td>
<td>0.06 (0.06)</td>
<td>0.00</td>
<td>0.21</td>
</tr>
<tr>
<td>Content Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Literacy</td>
<td>59</td>
<td>0.10 (0.08)</td>
<td>0.00</td>
<td>0.28</td>
</tr>
<tr>
<td>Math</td>
<td>50</td>
<td>0.09 (0.09)</td>
<td>0.00</td>
<td>0.36</td>
</tr>
<tr>
<td>Science</td>
<td>45</td>
<td>0.13 (0.14)</td>
<td>0.00</td>
<td>0.50</td>
</tr>
<tr>
<td>Social Studies</td>
<td>53</td>
<td>0.12 (0.12)</td>
<td>0.00</td>
<td>0.67</td>
</tr>
<tr>
<td>LISn Time Spent in Context</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity Setting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large Group</td>
<td>61</td>
<td>0.37 (0.18)</td>
<td>0.04</td>
<td>0.88</td>
</tr>
<tr>
<td>Small Group</td>
<td>61</td>
<td>0.08 (0.11)</td>
<td>0.00</td>
<td>0.38</td>
</tr>
<tr>
<td>Free Choice/Center</td>
<td>61</td>
<td>0.47 (0.20)</td>
<td>0.04</td>
<td>0.92</td>
</tr>
<tr>
<td>Content Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Literacy</td>
<td>61</td>
<td>0.23 (0.13)</td>
<td>0.00</td>
<td>0.58</td>
</tr>
<tr>
<td>Math</td>
<td>61</td>
<td>0.16 (0.13)</td>
<td>0.00</td>
<td>0.67</td>
</tr>
<tr>
<td>Science</td>
<td>61</td>
<td>0.14 (0.14)</td>
<td>0.00</td>
<td>0.71</td>
</tr>
<tr>
<td>Social Studies</td>
<td>61</td>
<td>0.22 (0.15)</td>
<td>0.00</td>
<td>0.58</td>
</tr>
</tbody>
</table>

Figure 4.1. The Proportion of Use of Complex Talk Within Each Type of Activity Setting and Content Area (Left) and Time Spent in Specific Type of Grouping and Content-specific Instruction (Right)
Correlations among classroom observation variables are presented in Table 4.7. They were included to describe how the proportion of use of complex talk within each type of activity setting and content area and the time spent in specific type of grouping and content-specific instruction were related. Given that the values of the proportion of complex talk within different content areas were highly correlated (r’s = 0.19-0.65), four separate sub-models were built for each content area. The proportions of complex talk within different activity settings were not significantly correlated (r’s = 0.06-0.31). For the time spent in specific type of grouping, large-group settings were negatively correlated with small-group settings (r = −0.27) and free choice/centers (r = −0.65). For the time spent in content-specific instruction, literacy activities were positively correlated with social studies activities (r = 0.35), and math activities were positively correlated with science activities (r = 0.34). Correlations between classroom-level assessment of ECE quality dimensions and gains in child outcomes are presented in Table 4.8. The CLASS emotional support domain was positively correlated with picture vocabulary and decoding skills (r’s = 0.11-0.14). To reduce the possibility of spurious associations, analyses of child outcomes controlled for this CLASS domain.

**Inferential statistics.** Inferential analyses fit hierarchical linear models (HLMs) to determine the degree to which the proportion of use of complex talk in different activity settings or during instruction in different content areas related to gains in language and literacy skills. This approach was used since evidence suggests gain scores decrease selection bias more
### Table 4.7.
**Correlations Among Classroom Observation Variables**

<table>
<thead>
<tr>
<th>CLASS ES</th>
<th>LISn Complex Talk (Proportion)</th>
<th>LISn Time Spent in Context</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1. CLASS Emotional Support</td>
<td>-</td>
<td>0.25*</td>
</tr>
<tr>
<td>2. Large-group</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Small-group</td>
<td>-</td>
<td>0.21</td>
</tr>
<tr>
<td>4. Free choice/Center</td>
<td>-</td>
<td>0.08</td>
</tr>
<tr>
<td>5. Literacy</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6. Math</td>
<td>-</td>
<td>0.65***</td>
</tr>
<tr>
<td>7. Science</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8. Social Studies</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9. Large-group</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10. Small-group</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11. Free Choice/Center</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12. Literacy</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>13. Math</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>14. Science</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>15. Social Studies</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Notes: * p < .05, ** p < .01, *** p < .001

### Table 4.8.
**Correlations Between Gains in Outcomes and Classroom Observation Variables**

<table>
<thead>
<tr>
<th>Gains in Child Outcomes</th>
<th>CLASS ES</th>
<th>LISn Complex Talk (Proportion)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Emotional Support</td>
<td>Large Group</td>
</tr>
<tr>
<td>1. Picture Vocabulary</td>
<td>0.14**</td>
<td>0.11*</td>
</tr>
<tr>
<td>2. Expressive Vocabulary</td>
<td>0.04</td>
<td>0.04</td>
</tr>
<tr>
<td>3. Decoding</td>
<td>0.11*</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Notes: * p < .05, ** p < .01, *** p < .001
effectively than using the fall score as a covariate (NICHD Early Child Care Research Network & Duncan, 2003). A set of HLM analyses with random classroom intercepts included the CLASS emotional support score, the time spent in different settings and instruction in specific content areas, and the proportion of teachers’ use of complex talk within each type of activity context at Level 2, and child covariates (gender, race, age, language, maternal education) at Level 1. Quantitative findings are detailed below.

First, a set of HLMs tested if teachers’ use of complex talk within each type of activity setting related to gains in children’s language and literacy skills (see Table 4.9). The proportion of use of complex talk in large-group activities was significantly related to larger gains in picture vocabulary ($\beta = 0.16$, $se = 0.05$), but the association was quadratic instead of linear, suggesting that the association was stronger at a higher than a lower proportion of use of complex talk. Visual inspection of Figure 4.2 demonstrates a clear quadratic relation between the proportion of all talk that involved complex language in large-group activities and gains in picture vocabulary. A one unit increase in complex talk in large-group settings below the proportion of 0.03 was not related to gains in picture vocabulary, but increase above the proportion of 0.03 was associated with gains in picture vocabulary.

Second, a set of HLMs investigated the extent to which teachers’ use of complex talk in content-specific instruction related to gains in children’s language and literacy skills (see Table 4.10). Larger gains in picture vocabulary were significantly related to the proportion of use of complex talk in science ($\beta = 0.12$, $se = 0.06$), but not in social studies ($\beta = -0.00$, $se = 0.06$), literacy ($\beta = -0.05$, $se = 0.06$), or math ($\beta = 0.03$, $se = 0.07$). The analysis of quantitative data showed that the proportion of teachers’ use of complex language in the activity in which the proportion of complex talk was higher related to gains in children’s picture vocabulary.
Table 4.9.
HLM: Gains in Pre-K and the Proportion of Teacher’s Use of Complex Talk Within Each Type of Activity Setting

<table>
<thead>
<tr>
<th></th>
<th>Picture Vocabulary (n = 240)</th>
<th>Expressive Language (n = 239)</th>
<th>Decoding (n = 241)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(SE)</td>
<td>(SE)</td>
<td>(SE)</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.20</td>
<td>0.19</td>
<td>0.27+</td>
</tr>
<tr>
<td></td>
<td>(0.15)</td>
<td>(0.19)</td>
<td>(0.14)</td>
</tr>
<tr>
<td>Child Characteristic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>-0.10+</td>
<td>-0.04</td>
<td>-0.05</td>
</tr>
<tr>
<td></td>
<td>(0.06)</td>
<td>(0.06)</td>
<td>(0.06)</td>
</tr>
<tr>
<td>Age</td>
<td>-0.03</td>
<td>-0.03</td>
<td>-0.04</td>
</tr>
<tr>
<td></td>
<td>(0.06)</td>
<td>(0.06)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>Black</td>
<td>-0.02</td>
<td>0.15+</td>
<td>-0.05</td>
</tr>
<tr>
<td></td>
<td>(0.08)</td>
<td>(0.08)</td>
<td>(0.07)</td>
</tr>
<tr>
<td>DLL</td>
<td>0.32***</td>
<td>-0.25**</td>
<td>0.28***</td>
</tr>
<tr>
<td></td>
<td>(0.09)</td>
<td>(0.09)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>Maternal Education</td>
<td>-0.09</td>
<td>-0.07</td>
<td>-0.04</td>
</tr>
<tr>
<td></td>
<td>(0.08)</td>
<td>(0.08)</td>
<td>(0.07)</td>
</tr>
<tr>
<td>Classroom Characteristic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLASS (Emotional-Support)</td>
<td>0.05</td>
<td>0.12</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>(0.09)</td>
<td>(0.11)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>Time Teacher(s) Speak Spanish in Class</td>
<td>-0.08</td>
<td>-0.10</td>
<td>0.14+</td>
</tr>
<tr>
<td></td>
<td>(0.08)</td>
<td>(0.11)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>Language Activities</td>
<td>0.04</td>
<td>0.19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.10)</td>
<td>(0.13)</td>
<td></td>
</tr>
<tr>
<td>Literacy Activities</td>
<td></td>
<td></td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.09)</td>
</tr>
<tr>
<td>Complex Talk in Large-group</td>
<td>-0.13</td>
<td>-0.10</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>(0.10)</td>
<td>(0.14)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>Complex Talk in Small-group</td>
<td>-0.13</td>
<td>-0.01</td>
<td>-0.05</td>
</tr>
<tr>
<td></td>
<td>(0.14)</td>
<td>(0.18)</td>
<td>(0.14)</td>
</tr>
<tr>
<td>Complex Talk in Free Choice/Center</td>
<td>0.08</td>
<td>-0.04</td>
<td>-0.03</td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
<td>(0.14)</td>
<td>(0.10)</td>
</tr>
<tr>
<td>Complex Talk in Large-group²</td>
<td>0.16*</td>
<td>0.05</td>
<td>-0.06</td>
</tr>
<tr>
<td></td>
<td>(0.08)</td>
<td>(0.10)</td>
<td>(0.09)</td>
</tr>
<tr>
<td>Complex Talk in Small-group²</td>
<td>0.07</td>
<td>-0.02</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>(0.07)</td>
<td>(0.09)</td>
<td>(0.07)</td>
</tr>
<tr>
<td>Complex Talk in Free Choice/Center²</td>
<td>-0.05</td>
<td>-0.06</td>
<td>-0.03</td>
</tr>
<tr>
<td></td>
<td>(0.08)</td>
<td>(0.11)</td>
<td>(0.09)</td>
</tr>
</tbody>
</table>

Notes: * p < .05, ** p < .01, *** p < .001; data are standardized in the multi-level models.
### Table 4.10.

**HLM: Gains in Pre-K and the Proportion of Teacher’s Use of Complex Talk Within Each Type of Content Area**

<table>
<thead>
<tr>
<th>Child Characteristic</th>
<th>Picture Vocabulary (n = 412)</th>
<th>Expressive Language (n = 405)</th>
<th>Decoding (n = 413)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(SE)</td>
<td>(SE)</td>
<td>(SE)</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.00 (0.05)</td>
<td>-0.03 (0.08)</td>
<td>0.01 (0.07)</td>
</tr>
<tr>
<td>Male</td>
<td>-0.07 (0.04)</td>
<td>-0.04 (0.04)</td>
<td>-0.04 (0.04)</td>
</tr>
<tr>
<td>Age</td>
<td>0.02 (0.04)</td>
<td>-0.04 (0.05)</td>
<td>0.03 (0.05)</td>
</tr>
<tr>
<td>Black</td>
<td>-0.06 (0.05)</td>
<td>0.01 (0.05)</td>
<td>-0.04 (0.05)</td>
</tr>
<tr>
<td>DLL</td>
<td>0.28*** (0.06)</td>
<td>-0.22*** (0.07)</td>
<td>0.14*** (0.07)</td>
</tr>
<tr>
<td>Maternal Education</td>
<td>-0.05 (0.05)</td>
<td>-0.06 (0.06)</td>
<td>-0.04 (0.06)</td>
</tr>
<tr>
<td>Classroom Characteristic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLASS (Emotional-Support)</td>
<td>0.12 (0.05)</td>
<td>0.06 (0.09)</td>
<td>0.10 (0.08)</td>
</tr>
<tr>
<td>Time Teacher(s)</td>
<td>-0.01 (0.06)</td>
<td>-0.07 (0.09)</td>
<td>0.06 (0.09)</td>
</tr>
<tr>
<td>Speak Spanish in Class</td>
<td>-0.01 (0.06)</td>
<td>-0.10 (0.09)</td>
<td>0.06 (0.09)</td>
</tr>
<tr>
<td>Literacy Activity</td>
<td>0.06 (0.06)</td>
<td>0.10 (0.09)</td>
<td>-0.01 (0.09)</td>
</tr>
<tr>
<td>Math Activity</td>
<td>-0.00 (0.07)</td>
<td>-0.02 (0.07)</td>
<td>0.22** (0.08)</td>
</tr>
<tr>
<td>Science Activity</td>
<td>0.15* (0.07)</td>
<td>0.03 (0.11)</td>
<td>0.11 (0.09)</td>
</tr>
<tr>
<td>Social Studies Activity</td>
<td>0.15* (0.06)</td>
<td>0.20* (0.09)</td>
<td>-0.06 (0.09)</td>
</tr>
<tr>
<td>Literacy Activity</td>
<td>-0.05 (0.06)</td>
<td>0.06 (0.09)</td>
<td>-0.02 (0.09)</td>
</tr>
<tr>
<td>Complex Talk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math Activity</td>
<td>0.03 (0.07)</td>
<td>-0.05 (0.10)</td>
<td>-0.09 (0.08)</td>
</tr>
<tr>
<td>Science Activity</td>
<td>0.12* (0.06)</td>
<td>0.03 (0.08)</td>
<td>-0.10 (0.08)</td>
</tr>
<tr>
<td>Social Studies</td>
<td>-0.00 (0.06)</td>
<td>0.11 (0.08)</td>
<td>0.05 (0.08)</td>
</tr>
</tbody>
</table>

Notes: * p < .05, ** p < .01, *** p < .001; data are standardized in the multi-level models.
RQ 3: Variations in Complex Talk Across Activity Contexts

To deepen an understanding of research question #3 (“Does complex teacher talk vary across activity contexts? How and why do teachers talk differently in different activity contexts?”), the quantitative and qualitative data were triangulated to examine convergences, expansions, and divergences. Quantitative and qualitative data analysis results and triangulation of quantitative and qualitative data analysis results are detailed.

**Quantitative data analysis results: Activity setting.** A two-level HLM model examined if teachers’ use of complex talk differed across activity settings (see Table 4.11). Model 3 included a random intercept and random slopes for each classroom (Level 2) to account for nesting of activity settings (Level 1) within classrooms. Dependent variables are repeated measures of the proportion of use of complex talk as assessed across activity settings. Table 4.11
shows the results from Model 3 that included classroom-level dummy variables for large-group (reference group), small-group, and free choice/center settings. The proportion of use of complex talk was significantly higher for large group than for small group (B = -0.04, se = 0.01) and for free choice/center time (B = -0.05, se = 0.01) (see Figure 4.3).

Table 4.11.
**HLM: Variability in the Proportion of Use of Complex Talk Across Activity Settings (n = 61)**

<table>
<thead>
<tr>
<th>Activity Setting</th>
<th>The Proportion of Use of Complex Talk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.11***</td>
</tr>
<tr>
<td>Small-Group Activity</td>
<td>-0.04*</td>
</tr>
<tr>
<td>Free Choice/Center Time</td>
<td>-0.05***</td>
</tr>
</tbody>
</table>

Notes: * p < .05, ** p < .01, *** p < .001

Multiple comparison tests in the repeated measures analysis also indicated that the proportion of use of complex talk in small group and large group on average differed by -0.04, and free choice/center time and large group differed by -0.05. However, there was not a significant difference between the proportion of complex talk in small group and free play (see Table 4.12).

Table 4.12.
**Activity Setting: Multiple Comparison Tests in the Repeated Measures Analysis (n = 61)**

<table>
<thead>
<tr>
<th>Activity Setting A</th>
<th>Activity Setting B</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Group</td>
<td>Small Group</td>
<td>-0.04*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.01)</td>
</tr>
<tr>
<td>Large Group</td>
<td>Free Choice/Center</td>
<td>-0.05***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.01)</td>
</tr>
<tr>
<td>Small Group</td>
<td>Free Choice/Center</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.01)</td>
</tr>
</tbody>
</table>

Notes: * p < .05, ** p < .01, *** p < .001
Qualitative data analysis results: Activity setting. This subsection reports a thematic analysis of all qualitative data to answer research question #3 related to variations in complex teacher talk across activity settings. As demonstrated in the quantitative results, the proportion of use of complex talk was greater for large group than for small group and for free choice/center settings. Participants also qualitatively described their use of complex talk across activity settings. Each theme and subtheme are described below related to research question #3 (activity setting).

Using more complex talk in large group than other settings. Teachers reported they used more complex talk in large group than other settings. Four subthemes emerged from interviews to describe this theme: (a) providing systematic, explicit, and purposeful instruction during large-group activities; (b) openness for complex talk during large-group activities; (c) teachers watching and listening during free play; and (d) recreating past experiences during imagination-driven play.

Providing systematic, explicit, and purposeful instruction during large-group activities. Teachers described the strategy of systematic, explicit, and purposeful instruction to provide
children with more complex language opportunities during large-group activities. First, nearly all teachers said large-group activity is a highly routinized context. Nicole, a veteran preschool teacher of 21-25 years, had strong beliefs about offering consistent, predictable daily experiences with complex conversations. She stated:

“This morning, I started off with our share time. I asked the kids what do they think the weather is going to be today? It’s just simple things to start off a conversation in a group setting. Just look out the window, and how do you think the weather’s going to go today? What’s going to happen outside? How does it look? What do you think … Why do you think it looks like that? And we can start off a general question like that.”

This teacher highlighted the importance of using large-group activities to provide rich opportunities for complex conversations.

Second, several teachers spoke about how they tried to fit as much learning as possible into large-group activities. Nicole, who has taught preschool for 21-25 years, noted:

“Group-time setting - 15 minutes that you spend a day with a child - this is when you’re trying to teach them a new subject. So you want them to learn as much as they can in that amount of time because that 15 minutes is where you get the most able to explain more of it in a group setting for all the kids.”

Similarly, Katherine, a veteran preschool teacher of 30 years, said, “I have all the kids there and I try to get them to also interact … I’m using complex words and phrases for them to ask questions.” This teacher reported she used more complex talk during large-group activities because all children were present and time was limited.

Third, most teachers mentioned that they provided rich, cognitively stimulating experiences in ways that are developmentally appropriate. Nicole, a veteran preschool teacher of 21-25 years, commented, “Throughout the week with a large-group setting, you just like asking them questions, presenting new information about a subject, so they can get a basic understanding of it. You don’t want to go too much in detail with it, because you might lose a lot of it. Pre-K - they are only four …” Katherine, who has taught preschool for 26-30 years, also
described how she assessed children’s readiness for learning during large-group activities. She reported children asked and answered questions in large-group settings which showed age appropriateness of topics and activities. She stated, “It (large-group) helps for a majority of my kids, and like I said, that’s because they like to ask each other’s questions and answer each other’s questions. For me, that gives me the notion they are age appropriately ready for the things that we are talking about.” These teachers considered developmentally appropriateness when using complex talk and deciding what level of detail to use during large-group activities not to lose children’s attention.

*Openness for complex talk during large-group activities.* Nearly all teachers reported large-group activities are conducive to involving children in conversational feedback loops and offering advanced language models. They also gave specific examples of using complex talk during large-group activities, such as elaboration and decontextualized talk. First, several teachers elaborated on what a child said and helped children elaborate their thoughts during large-group activities. Nicole, a veteran preschool teacher of 21-25 years, shared, “In my group time setting … I’m asking them questions and trying to get them to elaborate more, asking them what they think about something - give me some more information.” Nicole noted she used elaboration throughout the day and at an increased rate during large-group activities. She stated:

> “Because once they go to free play, they’re exploring. They’re playing in the centers, they might not want to listen. They might not want to talk about what you’re talking about. So large-group setting gives you a lot of time to ask those complex questions - talk about “why do you think this is happening? Give me more information about it.” … You’re trying to give all your information you can and trying to get as much from them from that topic.”

Second, some teachers encouraged children to remember past events and predict future events during large-group activities. Katherine, a veteran preschool teacher of 26-30 years, said,
“Usually in group time … we talk about things that “we could do …” or “have you ever …” or “do you think you would …” or “would you want to …”

**Differentiating supports for children who need extra instructional time in a specific area during small-group activities.** Teachers noted aligning complex talk with their curriculum and assessments targeted at specific skills and adjusting complex language to individual child’s interests and level of understanding. Ashley, who has taught pre-K for 11-15 years, said,

“We have a specific small-group activity that we’ll do with the children. In the lesson plan … we focus a lot on social emotional and conversations … So like, one of the activities we did was drawing yourself and being able to describe it and writing your name. So I will have three to four kids in the group when we’re working on that. We follow up with the children to see what they’re struggling with the activity as far as I give them the chance to do it first, and then we talk about it, and then we compare it to the other kids, “How are you different? How are you alike? What could you help so?” … with … just explaining and elaborating and supporting them … I have some children that come in, who you can tell there’s not a lot of conversations … so we have to build on that as far as just basic conversation.”

This teacher shared she aligned her lesson plan with complex talk and adjusted complex talk for children in need of additional support towards mastery.

**Teachers watching and listening during free play.** Teachers spoke of teaching and listening during free play. Some teachers explained they observed children to determine what they thought, felt, and believed. Jamie, who has taught preschool for 31-35 years, mentioned, “I’m quieter during those times because … I’m listening to them when they’re pretending … I’m really listening to what they’re thinking because they’re acting out so much.” This teacher shared she listened to children’s thoughts and feelings instead of interrupting during center time.

**Recreating past experiences during imagination-driven play.** A few teachers reported children recreated past experiences during imagination-driven play. Nicole, a veteran preschool teacher of 21-25 years, said, “For instance, if you’re in housekeeping pretending to be cooking eggs like your mom, that means you remember that you cook some eggs sometime another, so
you can pretend like you’re thinking like your mom. I can say, “You remember yesterday we had eggs in the classroom? Where else have you had eggs at?” It can jog their memory, because they’re using their imagination, but they’re remembering things they did in the past.” She provided examples of how teachers can help children use images that they have created in their minds to recreate past experiences during pretend play.

Table 4.13.
*Theme and Subtheme Table: Complex Talk in Different Activity Settings and Content Areas*

<table>
<thead>
<tr>
<th>Theme</th>
<th>Subtheme</th>
<th>Definition</th>
<th>Quote</th>
</tr>
</thead>
</table>
| Using more complex talk in large group than other settings | Providing systematic, explicit, and purposeful instruction during large-group activities | Creating highly routinized contexts in which teachers provide rich, cognitively stimulating experiences in ways that are developmentally appropriate | Consistent, predictable daily experiences with complex conversations: “At large group, we might talk about a problem that we have in the classroom … We might talk about their favorite things that they did that day.”
                                                                                                                                                                                                                           | “Reading a book … I want to get feedback with that … Children will ask questions … I’ll ask questions … If there’s a word in there … ask them, “What do you think that word means?”
                                                                                                                                                                                                                           | “I’ve intentionally planned these activities (decontextualized talk) to get my data and observation notes that are based on the standards. Like one of our objectives is recognizing and recalling, so just asking the questions of talking about yesterday or talking about future … helps me get my observations and my data for that specific objective … so using those mostly during large group.”
                                                                                                                                                                                                                           | Considering developmentally-appropriateness not to lose children’s attention:
                                                                                                                                                                                                                           | “(Large group) I have all the kids there and I try to get them to also interact … I’m using complex words and phrases for them to ask questions.”
                                                                                                                                                                                                                           | “At large group, we have a project … learning about how to take care of babies … We might have a question of the day, “What do you know about babies?” Everybody takes a turn to share. What the children share is what’s valuable. We model what they’re saying back to us with extensions.” |
| **Differentiating supports for children who need extra instructional time in a specific area during small-group activities** | **Teachers align complex talk with their curriculum and assessments targeted at specific skills and adjust complex language to individual child’s interests and level of understanding** | “With small group, I try to work more on … meeting … children’s IEP goals at that point … If a child is trying to work on stacking blocks, for instance, that’s where I will start with slowly … like counting … seeing if the children can sort of modeling language.”

“A small group is very comfortable … It’s kind of like being at home in a way. When you’re with your family, you’re not crowded out, and you’re not always in the spotlight … Some kids, it bothers them one-on-one … They feel like they’re in the spotlight … they’re also more respectful of each other when this conversation is going back and forth … they’ll all start bringing in.” |
| **Teachers watching and listening during free play** | **Listening to children’s thoughts and feelings instead of interrupting** | “Free play … They make their own decisions because I want them to become independent … I try not to interrupt their play because I’m trying to observe them and see what they’re doing. I don’t want to interrupt them too much by talking to.”

“The kids are talking amongst themselves in … center time/free playtime … I’ll allow the child to express themselves or talk about what they want to talk about.” |
| **Recreating past experiences during imagination-driven play** | **Children use images that they have created in their minds to recreate past experiences during pretend play** | “They’re … pretending to be a doctor … I can say … “Yesterday, we saw in a video that this person did this. Do you remember that? What else have you seen like this?” Even though they might not remember what we saw yesterday in the video, they might can’t remember. I’m going to ask them those questions.”

“If I have a child that’s playing in dramatic play … I see that they’re wearing an apron and a chef’s hat, and they’re at the stove cooking. I’ll come over there and I’ll ask them, “What are you doing?” And if they just say “cooking,” I’ll expand, “Oh, you’re cooking, well, what are you cooking? Are you playing a specific game? Are you a chef at a restaurant?”” |
| **Using more complex talk in science and social studies than math** | **Relating personal experiences to the content during social studies activities** | “We’ll talk about, “How did you get to school today? Did you drive on a road to get to school? What did you see in the community when you got to school?” So using that complex talk is really driven in those areas.”

“I think the most relevant area of social studies is our community in … So we did a project on maps where children drew maps to their house … You ask a question to help facilitate that (complex) language more … “How do you get from your
Real-world connections during social studies activities  Using more complex talk during social studies activities because the content connects children with the real world  “We talk about different flags all over the world … We talk about, “What do we need for buying stuff at the store?” For social studies, you have to use a lot of conversation and a lot of talking, so using that complex talk is really driven in those areas.”

Naturally stimulating and nurturing environments in science activities  Teachers using more complex talk during science activities because it is such an open content area  Decontextualized talk:  “We’ve done an experiment about the chicken and the eggs … “If we have this egg here, how long do you think it’ll take before it cracks if we just leave it?” Where the eggs come from, which is the chicken … that kind of thing. And then … “What do you have to do with the eggs before you can eat them?” You have to crack it and you have to cook it … So we’ve done like different science experiments about that.”

Skill-oriented talk during math activities  Instructional talk focusing on a discrete math task that requires a single response and is easier to teach  Focusing on basic skills:  “I have a goal for a child to rote count … just one two three four five. And then … we would scaffold up to point and do one-to-one correspondence as they count … Those are the kind of very simplified math activities in the math language that I have been using in my classroom.”

Content integration  Connections across the content areas  Integrating literacy, math, science, and social studies to make learning meaningful and content-rich  “All of our content areas are integrated into free play and center.”

**Quantitative data analysis results: Content area.** A two-level HLM model examined if teachers’ use of complex talk differed across content areas (see Table 4.14). Model 4 included a random intercept and random slopes for each classroom (Level 2) to account for nesting of content areas (Level 1) within classrooms. Dependent variables are repeated measures of the proportion of use of complex talk as assessed across content areas. Table 4.15 shows the results.
from Model 4 including classroom-level dummy variables for math (reference group), literacy, science, and social studies. First, the proportion of use of complex talk was significantly higher for social studies than for math ($B = 0.03$, $se = 0.01$). Second, the relative low proportion of science over all reduced power to detect significant differences between the proportion of complex talk in science than math ($B = 0.03$, $se = 0.01$) (see Figure 4.4).

Table 4.14.
*HLM: Variability in the Proportion of Teachers’ Use of Complex Talk Across Content Areas (n = 61)*

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Rates of Using Complex Talk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
</tr>
<tr>
<td>Intercept</td>
<td>$0.09***$</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
</tr>
<tr>
<td>Literacy</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
</tr>
<tr>
<td>Science</td>
<td>0.03+</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
</tr>
<tr>
<td>Social Studies</td>
<td>$0.03*$</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
</tr>
</tbody>
</table>

Notes: * $p < .05$, ** $p < .01$, *** $p < .001$

Multiple comparison tests in the repeated measures analysis also indicated that the proportion of use of complex talk in math and science on average differed by -0.03. However, no association was found between any of the other pairs of domains (see Table 4.15).

Figure 4.4.
*Density Plot: The Proportion of Use of Complex Talk Within Each Type of Content Area*
Table 4.15. *Multiple Comparison Tests in the Repeated Measures Analysis (n = 61)*

Differences of Least Square Means

<table>
<thead>
<tr>
<th>Activity Setting A</th>
<th>Activity Setting B</th>
<th>B (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math</td>
<td>Literacy</td>
<td>0.00 (0.01)</td>
</tr>
<tr>
<td>Math</td>
<td>Science</td>
<td>-0.03* (0.01)</td>
</tr>
<tr>
<td>Math</td>
<td>Social Studies</td>
<td>-0.02 (0.01)</td>
</tr>
<tr>
<td>Science</td>
<td>Literacy</td>
<td>-0.02 (0.02)</td>
</tr>
<tr>
<td>Science</td>
<td>Social Studies</td>
<td>0.01 (0.02)</td>
</tr>
<tr>
<td>Social Studies</td>
<td>Literacy</td>
<td>-0.01 (0.01)</td>
</tr>
</tbody>
</table>

Notes: * p < .05, ** p < .01, *** p < .001

**Qualitative data analysis results: Content area.** In this subsection, findings are presented thematically to describe how teachers used complex talk within each type of content area in addressing research question #3. As demonstrated in the quantitative results, the proportion of complex talk was greater for social studies and science than for math. Participants also qualitatively described their use of complex talk across content areas. Furthermore, some
teachers said it’s difficult to decide which content area is more conducive to using complex talk, highlighting the importance of content integration within an early childhood classroom.

Each theme and subtheme are described below and in the table 4.13 related to research question #3 (content area). Two main themes emerged: (1) using more complex talk in science and social studies than math and (2) content integration.

**Using more complex talk in science and social studies than math.** Teachers shared they used more complex talk in social studies and science than math. Four subthemes emerged: (a) relating personal experiences to the content during social studies activities; (b) real-world connections during social studies activities; (c) naturally stimulating and nurturing environments in science activities; and (d) skill-oriented talk during math activities.

**Relating personal experiences to the content during social studies activities.** Several teachers mentioned children preferred discussing a connection between their personal experiences and the content during social studies activities. Katherine, who has taught preschool for 26-30 years, commented, “We discuss different things … Kids like to discuss different things about when they were a baby or when they become a grown-up or when they do this or that. So social studies - a lot does that (decontextualized talk), because they’re learning about themselves and they’re learning about the world around them.” This teacher noted she encouraged children to use decontextualized talk by putting children’s interests at the heart of learning.

**Real-world connections during social studies activities.** Some teachers described how real-world connections generated many issues and questions to pursue through inquiry during social studies activities. Nicole, a veteran preschool teacher of 21-25 years, said, “More elaboration to get from that topic. With social studies … Who lives in your community? What are the community helpers in your community? Why are they there? What are they … What is
their job? Have you ever been …” This teacher reported real-world applications provided children with more opportunities to elaborate their thoughts and learn how their communities and society worked. Katherine, a veteran preschool teacher of 26-30 years, explained how she increased children’s interest and curiosity about concepts by connecting children with the real world. She shared the following example:

“Knowing about different things in the geographical world not only … what happens inside of a barn, we talk about what happens outside of a barn or a farm … One thing they were really shocked about this week … they didn’t know that you could put cow manure on your yard to help it grow, and they’re going “what’s manure?” and I’m like “cow poop” so now they know every day … you can put poop on your yard, and it grows. So just the geographical things of different things that can happen outside in the living world.”

This teacher used specific examples from the world outside the classroom to help children understand the concepts during social studies activities.

*Naturally stimulating and nurturing environments in science activities.* Teachers emphasized the value of naturally stimulating and nurturing science activity environments. First, nearly all teachers reported they used more complex talk during science activities because it’s such an open content area. Jamie, a preschool teacher of over 31-35 years, explained:

“You ask those what, why, how type questions with science because you’ve got different things going on. You have experiments going on … you might just have pieces and parts, and they’re putting them together. And maybe some magnets with them. And just anything … Science is … so open … You don’t ask as many concrete type questions - either not so much yes or no. I think you ask more of the open-ended-type things to see what they are thinking, what they think will happen, or why they think something happened.”

This teacher indicated she asked more open-ended questions and engaged in more inquiry-based exploration during science activities because conversations about science topics created naturally stimulating and nurturing environments. Nicole, a veteran preschool teacher of 21-25 years, provided specific examples of using complex talk in science. In the following excerpt, this
teacher articulated how she encouraged children to go into details by using elaborative conversations:

“With science … That’s asking more … You can have more elaboration on it … With the leaves, “Why the leaves change colors?” “Have you ever seen those leaves before?” “What’s inside that leaf to make them change colors?” It’s more elaboration done.”

Similarly, Jamie, a preschool teacher of over 31-35 years, commented on how she talked elaboratively about past or future events when children engaged in science experiments:

“They’ve got some ramps with different types of balls. Some might be bumpy, some might be very smooth and round, large, different sizes, some might be very lightweight. You might have a ball of paper or a ball of tinfoil, and you’re using these ramps … And experimenting with things. I think you ask more why questions. Or you’ll ask more prediction-type questions. You know, “What do you think will happen? Which do you think will go the farthest? What do you think this one will do?” Or bouncing, “Which of these do you think will bounce?” So I think you ask … more open-ended questions with it.”

Teachers agreed science activities are contexts in which teachers effectively engage children in meaningful interactions because these activities allow teachers to foster children’s higher-order thinking skills (e.g., make sense of information, analyze, compare, contrast, make inferences, predict).

Skill-oriented talk during math activities. Teachers shared that math activities directed them to spend more or less time attending to building basic instruction such as counting. For example, Nicole, a veteran preschool teacher over 21-25 years, noted, “In math, you either can count one to ten or you can’t. It’s if you can or not. You either know that shape or you don’t know that shape … It’s to the fact, it’s just to the point.” This teacher described how she used instructional talk focusing on a discrete task that requires a single response. Few teachers also highlighted ways in which they gave verbal directions during math activities. Jamie, a preschool teacher of over 31-35 years, said, “If it’s the number 5 on that card, then you’ll use 5 links to make his tail. And there’s a hole punch, so they can actually connect it … But now that took
direction … I kind of had to show an example of what I was talking about, because I had not used the links before. They were new.” This teacher emphasized using direct instructions to prompt children to carry out the math task.

Furthermore, teachers expressed that it’s easier to teach skills-focused subjects (e.g., literacy, math) than concept-focused subjects (e.g., science, social studies) because there were specific guidelines to follow. Katherine, a veteran preschool teacher of 26-30 years, stated, “It’s easier to teach because there is really specific right instructional - what to teach and how to teach - in those skill-based instructions.” This teacher reported the clearly defined and prescribed instructional guidelines helped her feel comfortable teaching math.

**Content integration.** Some teachers explained that it’s difficult to decide which content area is more conducive to using complex talk, since they integrated literacy, math, science, and social studies to make learning meaningful and content-rich. Nicole, a veteran preschool teacher of 21-25 years, noted, “I can’t say I do more complex talk in literacy, math, social studies or science … In dramatic play, there’s some math to do, there’s science … there’s social studies … there’s literacy.” Nicole also highlighted the importance of connections across the content areas. She stated:

“Each child, they can go to my science and math center, they can go to the reading center. But all that stuff is integrated throughout the whole classroom. We don’t just stay on one little math all day long - it’s throughout the whole classroom. You can go to housekeeping and you can count how many vegetables in a tray - that’s math. You can go to blocks, you can have a ramp, how fast is that car going down the ramp? - that’s science. Each area in the classroom, you can do all those content areas, but it’s throughout the whole classroom.”

**Triangulation of quantitative and qualitative data analysis results.** The data for research question #3 related to variations in complex teacher talk across activity settings and content areas revealed both confirmation and expansion. The analysis of quantitative data
demonstrates that the proportion of use of complex talk is higher for large group than for small group and free play. This finding is supported by the qualitative data, in which teachers typically described how they used systematic, explicit, and purposeful instruction to provide children with more complex language opportunities in large-group activities and how this activity setting was conducive to involving children in conversational feedback loops and offering advanced language models. Teachers also qualitatively explained they adjusted complex talk for children in need of additional support towards mastery during small-group activities, but their use of complex talk was generally targeted at specific skills. Furthermore, teachers described how they listened to children’s thoughts and feelings instead of interrupting and recreated past experiences during free choice/center time. The qualitative data obtained helps to elaborate quantitative results indicating that the use of complex talk is highest for large group and lowest for free play.

The analysis of quantitative data shows that the use of complex talk is higher for social studies than for math. This finding is supported by the qualitative data indicating that social studies activities, such as discussing topics related to children’s interests, social contexts, and real-world problems, can offer a context in which teachers efficiently engage children in conversational feedback loops and provide advanced linguistic forms. Additionally, the quantitative analysis demonstrates that rates of using complex talk are marginally higher for science than for math. This result is confirmed by the qualitative data showing that teachers encourage children to go into details by using elaborative conversations during science activities and talk elaboratively about past or future events when children conducted science experiments. On the other hand, teachers qualitatively described teaching basic skills and assigning discrete tasks that required a single response during math activities. This finding confirmed the quantitative results showing that complex talk is lower for math than for social studies and
science. The findings from the two sources of data not only confirm the results of the other but also provide insights of the variations in complex teacher talk across content areas by addressing different aspects of the complex talk phenomena.

**RQ 4: Relations Between Teacher and Child Characteristics and Complex Talk Within Activity Context**

The quantitative and qualitative data analysis results were triangulated to form a comprehensive understanding of research question #4 (“How do teacher and child characteristics relate to complex teacher talk?”). Quantitative findings, qualitative findings, and triangulation of the data are described below.

**Quantitative data analysis results.** Table 4.16 shows the sample means and distributions for the selected teacher and child characteristics. Table 4.17 and Table 4.18 show the correlations among the characteristics and the proportion of complex talk by type of grouping and content areas. They were included to describe how teacher and child characteristics were related to the proportion of use of complex talk within each type of activity setting and content area. The CLASS emotional support domain was positively correlated with the proportion of use of complex talk in large-group, literacy, and math activities (r’s = 0.16-0.18). To reduce the possibility of spurious associations, analyses of the proportion of complex talk controlled for this CLASS domain.

**Table 4.16.**

*Child and Teacher Characteristics*

<table>
<thead>
<tr>
<th>Child Characteristic</th>
<th>N</th>
<th>%</th>
<th>M (SE)</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shyness</td>
<td>436</td>
<td>1.3 (0.5)</td>
<td>1.0</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Teacher Characteristic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional Beliefs</td>
<td>59</td>
<td>2.6 (0.8)</td>
<td>1.1</td>
<td>4.7</td>
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<tr>
<td>Instructional Orientation: Abstract Talk</td>
<td>59</td>
<td>0.5 (0.3)</td>
<td>0.0</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Years of Teaching</td>
<td>61</td>
<td>12.5 (8.4)</td>
<td>0.5</td>
<td>35.0</td>
<td></td>
</tr>
</tbody>
</table>
Inferential analyses fit two-level HLMs to determine the extent to which teacher and child characteristics related to the proportion of use of complex talk derived from child-level LISn behavior counts (see Table 4.19). The two sets of HLM analyses with random classroom intercepts included the classroom-level CLASS emotional support score and teacher covariates (belief, practice, teaching experience, time teachers speak Spanish in class) at Level 2, and child covariates (gender, race, age, language, maternal education, shyness) at Level 1. A set of HLMs investigated if teachers’ and children’s characteristics were related to the proportion of use of complex talk within each type of grouping. First, the proportion of complex talk in large-group activities was positively related to teachers’ emotional support ($\beta = 0.13$, se = 0.04) and years of teaching experience ($\beta = 0.11$, se = 0.05). Second, the proportion of complex talk in small-group activities was significantly lower for Black children ($\beta = -0.25$, se = 0.11) and DLLs ($\beta = -0.37$, se = 0.12). Third, the proportion of complex talk in free play activities was positively related to children’s shyness ($\beta = 0.13$, se = 0.06).

Additionally, a set of HLMs examined if teachers’ and children’s characteristics were related to the proportion of use of complex talk within each type of content-specific instruction (see Table 4.19). First, the proportion of complex talk in literacy activities was positively related to children’s age ($\beta = 0.12$, se = 0.06) and teachers’ emotional support ($\beta = 0.21$, se = 0.06). Second, the proportion of complex talk in math activities was positively related to teachers’ emotional support ($\beta = 0.22$, se = 0.08). Third, the proportion of complex talk in social studies activities was positively related to children’s shyness ($\beta = 0.17$, se = 0.08).

**Qualitative data analysis results: Teacher characteristics.** The participant interviews were analyzed to answer research question #4 relevant to how teacher characteristics are
Table 4.17.  
Correlations Among Teacher and Child Characteristics

<table>
<thead>
<tr>
<th>Child Characteristic</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
<tr>
<td>Male</td>
<td>1</td>
<td>-</td>
<td>-0.10*</td>
<td>0.04</td>
<td>0.04</td>
<td>0.02</td>
<td>0.09*</td>
<td>0.02</td>
<td>0.01</td>
<td>-0.04</td>
<td>0.01</td>
</tr>
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<td>Age</td>
<td>2</td>
<td>-</td>
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<td>-0.04</td>
<td>0.00</td>
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<td>-</td>
<td>-0.42***</td>
<td>0.17***</td>
<td>0.00</td>
<td>0.15**</td>
<td>0.08</td>
<td>-0.10*</td>
<td>-0.07</td>
<td>-0.08</td>
<td>-0.08</td>
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<tr>
<td>DLL</td>
<td>4</td>
<td>-</td>
<td>-0.82***</td>
<td>0.00</td>
<td>-0.04</td>
<td>-0.06</td>
<td>0.07</td>
<td>0.05</td>
<td>0.22***</td>
<td>-0.07</td>
<td>0.01</td>
</tr>
<tr>
<td>Maternal Education</td>
<td>5</td>
<td>-</td>
<td>-0.06</td>
<td>-0.18*</td>
<td>-0.03</td>
<td>-0.02</td>
<td>0.09</td>
<td>0.05</td>
<td>-0.12</td>
<td>-0.08</td>
<td>-0.11</td>
</tr>
<tr>
<td>Shyness</td>
<td>6</td>
<td>-</td>
<td>-0.06</td>
<td>0.02</td>
<td>0.06</td>
<td>0.01</td>
<td>-0.12*</td>
<td>-0.08</td>
<td>-0.12</td>
<td>-0.11</td>
<td>-0.11</td>
</tr>
<tr>
<td>Teacher Characteristic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>-</td>
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<td>0.04</td>
<td>-0.16**</td>
<td>-0.21**</td>
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<td>0.02</td>
<td>0.17**</td>
<td>0.16*</td>
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Notes: * p < .05, ** p < .01, *** p < .001

Table 4.18.  
Correlations Between Teacher/Child Characteristics and the Proportion of Use of Complex Talk Within Each Type of Activity Context

<table>
<thead>
<tr>
<th>Child Characteristic</th>
<th>Large group</th>
<th>Small group</th>
<th>Free Choice/Center</th>
<th>Literacy</th>
<th>Math</th>
<th>Science</th>
<th>Social Studies</th>
</tr>
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<tr>
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<td>-0.02</td>
<td>0.09</td>
<td>0.05</td>
<td>-0.03</td>
</tr>
<tr>
<td>DLL</td>
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<td>-0.00</td>
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<td>-0.01</td>
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<td>0.01</td>
<td>0.10</td>
<td>0.03</td>
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Teacher Characteristic

<table>
<thead>
<tr>
<th>Teacher Characteristic</th>
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<th>Small group</th>
<th>Free Choice/Center</th>
<th>Literacy</th>
<th>Math</th>
<th>Science</th>
<th>Social Studies</th>
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<tr>
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<td>0.17**</td>
<td>0.16*</td>
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<td>-0.07</td>
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Notes: * p < .05, ** p < .01, *** p < .001
Table 4.19.  
**HLM: Teacher and Child Characteristics and the Proportion of Teacher’s Use of Complex Talk Within Activity Context**

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<tr>
<th></th>
<th>Activity Setting</th>
<th>Content Area</th>
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<td>Math</td>
<td>Science</td>
<td>Social Studies</td>
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<td>Complex Talk</td>
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<tr>
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<td>0.04 (0.09)</td>
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associated with their use of complex talk. As demonstrated in the quantitative results, (1) the proportion of use of complex talk in large-group activities was positively associated with teachers’ emotional support and years of teaching experience; and (2) the proportion of use of complex talk in literacy and math activities were positively associated with teachers’ emotional support. Teachers qualitatively described how their emotional support and teaching experience related to the proportion of using complex talk within activity contexts. Two themes emerged: (1) Importance of teachers’ emotional support in complex talk; and (2) refinement of teaching skills.

**Importance of teachers’ emotional support in complex talk.** Teachers underscored the importance of emotional support in early childhood classrooms. Two subthemes emerged from interviews to explain this theme: (a) creating a safe space and building positive teacher-child relationships; and (b) children’s feeling of embarrassment about complex talk in large-group and skill-based activities.

First, nearly all teachers highlighted the value of creating a safe space by building positive teacher-child relationships. They described creating a space where children can be comfortable learning about the world around them and using complex language by promoting secure teacher-child relationships. Erica, who has taught pre-K for 6-10 years, commented on the importance of emotional support in helping her have meaningful conversations with children. She stated:

“I think that, the stronger relationships that you have with the children, the more valuable your conversations and experiences with the children will be, the more likely they’re able to and want to engage in elaboration and those instances of thinking about things in the future, thinking about things that happened previously … I do think that relationships play a big, big part in that. If you don’t have a relationship with a child, it probably will just go in one ear and out the other.”
She shared that children were likely to open up to teachers when they trusted them and felt safe.

Second, a few teachers explained children were embarrassed about complex talk in certain activity contexts. Nicole, a veteran preschool teacher over 21-25 years, noted some children were embarrassed about complex talk in large-group activities because they felt they were falling behind their peers, saying,

“Complex talk is going on … You want to make sure you try to make everybody feel comfortable and answering questions … You don’t want to embarrass children. You don’t want to make them feel like they don’t know anything compared to other kids … In a large-group setting, showing a lot of emotional support is where it’s really needed … If I ask a child a question, and they don’t know it, it is okay.”

This teacher also shared some children were embarrassed when they engaged in complex conversations during literacy and math events they were not familiar with. She stated,

“With writing your name, that’s literacy. Math, how you count, that can be embarrassing for some kids. It can be embarrassing if they can’t write their name. It can be embarrassing if everybody else is counting to 10, and I can only count to two. So you let them know, “Look, you’re doing a good job. Yeah! You did good. You counted to two - Oh my God! Everybody gives them a hand. You show the emotional support.”

She mentioned the importance of providing more emotional support in large-group and skill-based activities because children felt more nervous and embarrassed when they engaged in complex conversations in those activities.

**Refinement of teaching skills.** Teachers described how they continued to improve in their teaching effectiveness as they gained experience in the teaching profession. Most teachers explained more experienced teachers were more effective in boosting children’s learning and development. Kristen, a preschool teacher over 16-20 years, noted she became increasingly adept at understanding children’s needs and how to respond to them, saying:

“You have to have that experience on how to talk to children … If you want it to get information out of them … There’s a certain what you have to ask the child, like what happened, or why do you think this happened … It took me a little while before I was able to learn … Because you might have a child that comes to school, they can’t talk …
He came at three years old he had an IEP … How to ask children certain things … How much you allow them to elaborate the question … that’s things that you've learned over the years.”

This teacher shared her depth of teaching experience allowed her to better understand children and adapt complex talk to their interests and level of understanding. Similarly, Jamie, a preschool teacher of over 31-35 years, mentioned she was growing accustomed to using assessment tools based on learning objectives/outcomes. She said, “Like my assessment … Like with the recall … As I’ve gotten more accustomed to the assessment and how it’s working, it kind of gets me going in that direction.” This teacher reported she became increasingly skilled at aligning curriculum and assessment with complex talk.

**Qualitative data analysis results: Child characteristics.** This subsection describes a thematic analysis of all qualitative data to answer research question #4 related to how child characteristics are associated with teachers’ use of complex talk. As demonstrated in the quantitative results, the interview data indicated: (1) the proportion of use of complex talk in small-group activities was negatively associated with children’s Black and DLL status; (2) the proportion of use of complex talk in literacy activities were positively associated with children’s age; and (3) the proportion of use of complex talk in free play and social studies were positively related to children’s shyness. Teachers qualitatively explained how children’s home language, age, and shyness related to the proportion of using complex talk. Sensitive topics about race and ethnicity were not discussed during the interviews. Three themes emerged: (1) age and developmental status; (2) dual language learners; and (3) shyness.

**Age and developmental status.** Nearly all teachers discussed variations in complex talk based on children’s ages and developmental stages. Shannon, a preschool teacher of 11-15 years, noted the use of complex talk varied depending on the ages and developmental stages of
children, saying, “(The use of complex talk) depends on the age of the student … And it also depends, you know, where they are developmentally.” Similarly, Katherine, who has taught preschool for 26-30 years, mentioned complex talk changed especially based on children’s cognitive skills. She stated, “Depending on the cognitive skills of the children in your class … there’s definitely a difference.”

Dual language learners. Teachers explained they used less complex talk with dual language learners (DLLs). Some teachers contended it’s more difficult for DLLs to grasp complex talk in the child’s second language. Kristen, a veteran preschool teacher of 16-20 years, noted asking DLLs simple questions requiring a single response, saying: “I wouldn’t expect for them to elaborate … I would take a yes or no answer from them because I’m not 100% sure on if they understand what I’m saying.” This teacher shared she used less complex talk with DLLs due to a belief that it’s more difficult for them to understand complex talk.

Shyness. Teachers described how they interacted with children who were shy. In this theme, two subthemes emerged: (a) teachers encouraging shy children to engage in conversations; and (b) contexts in which teachers effectively engage shy children in complex conversations.

First, teachers explained they tried to encourage shy children to engage in conversations. Shannon, a preschool teacher of over 11-15 years, shared she talked more to shy children, saying, “A lot of children that are shy … They don’t speak a whole lot, so you want to speak more words to them. And even if you say something … they just nod their head in agreement … That lets me know that they’re thinking of things.” Erica, who has taught pre-K for 6-10 years, provided another example of encouraging conversations. She commented, “I’ve found myself in a situation … children who don’t talk as much or might not respond to me, then that’s kind of
when I start talking about what I’m noticing them doing … And maybe that would engage them in, I guess, an opportunity to start talking.” Similarly, Nicole, a veteran preschool teacher over 21-25 years, reported using more complex talk with shy children with a belief that all students can learn how to use complex talk. She mentioned, “As a teacher, my belief is all students can learn, everybody learns in a different way … And if I got to do complex talk … If I got to pull it out of them … I’m going to keep talking to you everyday … Because I know you can talk. You might be shy, but I’m gonna … make sure that you’re learning and you’re growing, and you’re gonna talk more eventually.”

Second, teachers discussed contexts where teachers effectively engage shy children in complex conversations. Some teachers noted they were not likely to ask shy children complex questions during large group activities because they felt uncomfortable speaking in front of a group. Katherine, a veteran preschool teacher who has taught preschool for 26-30 years, stated:

“Because in large group … your very social kids that love to answer questions and talk, they seem to out-talk your timid and your shy kids. In my opinion, that (complex talk) does not give your shy, quiet kids as much advantage because they’re uncomfortable with speaking over the loud talking kids. So that’s why my suggestion … group time would not be as beneficial for complex learning for the different levels of social-emotional learning kids.”

Those teachers reported free play was more conducive to using complex talk with shy children because it’s private. Jennifer, who has taught pre-K for 6-10 years, shared shy children felt more comfortable initiating conversations during free play, saying:

“There’s a child in my classroom right now that is shy and, he prefers our (complex) conversations to sort of be in private … He knows that I’m open, but that if I am around a bunch of other children, I often will step out of a conversation with other. I will remove myself to give him that opportunity to talk one-on-one. If he wants to whisper, if he wants to tell me something really soft, I can just whisper back to him to … help make him feel more comfortable … I never would try to make that child feel uncomfortable by asking him a question where he feels like he would have to stand up and answer a question in front of all the other children.”
Additionally, several teachers underscored the importance of developing trusting relationships with shy children in helping them come out of their shells and have meaningful conversations during free play. Melissa, who has taught pre-K for 1-5 years, stated:

“But once you get to know you and know that you care about them … so they get very used to us … This particular student - she is very open now, and she has just blossomed out, and so I’m able to use complex talk with her and, just like the non-shy students, because she enjoys playing in the free play centers … They’re all playing in something that’s interesting to them … The free play center is just … elaborating on what they have said.”

Table 4.20. Theme and Subtheme Table: Teacher and Child Characteristics and Complex Talk

<table>
<thead>
<tr>
<th>Theme</th>
<th>Subtheme</th>
<th>Definition</th>
<th>Quote</th>
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</thead>
</table>
| Importance of teachers’ emotional support in complex talk | Creating a safe space and building positive teacher-child relationships to encourage children to use complex talk | Children are likely to open up to teachers and use complex talk if they trust them and feel safe | “If they want you to incorporate something in their learning, if you do that, it’s going to get them more active and more engaged … They will be more open, and they will enjoy talking about it.”
|                                            |                                                                          |                                                                            | “You have to have the emotional pull as a teacher. You got to love what you do, you got to love the kids and want them to be better at what they’re doing. And the more love you show them, the more they’re going to learn, because they see that, “Oh my God! My teacher wants me to learn! My teacher is doing this for me!” |
|                                            |                                                                          |                                                                            | Large group: “I never would try to make that child feel uncomfortable by asking him a question where he feels like he would have to stand up and answer a question in front of all the other children.” |
|                                            |                                                                          |                                                                            | Greater effectiveness: “When I first began teaching with NC pre-K … I knew how to teach in the classroom, I knew what to do, because … in the book, this is what it said. But when you get that understanding, when you’re able to teach a while, you can see how your actions can either help or hinder a child. So the longer you teach, the more you understand it, the more you can get better at teaching a student, because |
|                                            |                                                                          |                                                                            |                                            |
sometimes, when you first start off, you don’t know what to do. You don’t know what questions to ask.”

“Experience was a big one … The more you do it, the more natural it becomes. And it gets exciting at times too.”

**Increased patience:**
“Teachers that have been in … the profession for several numbers of years or quite a good amount of time, have more patience than sometimes newcomers who just want the kids to sit down, be quiet, and pay attention to everything I say. Well, as an education learner, you know, that’s not going to be the case. So it’s like just being able to know which child needs, which instruction, and just being there for each child individually … During large group settings or small group settings, just individualizing what each child needs at that moment.”

<table>
<thead>
<tr>
<th>Age and developmental status</th>
<th>Variations in complex talk based on children’s ages and developmental stages</th>
<th>Complex talk varies depending on the ages and developmental stages of children</th>
<th>Ages and developmental stages</th>
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<td></td>
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<td></td>
<td>“You can ask them questions slowly with the complex talk … You don't want to just put too much on them … ready to talk … it just depends (on) their developmental state.”</td>
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<table>
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<th>Difficulty in grasping complex talk</th>
<th>Teachers use less complex talk with dual language learners due to a belief that it is more difficult for them to understand complex talk</th>
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<td></td>
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<td>“If I have children that speak Spanish or … Muslim, Portuguese, different languages, then using complex words for them is not as beneficial for your dual language learners. If they’re already on the brinks with trying to continue to talk their language and also learn a different language or English language … it would be more of a hard thing for them to grasp.”</td>
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<th>Shyness</th>
<th>Contexts in which teachers effectively engage shy children in complex conversations</th>
<th>Free play is conducive to using complex talk with shy children because it’s private</th>
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<td>“She’s shy. She doesn’t want to talk that much at all. So I try to make sure, when I’m talking to her, I show her eye contact, I get close to her. I let her know that, “Hey, I’m your teacher. You can trust me.” So I do like a one-on-one thing, I get close to her, and I ask her questions. I don’t try to be too loud or too low. I just try to make sure she can hear”</td>
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Triangulation of quantitative and qualitative data analysis results. The combined data for research question #4 related to how teacher and child characteristics are associated with their use of complex talk showed confirmation and expansion. The analysis of quantitative data reveals that the use of complex talk in large-group, literacy, and math activities is positively related to teachers’ emotional support. This finding is supported by the qualitative data demonstrating that emotional support helps teachers have meaningful conversations with children. In particular, teachers contended that shy children or dual language learners were embarrassed when engaging in complex conversations during large-group and skill-based activities, and emphasized the importance of providing more emotional support during those activities. Also, the analysis of quantitative data shows that the use of complex talk in large-group activities is positively related to teaching experience. This result is confirmed by the qualitative data revealing that teachers become increasingly adept at understanding children’s needs, adapting complex talk to their interests and level of understanding, and aligning curriculum and assessment with complex talk and started to enjoy the outcomes of their teaching efforts.

In addition, the analysis of quantitative data shows that the use of complex talk in small-group activities is lower for children who are Black and DLLs; and the use of complex talk in literacy activities is positively related to children’s age. This finding is supported by the qualitative data indicating that teachers’ use of complex talk varies depending on children’s ages, home language, and developmental stages. Sensitive topics about race and ethnicity were not
discussed during the interviews. The quantitative analysis also reveals that the use of complex talk in free play and social studies is positively related to children’s shyness. This finding is confirmed by the qualitative data demonstrating that teachers talk more to shy children regardless of their demographic characteristics to help them come out of their shells and engage in meaningful conversations. Teachers noted free play was more conducive to utilizing complex talk with shy children because they felt more comfortable having private conversations during free play.

**Conclusion**

Major findings in the current study revealed teachers modulated their use of complex talk depending on instructional context and learner variability. The analysis of quantitative and qualitative data showed: (1) Teachers’ use of complex talk was higher for large group than for small group and free choice/center time. (2) Complex teacher talk was higher for social studies and science than for math. (3) Teachers’ use of complex talk in large-group, literacy, and math activities was positively related to their emotional support. (4) The use of complex talk in large-group activities was positively related to teaching experience. (5) Black children and dual language learners experienced lower levels of complex talk in small-group activities. (6) The use of complex talk in free play and social studies was positively related to children’s shyness.

Additionally, the analysis of quantitative data revealed larger gains in picture vocabulary were positively associated with the use of complex talk in large-group and science activities, indicating that the use of complex language in the activity in which the proportion of using complex talk was higher related to gains in children’s language skills. Also, the analysis of quantitative data demonstrated the use of complex talk within different activity contexts was not related to teachers’ attitude toward ECE and instructional orientation, while teachers
qualitatively described the value of using complex talk in their classrooms. One potential reason for the discordance is that teachers’ beliefs about the importance of providing high-quality language input don’t align with their actual practice. The combination of the quantitative and qualitative analysis illustrated the complexity of teachers’ use of complex language across different activity contexts and expanded our understanding about the complex talk phenomena.
CHAPTER 5: DISCUSSION

There have been many attempts to promote children’s language and literacy development through classroom-based interventions with mixed results (Dickinson, 2011; Dickinson et al., 2014). One possible explanation for this is the difficulties connected with changing preschool teachers’ ways of using language (Dickinson et al., 2014). In particular, we have a limited understanding of how language is used across preschool activity contexts and what elements are related to its use (Barnes et al., 2016; Bratsch-Hines et al., 2019; Burchinal et al., 2021; Cabell et al., 2013; Massey et al., 2008; Nores et al., 2022; Turnbull et al., 2007).

This study used a modified mixed-method sequential explanatory design to explore how preschool teachers perceive and use complex talk within each type of activity setting and content area to facilitate language and literacy skills. The combination of large-scale, quantitative data (455 children, 63 teachers) from a pre-K study and in-depth, qualitative interview data from a separate sample of 10 preschool teachers in rural North Carolina provided a holistic analysis of the phenomena of complex teacher talk. The findings from the two sources of data not only confirmed the results of the other but also expanded insights of the complex talk phenomena in different activity contexts within preschool classrooms.

This research contributes to the existing literature by offering a contemporary, in-depth examination of language learning experiences provided to preschoolers. Evidence suggests the most effective strategy to promote children’s language and literacy development in early childhood settings is to explicitly target the precise, proximal processes resulting in high-quality
conversational interactions (Burchinal et al., 2021; Cabell et al., 2015; Dickinson et al., 2014; Hindman & Wasik, 2012; Justice et al., 2018; Pentimonti et al., 2010; Zucker et al., 2010). Despite the increased focus on the quality of children’s language-learning environment, the ECE field continues to confront a significant research-to-practice gap in the implementation of complex language practices (Girolametto et al., 2003; Piasta et al., 2012; Wasik & Hindman, 2011). To promote the adoption and integration of evidence-based language practices into real-world settings, this study sought to explore how complex teacher talk differs based on classroom context and what teacher and child characteristics are related to its use.

In this chapter, the study outcomes for each research question are situated within recent research on ECE quality. Results of this study may particularly encourage preschool teachers to reflect on variations in the effectiveness and use of complex talk across activity settings and content areas and to be more intentional in modifying components of complex language to fit their specific classroom context. Results of this study also provide important implications for ECE quality measures influencing how policymakers conceive and fund “high-quality” ECE programs and teachers and administrators implement them. Furthermore, results of this study support context-specific, targeted professional development efforts focusing on various strategies to foster language and literacy skills. Implications for practice, policy, and future research are discussed in detail. Last, limitations and future directions are discussed.

**RQ 1: Teachers’ Perceptions of Complex Talk**

The purpose of complex talk. The first aim of this study was to examine how preschool teachers perceived their use of complex talk influencing children’s language and literacy skills. The qualitative data provided information about why teachers used complex talk in their
classrooms and expanded our understanding about the purposes of complex talk. Many of the components of complex talk, including (1) preparing children for school talk, (2) checking for student understanding, and (3) transferring of learning, perceived by teachers to be useful and effective fell into clear alignment with previous research highlighting the importance of academic language (Barnes et al., 2016; Dickinson et al., 2014; Uccelli et al., 2018). The specific purposes of complex talk are detailed below based on teacher interviews.

First, teacher participants described how they prepared children for school by broadening and deepening children’s understanding of concepts and helping them understand and use specific discourse functions common in school. Teachers specifically reported using complex talk (elaborates and decontextualized language) to challenge children to “go deeper” by encouraging thinking in new and different ways. This finding aligns with the research of Dickinson et al. (2014) purporting that academic language is often used in discussions to enhance and enrich children’s world knowledge.

For instance, teachers emphasized helping children elaborate their thoughts to further build conceptual knowledge. This finding is consistent with previous research demonstrating that teachers support teaching practices shown to be effective previously, such as remaining on a topic and elaborating children’s thoughts to foster vocabulary and conceptual knowledge (Hoff-Ginsberg, 1991; Nelson, 1989). Similarly, conversations including talk about vocabulary and comprehension-related topics are those in which academic language registers like expansions or recasts tend to be present (Barnes et al., 2016; Connor et al., 2006; Dickinson et al., 2014).

Teachers also noted recounting stories of personal experiences about past or future events to broaden and deepen children’s understanding of concepts. This lends further evidence to the
positive influence of decontextualized talk on children’s vocabulary and concept development (Curenton & Justice, 2004; Dickinson & Tabors, 2001; Heath, 2012; Rowe, 2012; Schleppegrell, 2004; Uccelli et al., 2015). Previous research demonstrated that, with increases in experience in talking elaboratively about past events, children construct enriched representations of concepts and their narratives become more richly detailed and complex (e.g., Haden, 1998; Ornstein et al., 2004). Furthermore, teachers build on children’s strengths and interests to help them learn new vocabulary by using decontextualized talk because this type of talk links with children’s existing funds of knowledge and connects learning to their authentic experiences (Nelson, 2009; Peterson & Greenberg, 2017).

Additionally, teachers reported promoting the type of vocabulary and communication skills common in school talk by using complex talk. Previous research similarly identified academic language as “the new set of registers that many children encounter for the first time on arrival at school” (Schleppegrell, 2012, p. 411). The examples of complex talk shared by participants are consistent with recent research highlighting the importance of academic language for children’s long-term academic achievement. For example, previous research has indicated academic language is associated with achievement in literacy and the content areas in elementary school and beyond (Barnes et al., 2016; Schleppegrell, 2012; Townsend et al., 2012). Children who are skilled in academic language also understand content area textbooks better (Schleppegrell, 2004) and demonstrate superior conversational language (Girolametto et al., 2003; Piasta et al., 2012), which may promote long-term academic success.

Second, teachers shared complex talk helped effectively gather objective evidence and detailed data to inform and adjust their teaching practices. They emphasized using complex talk as a tool to learn what children know about the world and what they wonder. This finding aligns
with the research of Katz and Chard (1996), which showed that teachers can gain insights into children’s thinking and learning through the process of observation, documentation, and interpretation of children’s conversations. The use of this practice allows teachers to reflect on the effectiveness of their instructional practices by gaining a better understanding of their children (Kroeger & Cardy, 2006).

Third, teachers described motivating children to apply what they learned about complex talk in real-world contexts. They shared children learned about themselves, others, and the world around them by using complex talk with parents, peers, and teachers. This finding supports previous research highlighting the importance of encouraging children to process and practice extended discourse and expand the limits of their world, which will resemble the specialized language of academic settings in later phases of language development (Uccelli et al., 2018).

Contextual factors relevant to complex talk. The qualitative findings highlight different aspects of the complex talk phenomena, highlighting the importance of understanding the effects of context on complex talk. In this section, how contextual factors, such as situations, teaching events, and children, are associated with teachers’ use of complex talk will be detailed.

Teachers qualitatively explained contextual factors impacting their use of complex talk. First, they described how complex talk changed across the school year. For instance, at the beginning of the year, teachers often used directional talk to establish a foundation for new environments. But as the year progressed, they used more complex talk. This finding echoes previous research showing that children need to feel emotionally supported and at ease, before they are mentally prepared to learn (Curby et al., 2013; Durlak et al., 2011; Wentzel, 2004). Children may be anxious about starting the school year because of uncertainty and a
perceived lack of control (Dockett & Perry, 1999). Furthermore, classrooms spend more time in organization, such as instructing students in classroom rules and procedures and clarifying expectations for proper child behaviors, at the beginning of the school year than in the middle or at the end (Cameron et al., 2005; Pittman, 1985). As the school year progresses, however, children may be better able to use a teacher as a secure base and a resource for language learning opportunities as they establish a trustful relationship with the teacher.

Second, teachers discussed individual differences in who benefits from complex talk. For instance, shy children didn’t benefit as much from large-group activities since they felt uncomfortable with speaking up. In this context, teachers reported changing their use of complex talk based on individual children’s characteristics and abilities. Research demonstrated that teachers’ ability to adapt linguistic input to individual children’s needs and interests plays useful roles in fostering learning and development (Copple & Bredekamp, 2009; Gerde & Powell, 2009). However, according to Dicarlo et al. (2012), accommodating children’s individual needs and interests within whole-group settings may be a distraction. Since much of what children experience occurs during large-group activities and the part of individual variation lies at the child level, future research examining individual differences via the investigation of the level of engagement in large-group settings is necessary to better understand how teacher’s use of complex talk is adapted for varied audiences during circle time.

Third, teachers discussed how complex talk changed based on the purpose of activities. They provided examples of giving verbal directions in some science activities and asking open-ended questions in other science activities. The context in which teacher-child language exchanges take place is defined by the goals of activity, the nature of the content matter, and the settings where teaching and learning occur (Darling-Hammond & Snyder, 2000). To understand
teachers’ use of complex talk in various activities, future research needs information about what activity goals teachers try to accomplish and what aspects of classroom setting and content they consider. In addition, given that the goal of each activity matters, observations and assessments should offer opportunities to demonstrate teachers’ and children’s abilities in different activity contexts.

Fourth, teachers noted they made integrated curriculum and complex talk work toward the same ends. In this regard, they explained it’s difficult to determine which content area is more conducive to using complex talk because they connected different content areas by cutting across subject-matter lines and pursuing unifying concepts. Different early childhood curricula, such as Montessori, Waldorf, and Reggio Emilia, may map onto different activity settings and content areas that may be ideal for improving children’s languages and literacy skills. Therefore, variations in complex talk across different curricula require continued attention. Moreover, we need to be cautious about generalizing these results to classrooms in other types of programs or in other countries. For instance, complex language may be used in different ways in collectivistic societies (e.g., China) which highlight greater emotional control and inhibition of personal expression of young children (Chen et al., 2015).

Given the value of using complex talk, an emerging body of research examines language learning experiences in early childhood classrooms, including measuring the frequency and quality of teacher-child language interactions (Burchinal et al., 2021; Hindman & Wasik, 2012; Justice et al., 2018). Many researchers have particularly sought to understand better linguistic environments by investigating whether they reflect academic language use and examining how the associations between teachers’ use of specialized discourse functions and children’s language and literacy development vary across activity contexts (Bratsch-Hines et al., 2019; Burchinal et
al., 2021; Cabell et al., 2013; Dickinson et al., 2014; Massey et al., 2008; Nores et al., 2022; Turnbull et al., 2007). This study lends further evidence to the variations in the effectiveness of complex talk across activity contexts. In the next section, how complex talk within each type of activity setting and content area relates to children’s language and literacy development will be explored.

**RQ 2: Variations in the Effectiveness of Complex Talk Across Activity Contexts**

The second aim of this study was to test if children showed larger gains in language and literacy skills when teachers engaged in more complex talk within each type of activity context. Bronfenbrenner (1995) asserted that proximal processes occurring in more effective contexts have a greater influence on children’s development and learning. However, ECE quality research has often overlooked contextual factors influencing teaching practices, such as activity settings and content areas (Burchinal et al., 2021; Cabell et al., 2013; Dickinson et al., 2014; Rimm-Kaufman et al., 2005). Specifically, there is still a great deal of uncertainty about the degree to which the effectiveness of teaching practices differs across classroom contexts (Cote, 2001; Dickinson et al., 2014; Fuligni et al., 2012; Massey et al., 2008; Nores et al., 2022). The quantitative data provided information about the extent to which the effectiveness of the use of complex talk varies among activity settings (large group, small group, free choice/center time) and content areas (literacy, math, science, social studies).

The analysis of quantitative data demonstrated that the use of complex talk during large-group activities was significantly associated with larger gains in picture vocabulary, but the association was quadratic instead of linear. This finding echoes Cabell and her colleagues (2013), who showed that the effectiveness of instructional practices is typically greater during
large-group activities than other activities. Teachers are more likely to engage children in meaningful interactions in large-group settings since they regard the time as instructional in nature (Cote, 2001; Dickinson, 2001; Early et al., 2010; Turnbull et al., 2009; Winton & Bussye, 2005). On the other hand, teachers do not maximize opportunities to interact with children and provide advanced language models during free choice/center settings (Gobel et al., 2016; Gobel & Pianta, 2017; Winton & Bussye, 2005).

In addition, the analysis of quantitative data showed that larger gains in picture vocabulary were significantly related to the use of complex talk in science activities. This study supports other observational studies in finding that language interactions are more effective in science than in other content areas (Cabell et al., 2013; Fuccillo, 2011). Many aspects of teacher-child conversations about science have been found to be beneficial for children’s concept learning (Leech et al., 2020; Haden et al., 2014). For instance, richer conversational exchanges during science activities (e.g., open-ended questions, connections to previous experiences, predictions) help children retain scientific concepts (Benjamin et al., 2010; Haden et al., 2010). Adults’ engagement in complex language during science activities also affected children’s own articulation of inferences, comparisons, and explanations about scientific concepts (Callanan et al., 2017; Humphrey & Gutwill, 2005). According to Cabell et al. (2013), this is the only content area in which the average instructional interaction score approached or surpassed the minimum threshold of enhancing children’s learning. Consequently, this domain facilitates high-quality, extended conversations fostering children’s language and higher-order thinking skills.

In the next section, how and why teachers’ use of complex talk varies across activity contexts will be discussed. In particular, this study investigated if teachers use more complex language in the activity in which complex talk is more effective.
RQ 3: Variations in the Use of Complex Talk Across Activity Contexts

The third aim of this study was to investigate how teachers’ use of complex talk varied across activity settings (large group, small group, free choice/center time) and content areas (literacy, math, science, social studies). The Systemic Linguistics Approach (SLA; Dickinson et al., 2014; Halliday, 1993; Schleppegrell, 2012) was used to explain the nature of complex teacher talk and the factors relevant to its use. SLA is built on the idea of language registers, setting-specific features of linguistic competence, and the content of the interaction. Language registers (e.g., the sets of phonological, semantic, and grammatical components) are differentiated by their specific linguistic features and functions, and people use different registers for different intellectual and social purposes (Halliday, 1993). Based on this theory, the analysis of both quantitative and qualitative data identifies contextual factors associated with teachers’ use of complex talk involving academic language registers.

Variations across activity settings. The analysis of quantitative data demonstrated that the use of complex talk was highest for large group. Teachers also qualitatively described how they used systematic, explicit, and purposeful instructions to provide children with more complex language opportunities during large-group activities and how this activity setting was more conducive to engaging children in conversational feedback loops and offering advanced language models than other settings. This study supports previous findings that teachers tend to engage in conceptually rich conversations during large-group activities (Cabell et al., 2013; Early et al., 2010; Turnbull et al., 2009; Winton & Bussye, 2005). For example, teachers regard this setting as a time for introducing children to new content and a way to tap into their existing funds of knowledge (Ansari & Purtell, 2017; Barnes et al., 2016; Early et al., 2010). Large-group instruction is also an ideal setting for the integration of informational texts (Barnes et al., 2016).
Furthermore, teachers employ more rare or new words, offer more advanced linguistic forms, and pose more open-ended questions during teacher-directed activities (Cote, 2001; Turnbull et al., 2009).

In contrast, the analysis of quantitative data showed that the use of complex talk was lowest for free choice/center time, even though children were observed in free choice/center settings most frequently. Teachers also qualitatively noted they listened to children’s thoughts and feelings instead of interrupting during center time. This result is consistent with a recent study, which found that teacher-child interactions during free choice/center time are infrequent and less effective than large-group activities (Cabell et al., 2013; Winton & Bussye, 2005). Previous studies similarly revealed free choice/center settings lack a curricular structure and require teachers to engage children in real time, so that teachers often have a hard time promoting children’s conceptual understanding during free play (Cabell et al., 2013).

However, free choice/center time has the potential to promote rich, one-on-one interactions and help teachers extend and elaborate children’s thinking (Winton & Bussye, 2005). The examples of using complex talk during free play shared by participants align with previous research showing that teachers may engage children in meaningful conversational interactions and use decontextualized language during pretend play (Gest et al., 2006; Uccelli et al., 2018). Similarly, children have shown significant gains in language and literacy skills when teachers make the best use of linguistically responsive behaviors and provide instructional and emotional support during center time (Dickinson, 2001; Dickinson and Porch, 2011; Gest et al., 2006; Goble & Pianta, 2016; Winton & Bussye, 2005).
**Variations across content areas.** The analysis of quantitative data demonstrated the use of complex talk was highest for social studies and lowest for math. This finding is supported by the qualitative data indicating that social studies activities can offer a context in which teachers efficiently engage children in conversational feedback loops and provide advanced linguistic forms. Teachers described how complex talk capitalized on opportunities supportive of social system and social concept learning, such as providing topics of study focusing on children’s interest, social context, and real-world problems. Through these authentic experiences, they relied on culturally and linguistically responsive instructions during social studies activities.

This finding builds on the previous research of Cabell et al. (2013), which showed that conceptual talk is more common when social studies is discussed than when basic skills (e.g., letter names, numbers) are being taught. During social studies activities, children investigate and ask questions about social systems and abstract societal rules which shape human relationships and interactions (Epstein, 2014). Children also discuss social concepts related to real-world situations or issues they confront in their classrooms and communities (Catalino & Meyer, 2016; Mindes, 2015). Through these authentic experiences, teachers can use systematic and responsive instruction to present diverse perspectives, model respect for different ideas and opinions, and expand children’s understanding of the world around them (Copple & Bredekamp, 2009; Gronlund & Rendon, 2017).

In addition, the quantitative analysis showed the use of complex talk was higher for science than for math. This result is confirmed by the qualitative data revealing that science activities create naturally stimulating and nurturing environments. Teachers mentioned how they encouraged children to go into details by using elaborative conversations during science activities and talked about past or future events when children conducted science experiments.
They also illustrated how they listened attentively to children’s thoughts, probed their thinking, and worked collaboratively with them to solve problems during science activities.

This study supports previous findings that science activities can provide a context where teachers naturally engage children in conversational feedback loops and provide advanced linguistic forms (Cabell et al., 2013; Corriveau & Harris, 2015; Dickinson et al., 2014; Trundle et al., 2017). For instance, classroom science activities (e.g., growing plants, sink or float experiment) may function as a cognitively stimulating context in which teachers introduce new words, discuss scientific concepts with children, connect to previous experiences, and ask open-ended questions that encourage children to compare, explain, and make inferences (Benjamin et al., 2010; Callanan et al., 2017; Haden, 2010; Humphrey & Gutwill, 2005; Leech et al., 2020).

On the other hand, the analysis of quantitative data demonstrated the use of complex talk was lowest for math. Teachers qualitatively described teaching basic skills and using clearly defined and prescribed instructional guidelines during math activities. They shared there were much more rote instructions because a discrete math task required a single response. This finding echoes Dickinson and his colleagues (2014), who reported skill-oriented talk is more common when literacy and math are taught than when science and social studies are discussed. Similarly, teachers rely on rote instruction (e.g., repeated exposure to counting and numbers) during math activities (Ginsburg, 2009) and rarely read math information books (Pentimonti et al., 2010).

**RQ 4: Relations Between Teacher and Child Characteristics and Complex Talk**

The fourth aim of this study was to investigate how teacher and child characteristics related to teachers’ use of complex talk within each type of activity context. Bronfenbrenner highlighted the complex relations among process, person, context, and time (PPCT model;
Bronfenbrenner, 1995). In proximal processes, through bidirectional and transactional relationships, knowledge and experience are transmitted between adults and children (e.g., caregivers affect children’s use of language and children affect how caregivers talk) (Bronfenbrenner & Ceci, 1994; Justice et al., 2013; Sroufe, 2005). Nonetheless, the mechanism by which the combination of individual child and caregiver characteristics is related to instructional practices across activity contexts needs further attention (Desimone, 2009; Hamre et al., 2012; Hindman & Wasik, 2008; Nurmi, 2012). Hence, the analysis of both quantitative and qualitative data reveals how teacher and child characteristics are associated with teachers’ use of complex talk within each type of activity context.

**Teacher characteristics.** There is scant research on how teachers’ characteristics relate to the dimensions of quality learning environments (Graham et al., 2020; Jennings, 2015). In particular, little is known about the relations between teachers’ characteristics (e.g., beliefs, practices, teaching experience) and their use of complex language across activity contexts. This section will focus on how teachers’ attitude toward ECE, instructional orientation, emotional support, and years of teaching are associated with complex talk within each type of activity setting and content area.

**Attitude toward ECE and instructional orientation.** The analysis of quantitative data demonstrated that the proportions of using complex talk in activity settings and content areas were not related to teachers’ attitude toward ECE and instructional orientation. In contrast, teachers qualitatively described the value of using complex talk in their classrooms. One potential reason for the discordance is that teachers’ beliefs about the importance of providing high-quality language input don’t align with their actual practice (Subrahmanyam et al., 2013).
This finding needs to be interpreted cautiously because a separate sample of pre-K teachers (i.e., not from the original quantitative study) was selected in the qualitative portion.

**Emotional support.** The analysis of quantitative data revealed the proportions of using complex talk in large-group, literacy, and math activities were positively related to teachers’ emotional support. This finding is supported by the qualitative data demonstrating that emotional support (especially teacher sensitivity) helps teachers have meaningful conversations with children. In particular, teachers contended shy children or dual language learners were embarrassed when engaging in complex conversations during large-group activities since they felt they were falling behind their peers. Teachers also reported some children who were not familiar with literacy and math events felt embarrassed about complex talk in these skill-based activities. In this context, teachers emphasized the importance of providing more emotional support during large-group, literacy, and math activities.

This finding aligns with previous research demonstrating that higher levels of emotional support are associated with effective instructional practices (Curby et al., 2013; Rimm-Kaufman et al., 2007). Previous research has indicated having closer, warm, and respectful interactions paves the way for higher-quality instructional interactions (Curby et al., 2010; Hamre & Pianta, 2007). Large-group settings and skill-based activities can particularly be overwhelming to some preschoolers and their teachers (Jamison et al., 2012; Katz & Chard, 2000; Gresham & Burleigh, 2017; Wohlhunter & Quintero, 2003). In this regard, children may need to feel emotionally supported and at ease before they are mentally prepared to learn within these activity contexts. Children are likely to use a teacher as a secure base and a resource for learning opportunities, when children build a trustful relationship with the teacher (Curby et al., 2010; Howes, 2000, Howes et al., 2000). Teachers may also be effective when they are confident in their ability to
create safe and supportive learning environments and manifest an awareness of children’s interests and needs (Zee & Koomen, 2016).

**Teaching experience.** The analysis of quantitative data showed the use of complex talk in large-group activities was positively related to teaching experience. This result is confirmed by the qualitative data revealing that teachers become increasingly adept at understanding children’s needs, adapting complex talk to their interests and level of understanding, and aligning curriculum and assessment with complex talk. Teachers also explained experienced teachers had more patience with children, were better able to offer individualized instructions, and started to enjoy the outcomes of their teaching efforts.

This finding builds on previous research demonstrating that teaching experience improves instructional quality (Berliner, 1986; Graham et al., 2020; Rivkin et al., 2005; Schachter et al., 2016). Evidence suggests years of teaching are associated with high-quality instructional practices, indicating that teaching experience may play a role in the development of knowledge and beliefs about language and literacy instruction (Guarino et al., 2006; Nye et al., 2004). Specifically, according to LoCasale-Crouch et al. (2007), teachers in the positive emotional climate, high instructional support profile tended to have higher teaching experience. Nonetheless, the evidence for the relation between teaching experience and classroom quality is mixed and does not support a clear set of conclusions about the significance of years of teaching as a predictor of instructional quality (Graham et al., 2020; Hamre et al., 2007; Pianta & Hamre, 2009; Schachter et al., 2016). This study aimed to add to the literature by drawing on LISn behavior counts to examine if there is any relation between teaching experience and complex teacher talk fostering children’s language and literacy skills. Further research with a larger number of teachers from a range of different school contexts is needed before generalizing the findings.
Child Characteristics. Preschoolers may evoke or elicit different opportunities for facilitative language use from caregivers (Pelatti et al., 2014). Individual children’s characteristics, including race, language proficiency, and shyness, are one possible explanation for such differences. In this section, how children with specific characteristics elicit different complex language opportunities will be discussed.

Race. The analysis of quantitative data indicated Black children experienced lower proportions of complex talk during small-group activities. In the qualitative portion, sensitive topics about race and ethnicity were not discussed during the interviews. The finding is similar to a recent study, which found that children of color tend to experience less enriched learning opportunities (Early et al., 2010; Gilliam et al., 2016; Lee & Ginsburg, 2007). In particular, Black children are prone to experience lower quality instructional interactions and higher amounts of non-play and non-educational activities compared to their White peers (Barnett, Carolan, & Johns, 2013; Tonyan & Howes, 2003).

Children of different skill levels. The analysis of quantitative data showed that dual language learners experienced lower proportions of complex talk in small-group activities; and the use of complex talk during literacy activities was positively related to children’s age. This finding is supported by the qualitative data indicating that teachers’ use of complex talk varies depending on children’s ages and developmental stages. In particular, teachers shared they were likely to use simple talk (e.g., repeat or confirm, give verbal directions, provide information, labels, or names) with DLLs or children with low English proficiency because of a belief that it’s difficult for them to understand complex language.

This finding echoes previous research indicating that children elicit different linguistic input from caregivers whom they interact with, and caregivers also modify their instruction to
meet the needs of individual children (Golinkoff & Hirsh-Pasek, 2006; Stanovich, 1986; Tomlinson et al., 2003). Justice et al. (2013) particularly showed the importance of the complex, bi-directional relations underlying the complexity of teacher-child interactions in early childhood classrooms. Specifically, richer language interactions between teachers and children affect children’s language development (Girolametto et al., 2003; Piasta et al., 2012) and vice versa (Justice et al., 2013).

The quantitative and qualitative findings are also similar to other studies focusing on DLLs. Evidence suggests teachers use less sophisticated vocabulary and decontextualized language as a means of responding to the initial levels of DLLs’ language proficiency (Franco et al., 2019; Sawyer et al., 2018). Also, teachers’ perceptions of the importance of providing high-quality language input aren’t in line with their actual interactions with DLLs (Subrahmanyam et al., 2013). DLLs may have fewer opportunities to learn and use complex language because they may not be ready to speak words they have learned or equipped to answer when asked complex questions (Hall et al., 2003; Weizman & Snow, 2001).

**Shyness.** The quantitative analysis revealed the proportions of using complex talk during free choice/center time and social studies activities were positively related to children’s shyness. This finding is confirmed by the qualitative data demonstrating that teachers talk more to shy children to help them come out of their shells and engage in meaningful conversations. Teachers also explained asking complex questions in large-group activities was not as beneficial for shy children since they were uncomfortable speaking in front of a group. They noted free play was more conducive to using complex talk with shy children because they felt more comfortable having private conversations during free choice/center time. Teachers further highlighted the
importance of building trusting relationships with shy children in helping them have complex conversations during free play.

This finding aligns with previous research, which demonstrated that shy children elicit more conversation opportunities from teachers (Coplan & Armer, 2005; Coplan et al., 2010). Shy children are more prone to show frequent reticent behaviors (e.g., watching their peers without joining in play, remaining unoccupied) and overt indices of anxiety, which may attract teacher attention (Coplan et al., 2001; Coplan et al., 2010). According to Birch and Ladd (1998), teachers view shy and anxious children as more dependent on them and are likely to spend a large amount of time with them. Teachers are particularly expected to be more responsive to shy children during center time. Coplan and Prakash (2003) revealed shy children receive more interactions from teachers during free play because they are less likely to initiate interactions with their teachers. Future investigations of the dimensionality of the quality learning environments should further investigate how teachers engage shy children in conversational feedback loops and provide advanced linguistic forms for them.

**Practice and Research Implications**

The present study has several significant implications for practice and research. First, the importance of teachers’ linguistically responsive behaviors in early childhood classrooms (e.g., elaboration and extension, sustained conversation, decontextualized talk) should be underscored. The most effective way to foster children’s language and literacy skills is to explicitly target the precise, proximal processes culminating in high-quality conversational interactions (Cabell et al., 2015; Dickinson & Smith, 1994; Justice et al., 2018; Zucker et al., 2010). This study demonstrated that children’s exposure to complex language was crucial for their language
development, especially vocabulary. However, there were limited opportunities for children to interact with their teachers and engage in meaningful conversations. The current findings suggest preschool teachers and administrators need to investigate the degree to which individual children experience high-quality linguistic input and promote teachers’ use of complex language that occurs at low rates.

Second, information about the relative malleability of different linguistic elements and complex language phenomena that occur naturally helps teachers reflect on their use of complex talk within each type of activity context and set instructional goals (Dickinson et al., 2014). Specifically, the present findings indicate the use of complex language may be especially effective when paired with conceptual talk about science and social studies or conversational exchanges during circle time. Curriculum guidance combined with practice-based coaching may enable teachers to use complex talk in ways that are context-sensitive. In this regard, we need a deeper knowledge of the natural variation in effectiveness occurring across activity settings and content areas. To answer such questions, elaborate experiments may be required in addition to classroom observations and teacher interviews.

Third, findings from recent research raise concerns about depending exclusively on general ECE quality measures. To date, diverse ECE stakeholders have worked together to describe how quality is defined and measured using descriptions of quality generated by classroom-level ratings of teacher-child interactions, such as Early Childhood Environment Rating Scale (ECERS; Harms et al., 1998), Classroom Assessment Scoring System (CLASS; La Paro et al., 2008), and Early Language and Literacy Classroom Observation (ELLCO; Smith et al., 2008). However, such measurement tools explain relatively small proportions of variance in language and literacy outcomes, although they have proved useful and are much easier to use
than language-intensive approaches (Dickinson et al., 2014). The current findings of this study provide further evidence of the value of behavior counts that focus on the individual child’s experiences. Specifically, LISn was found to appropriately document the important proximal processes that significantly influence child language gains during preschool by showing the potentially critical effects of teaching practices encouraging children to engage in responsive and complex language exchanges (Burchinal et al., 2021; Keys et al., 2013).

This study particularly used the Language Interaction Snapshot (LISn; Atkins-Burnett et al., 2009) providing concrete, context-specific descriptions of the nuances of teaching. While ECE quality is often measured by ratings of the whole classroom (Hamre, 2014), the LISn uses counts of specific teacher and child behaviors to measure the types of language interaction children experience with teachers and the time spent in different activity settings and content areas (Burchinal et al., 2021; Howes et al., 2008). The quantitative results revealed classroom-level aggregated behavior counts of the selected language experiences (i.e., responsive and complex language exchanges) were related to gains in language skills, while general dimensions of ECE quality were not. Given that behavior counts measure something different from general classroom-level ratings, it may deepen understanding of children’s language-learning environments to consider what children experience in different activity contexts in addition to classic measures of global ECE quality (Burchinal et al., 2021; Justice et al., 2018, Pianta et al., 2020).

Fourth, the results may have implications for improving professional development models for preschool teachers. This study raises doubts about the current approaches to fostering children’s language skills, particularly those focusing on enhancing the systems-level general environment through pre-service and in-service professional development of preschool teachers.
(Early et al., 2017; Hamre et al., 2012; LoCasale-Crouch et al., 2016). Most current models emphasize global strategies while paying little attention to the differences across activity contexts. Teachers also talk at, rather than with, children in some settings (Dickinson et al., 2014; Farran et al., 2017). This could be one of the reasons why preschool interventions typically have limited success in improving the use of academic language registers (Barnes et al., 2016; Dickinson et al., 2011).

Teachers are expected to adapt their practice simultaneously across activity contexts, possibly leading to minimal change in their teaching performance (Cabell et al., 2011, Pence et al., 2008). In this regard, some researchers advocate for more targeted approaches to professional development since adjusting teaching strategies is difficult (Dickinson et al., 2011; Matsko & Hammerness, 2014). The present results indicate teacher education efforts could be adapted to capitalize on the natural variation in effectiveness occurring across activity settings and content areas. A promising approach would be to design and implement professional development models that would leverage on teachers’ strengths by maximizing the effectiveness of language exchanges within activity contexts more conducive to using complex talk. Offering context-specific professional development that supports teachers’ abilities to “enact core teaching practices in context” (Matsko & Hammerness, 2014, p. 130) and prioritizes areas of relative teacher strength in effectiveness of complex talk may lead to greater adoption of teaching strategies. Given that such investigations are rare in the ECE field, additional research on context-specific pre-service and in-service teacher education programs would contribute substantially to the ECE literature.

Based on the current results, ECE stakeholders can design and implement context-specific classroom interventions to improve the quality of language exchanges within large-
group science and large-group social studies activities as well as encourage teachers to spend more time offering science and social studies instructions that are conducive to using complex language. One possible way to increase the quality and quantity of language exchanges is to encourage teachers to use age-appropriate science and social studies information texts as part of reading instruction during large-group activities (Price et al., 2012). The Systemic Linguistic Approach (SLA; Halliday, 1993) indicates teacher-child interaction may be influenced by the text being read. For instance, teachers use richer extra-textual language, ask more cognitively challenging questions, and promote more abstract thinking during shared-reading activities (Cote, 2001; Gest et al., 2006; Massey et al., 2008), especially when reading science information books (Price et al., 2012). However, teachers seldom read these texts in their classrooms (Pentimonti et al., 2010; Husband, 2010). Therefore, ECE stakeholders need to make efforts to offer enhanced access to the use of these types of books and professional development on how to engage in high-quality conversational interactions during these activities (e.g., Lee et al., 2012). Also, given that boys prefer information texts and girls prefer narratives (Chapman et al., 2007), training teachers with a gender-sensitive approach needs further attention.

Fifth, the results show that ECE experiences differ among children depending on teacher and child characteristics. In this regard, child-level observations may be beneficial for predicting gains in language and literacy skills when there are considerable individual variations in teacher behaviors that encourage children to engage in high-quality conversational interactions (Sawyer et al., 2018). In response to the demands of teaching more diverse learners, there is a need for teacher education that helps teachers to develop a nuanced understanding of the effects of context and learner variability on teaching and learning. Instead of using prescribed instructional
Sixth, even though these results give a better understanding of language use across activity contexts, they should be viewed in the context of early learning and teaching standards for young children. Currently, all 56 States and Territories have developed early learning standards for preschoolers (Administration for Children and Families, 2016). According to the bioecological systems model (Bronfenbrenner & Morris, 1998), the quantity and quality of adult-child interactions play an important role in children’s development and learning and serve as the basis for program standards pertaining to aspects of the cultural and institutional context. Recent studies, however, raise doubts as to whether ECE programs designed to meet explicit early learning standards address all facets of children’s development (Burchinal, 2018; Neuman & Rokos, 2005). The main limitation is that these standards focus primarily on literacy and math and isolated subject learning (NAEYC, 2002) with a limited focus on socio-emotional and language development.

ECE has highlighted the importance of content integration (NAEYC, 2002; Neuman & Rokos, 2005; Schickedanz et al., 1997). Similarly, this research demonstrated strong synergies between academic language and other content areas (e.g., developing academic language for science and social studies). Therefore, this study recommends States explore how early learning standards can foster connections across the content areas and develop additional standards to offer a holistic view of children’s developmental needs.

Seventh, this study found children of color and DLLs tend to experience less enriched language learning opportunities. Teachers may think minority children need more prescriptive
curricula promoting didactic instruction to address the achievement gap (Franco et al., 2019; Lee & Ginsburg, 2007; Sawyer et al., 2018). However, this approach may have the opposite effect to what was intended by providing fewer conversation opportunities and advanced language models, aggravating the achievement gap by reducing the opportunities to improve higher-order thinking skills. Systematic, explicit, and purposeful instruction of complex language in school would benefit children with less English academic language experience. For example, teachers can help minority children understand when complex language is valued, how it is used, and how to develop it across different activity settings and content areas (Barnes et al., 2016).

Finally, results of this study support professional development efforts focusing on cultural and linguistic continuity between home and school. Teacher participants explained how complex talk capitalized on opportunities supportive of social concept learning. Specifically, they efficiently engaged children in complex language by discussing topics relevant to their interests, social contexts, and real-world problems during social studies activities. This research advocates for professional development interventions aimed at improving teachers’ culturally and linguistically responsive instruction focusing on minority children’s authentic experiences to engage in complex conversations.

**Study Limitations**

There are some significant limitations to the current study. First, there are dimensions of the language environment that were not included in this research, such as teachers’ inferential questioning (Zucker et al., 2010), conceptually focused comments (Dickinson & Smith, 1994), and data-providing features of teacher talk (Hoff, 2003). Future studies should continue to
explore how best to describe the linguistic environment of early childhood classrooms and ensure that all important dimensions are addressed (Justice et al., 2018).

Second, despite the fact that the LISn offered a more nuanced understanding of pre-K classrooms, the findings were drawn from a 3-hour sample of classroom activities occurring on a single day. The analysis of qualitative data revealed that teachers’ use of complex language differed based on contextual factors that were not considered in the quantitative study, including the time of day and the time of year. Additionally, limiting classroom observations to mornings when instruction tended to take place may have resulted in the exclusion of observations of classroom activities fostering social skills. It might be beneficial to measure daily activity profiles across multiple typical days in future studies. Technological tools capturing naturalistic language experience in early childhood classrooms over a longer period of time (e.g., LENA device which is a small, wearable recorder) would provide additional insight into the benefits of teachers’ use of complex talk for individual children.

The third limitation concerns the degree to which the findings of this study can be generalized to other populations. In the qualitative portion, the sample was a sample of convenience with only 10 teacher participants. In the quantitative portion, the sample size was limited in the level-2 of the hierarchical linear modeling given that this study involved only 63 classrooms. Although a sample size of 50 is adequate for obtaining unbiased parameter estimates and standard error for fixed effects (Maas & Hox, 2005), it’s unclear if the patterns of teachers’ use of complex language found in this study would be observed in classrooms serving other populations and those in more diverse settings. In particular, generalizing the findings need to be done cautiously given the sample of convenience with a 5% response rate for the qualitative study and a 50% response rate for the quantitative data. Volunteers typically have a higher need
for social approval, so that often yield the different results as non-volunteers (Creswell, 2002). Specifically, those teachers who agreed to participate in the study were likely teachers who understood the importance of using complex talk in their preschool classrooms. The classrooms involved in this study also served only children who lived in rural areas in the Southeast region of the United States. Hence, the sample of classrooms was not intended to be representative of all programs serving children from low-income families.

Fourth, this study suffers from several statistical limitations. The dependent nature of teacher utterances represents a limitation. Behavior counts consist of multiple cycles of iterative observations of individual children for a short period of time each. Nevertheless, in the context of time-sampling observations, it is possible that the likelihood of complex teacher talk may be associated with previous utterances, which is a limitation given the time-dependent nature of the sample of utterances.

Fifth, this study is exploratory in nature and does not allow for causal inference. This study cannot show causal relations between complex teacher talk and children’s language and literacy development because the quality aspects are not manipulable by the researcher and cannot be randomly assigned. However, this research offers some insight into how a causal study can be designed in future studies.

Sixth, teachers in this study rarely engaged in complex language practices across various classroom contexts, even in large-group, science, and social studies. Identification of associations was likely hampered by low rates and especially the lack of complex talk by many teachers in some settings and content areas. Thus, we need to be cautious about drawing
conclusions regarding the relations between teacher/child characteristics, complex talk within activity contexts, and child outcomes.

Finally, teachers’ impact on shy children is related to their perceptions of shyness as a problem, which is influenced by cultural beliefs and values (e.g., socialization goals) (Chen, 2018). Shy behaviors are more acceptable and linked to positive adjustment in collectivistic societies (e.g., Eastern Asian countries), which promote greater emotional control and inhibition of personal expression (Chen et al., 2015). Future studies should investigate the influence of culture in the display and implications of shy behaviors in individualistic Western classrooms, which foster greater self-expression and less concern about public scrutiny of one’s self (Chen, 2018).

**Future Directions**

This study deepens our understanding of the language experiences of low-income 3- and 4-year-old children. Future research should be conducted to continue to explore how teachers perceive and use complex language to facilitate language and literacy skills. First, this study used the CLASS ratings and the LISn counts to assess preschool learning environments. However, there are ECE quality dimensions that were not included in this research, including teacher education and curriculum (Weiland, 2017). Future studies may investigate the strength of these relations by manipulating activity settings, content areas, and features of language through experimental research.

Second, preschool teachers may benefit most from professional development models offering practice-based opportunities that integrate the latest research on evidence-based linguistic environments of early childhood classrooms (Whitebrook & Ryan, 2011). This study
found complex talk is not necessarily “better” in some contexts. For example, teacher
participants shared they provided verbal directions in some science activities and asked complex
questions in other science activities. Teachers also reported shy children reaped less benefit from
complex language in large group because they were uncomfortable speaking in front of a group.
This study supports previous findings that the context where teaching and learning occur is
defined by the goals of activity, the nature of the content area, and the settings in which teacher-
child interactions take place (Darling-Hammond & Snyder, 2000). In this regard, preschool
teachers should have a deep understanding of these contextual factors and be adept in using
complex language across various contexts with all children.

Capitalizing on specific classroom activity contexts where teachers demonstrate relative
strength in effectiveness of complex talk might be considered as a starting point for improving
the teacher education models. Future practice-based coaching might encourage teachers to reflect
on the degree to which the daily routines implemented in their classrooms support children’s
language learning opportunities and to be more intentional in their allocation of children’s time
to diverse activity settings and content areas. Within the collaborative professional development
model, a preschool teacher and a coach may work together to identify what is effective and what
barriers exist to refine the implementation of evidence-based complex language practices in
context (Snyder et al., 2015). Providing ongoing professional development support using
technology would also benefit rural preschool teachers facing challenges of limited access to
community and school resources.

Third, the quantitative data are based on single observations, an approach in line with
what other researchers employing ECE quality ratings method have used (Cabell et al., 2013;
Dickinson & Porche, 2011; Massey et al., 2008; Nores et al., 2022; Turnbull et al., 2009). This
study gives a glimpse into representative instructional practices, since classrooms were observed during a one-day visit in the winter (January through March) and the observations were scheduled during the morning hours (a 3-hour period in each classroom). Sampling with single observations may not culminate in replicable results (Curby et al., 2010; Meyer et al., 1991). Multiple observations would offer a more reliable description of teachers’ use of complex talk. Adding time to the current study would help explore changes in complex teacher talk over time and expand its explanatory potential.

Fourth, related to the issue of the generalizability of findings, larger and more varied samples should be used to further explain the relations among teacher and child characteristics, complex talk, and children’s language and literacy development in future studies. As access to ECE continues to extend toward universal access, it is important to ensure that research findings related to targeted-enrollment programs would generalize outward to contain all ECE programs and a sample of children who were not selected. In this regard, more research should be conducted with rural, urban, and suburban samples. Furthermore, multiple, varied opportunities for assessment over time may provide a holistic analysis of the phenomena of complex teacher talk.

Finally, the present study extends previous research demonstrating more frequent complex talk in general and less time in large-group activities within the preschool curriculum related to larger gains in vocabulary skills (Burchinal et al., 2021). Expanding on the previous work, the current study focuses on the proportion of complex talk within each type of activity context. The analysis of quantitative data showed the proportion of complex talk in the activity in which complex language was higher (i.e., large group) was associated with gains in picture vocabulary. Previous research has indicated time in large-group settings is more detrimental for
preschoolers, because large-group activities promote passive modes of child participation in classroom activities (Powell et al., 2008) and more time in these activities relates to off-task and aggressive behaviors (Rimm-Kaufman et al., 2005). However, this study found the use of complex talk during large-group settings benefits children’s language skills. The research community should consider potential thresholds in quantity and quality of complex talk needed to produce moderate to strong positive child outcomes.

**Conclusion**

Human development takes place through the reciprocal interactions between an individual and the environment surrounding the individual (Bronfenbrenner & Morris, 1998; Thelen & Smith, 2006). However, some dimensions of individual behavior or contextual factors might be difficult to grasp using only quantitative or qualitative methods (Yoshikawa et al., 2008). In this study, the combination of inferential analyses and qualitative themes illustrates the complexity of teachers’ use of complex language within each type of activity context and expands our understanding about the complex talk phenomena.

The current study describes how preschool teachers perceive and use complex talk within each type of activity setting and content area to facilitate language and literacy skills. Contributing to the accumulating literature on linguistic environments of early childhood classrooms, the quantitative analysis shows that: (1) Larger gains in picture vocabulary are positively associated with the use of complex talk in large-group and science activities. (2) The use of complex talk is higher for large group than for small group and free play. (3) The use of complex talk is higher for social studies and science than math. (4) The use of complex talk in large-group activities is positively associated with teachers’ emotional support and years of
teaching experience. Black children and DLLs experience lower levels of complex talk in small-group activities. The use of complex talk in free choice/center settings is positively associated with children’s shyness. (5) Teachers use proportionately more complex talk in literacy and math when they are rated as more emotionally supportive, in literacy with older children, and in social studies with shy children. The findings from the qualitative data not only confirm the quantitative data analysis results but also expand insights of the complex talk phenomena within different activity contexts. The qualitative findings particularly point out different aspects of the complex talk phenomena, highlighting the importance of understanding the effects of context and learner variability on complex talk.

The results are highly related to the early childhood education and teacher education fields. Preschool teachers and administrators need to take into account the roles that they might play in facilitating linguistically responsive behaviors as well as manipulation of the structural components of classrooms that summon high-quality conversational interactions. The results of this study also provide important implications for measuring quality and a rationale for the context-specific, targeted professional development model.
Figure A.1.
*Paired T-tests: Pre-K Child Outcomes (Picture Vocabulary, Expressive Language, and Decoding Skills)*
Figure A.2.
Correlations Among Classroom Variables (The Proportion of Complex Talk and Time Spent Within Each Type of Activity Setting)
Figure A.3.
Correlations Among Classroom Variables (The Proportion of Complex Talk and Time Spent Within Each Type of Content Area)
APPENDIX B. MISSING PATTERN

Structures of missing values are presented in Figure B.1 and B.2. They were included to describe which variables were missing more often and to check some basic assumptions. First, Figure B.1 shows that teachers’ use of complex talk in small-group, science, math, and social studies had much missing data (n’s = 83–176), especially when the other variables were complete.

Figure B.1.
Missing Patterns: Structure of Missing Values

Scatterplot matrices are a simple multivariate extension of scatterplots (Temple et al., 2012). In Figure B.2, the pairwise scatterplots highlighted observations with missing values in a
specific variable or combination of variables, allowing for more than two-dimensional relationships. For observations having missing values in one variable, rug representations were drawn. The red-crosses denoted observations with missing values in any of the variables. In general, the presence of missing values in one variable is not associated with missing values in other variables (i.e., Missing Completely at Random). Even though the fact that the data were missing was systematically associated with the observed but not the unobserved data (i.e., Missing at Random) in some variables, that size was marginal.

Figure B.2.
Missing Patterns: Shadow Plots
APPENDIX C. BOX-COX TRANSFORMATION

Transformations of the dependent and/or independent variables can improve the fit and correct violations of the model assumptions like non-normality and non-constant error variance. The Box-Cox transformation technique was used to find the best fit to the data. This method transformed the dependent variable $y$ to $g_\lambda(y)$ in which the family of transformations indexed by $\lambda$ was:

\[
g_\lambda(y) = \frac{y^\lambda - 1}{\lambda} \quad \text{when } \lambda \neq 0
\]
\[
g_\lambda(y) = \log \log (y) \quad \text{when } \lambda = 0
\]

We chose the parameter $\hat{\lambda}$ that maximized the log-likelihood function (see Figure C.1):

\[
L(\lambda) = -\frac{n}{2} \log \log \left( \frac{RSS_\lambda}{n} \right) + (\lambda - 1) \sum \log (y_i)
\]

\[100(1 - \alpha)\% \text{ Confidence Interval: } \{ \lambda: L(\lambda) > L(\hat{\lambda}) - \frac{1}{2} \chi^2_{1,\alpha} \}\]

Figure C.1.
Box-Cox Transformation: Choosing Parameter $\hat{\lambda}$

We transformed the dependent variable accordingly $\left(\frac{\sqrt[4.55]{y} - 1}{4.55}\right)$, and re-computed the linear model with this transformed variable (see Figure C.2). The Box-Cox transformation models showed that the same main effects emerged.
Figure C.2.
Box-Cox Transformation: Transform Dependent Variable
Dear <<Name>>, 

My name is Wonkyung “Won” Jang and I am a doctoral student in the School of Education at the University of North Carolina at Chapel Hill working on my dissertation with a focus on teachers’ talk and its influence on children’s language and literacy development.

As a future teacher educator, I’m interested in understanding teachers’ perceptions of their use of complex talk related to language and literacy skills as well as the practical, day-to-day realities of teachers’ talk in various classroom activity settings (e.g., large-group, small-group, free choice/center time) and content areas (e.g., literacy, math, science, social studies). My goal is that this study will help determine ways teachers can better use their language interactions with children to improve both language and literacy skills.

I am writing to request your permission to contact teachers of your school system to invite them to participate in my research study. Teachers will be asked to contact me to schedule a one-on-one interview.

The interview would take approximately 45-60 minutes. Attached are the interview questions. We will conduct the interview via Zoom at a time that is convenient for teachers. Their names will not be linked to the interview – a pseudonym will be assigned to them. All information will be stored on a password-protected site, only accessible to the researchers.

Teachers will be presented with informed consent information prior to participating. Taking part in this study is completely voluntary, and teachers are welcome to discontinue participation at any time. The minimum age to participate in this study is 23.

For being in this study, they will receive a $50 Amazon gift card and an annotated list of curriculum resources to help them facilitate language and literacy in their classrooms. The study’s results will also be shared with them.

Thank you for considering my request. If you choose to grant permission, please provide a signed statement on official letterhead indicating your approval. Attached please find a flyer describing the study for you to distribute to preschool teachers. If teachers are interested in participating, they can contact me directly at the email provided.

If you have any questions, please contact me at wkjang@live.unc.edu or (919) 360-3560.

Thank you for your assistance and collaboration.

Best Regards,

Wonkyung Jang, PhD Candidate

Wonkyung Jang
APPENDIX E. FLYER

UNC School of Education

TEACHER’S PERCEPTIONS OF USING COMPLEX TALK RELATED TO LANGUAGE AND LITERACY SKILLS

We are looking for preschool teachers to help us understand how teachers perceive and use complex language in various classroom activity settings and content areas.

Current preschool teachers can participate in this research.

Participants will take part in an interview via Zoom at a time that is convenient for them. The interview would take about 45-60 minutes.

The minimum age to participate in this study is 23.

Participants will receive a $50 Amazon gift card and an annotated list of curriculum resources to help them facilitate language and literacy in their classrooms.

To ask about participating, or to learn more about the study, please contact:

Lead Researcher: Wonkyung Jang, MEd, MS
(919) 360-3560
wkjang@live.unc.edu
APPENDIX F. RECRUITMENT EMAIL

SUBJECT: We’re listening! How do you perceive your talk in early childhood classrooms?

Greetings <<Name>>,

My name is Wonkyung “Won” Jang and I am a doctoral student in the School of Education at the University of North Carolina at Chapel Hill working on my dissertation with a focus on teachers’ talk and its influence on children’s language and literacy development. My faculty advisors are: Dr. Harriet Able at the University of North Carolina at Chapel Hill and Dr. Margaret Burchinal at the University of Virginia.

As a future teacher educator, I’m interested in understanding teachers’ perceptions of their use of complex talk related to language and literacy skills as well as the practical, day-to-day realities of teachers’ talk in various classroom activity settings (e.g., large-group, small-group, free choice/center time) and content areas (e.g., literacy, math, science, social studies). Teachers talk differently in different instructional contexts and each activity setting and content area has affordances and limitations for supporting language and literacy development. My goal is that this study will help determine ways teachers can better use their language interactions with children to improve both language and literacy skills.

The minimum age to participate in this study is 23. The interview would take approximately 45-60 minutes. Attached are the interview questions. And we can conduct the interview via Zoom at a time that is convenient for you. Your name will not be linked to your interview – a pseudonym will be assigned to you. All information will be stored on a password protected site, only accessible to the researchers.

For being in this study, you will receive a $50 Amazon gift card and an annotated list of curriculum resources to help you facilitate language and literacy in your classroom. The study’s results also will be shared with you.

Participation is completely voluntary and your answers will be anonymous. You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

If you have any questions or you are interested in participating in this study, please contact me at wkjang@live.unc.edu or (919) 360-3560. Attached you will find the consent form. Please bring your consent form signed at the time of the interview.

Thank you for your time.

Wonkyung Jang

School of Education

University of North Carolina at Chapel Hill

E wkjang@live.unc.edu P (919) 360-3560
APPENDIX G. CONSENT FORM

University of North Carolina at Chapel Hill

Consent to Participate in a Research Study

Adult Participants, Interview

Consent Form Version Date: 01.26.22

IRB Study #

Title of Study: Early Childhood Teachers’ Characteristics, Complex Talk, and Children’s Language and Literacy Development

Project Principal Investigator: Wonkyung “Won” Jang

Principal Investigator Department: School of Education

Prevention Principal Investigator Phone number: (919) 360-3560

Principal Investigator Email Address: wkjang@live.unc.edu

What are some general things you should know about research studies?

You are being asked to take part in a research study. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies. Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study.

You will be completing your consent form wherever and whenever is convenient for you. You will email a signed copy of the consent form to the research team. The consent form would not reveal any information about the your health. You may ask the researchers named above any questions you have about this study at any time.

What is the purpose of this study?
As a future teacher educator, I’m interested in understanding teachers’ perceptions of complex talk associated with language and literacy skills and the practical, day-to-day realities of teachers’ talk in various classroom activity contexts with the desires for sharing teachers’ authentic voices.

Teachers talk differently in different instructional contexts and each activity setting and content has affordances and limitations for supporting language and literacy development. And I hope to determine ways to better support early childhood teachers during and immediately following their entrance into the field; and provide a realistic picture of language interactions to pre-service teachers that will allow them to understand and re-establish more realistic expectations for their future practice, interrupting this problematic continuum.

**Are there any reasons you should not be in this study?**

Participating in this study has no known risks.

**How many people will take part in this study?**

There will be approximately 8-10 preschool teachers in the study.

**What is the minimum age to take part in this study?**

The minimum age to participate in this study is 23.

**How long will your part in this study last?**

Total commitment is approximately 45-60 minutes.

**What will happen if you take part in the study?**

If you choose to participate in the study, you will participate in a single interview lasting approximately 45-60 minutes. The interview will take place via Zoom. The researcher will ask you a series of interview questions and audio record the session. After all of the interviews have been conducted and the transcripts have been developed, we will ask you to confirm that the transcripts accurately reflect your comments.

Additionally, photos demonstrating your language and literacy strategy use in the classroom will be requested. These photos will include instructional planning tools (e.g., lesson plan), meaningful language and literacy centers and materials (e.g., toy, letter wall, picturebook), and the overall design and management of the preschool classrooms (e.g., daily schedule picture). These photos will not include any pictures of children or the teacher’s or children’s name(s), picture, or other information that would readily lead to the identification of the child or the teacher.

**What are the possible benefits from being in this study?**

Participating in this study will contribute to greater understanding of the realities of teachers’ talk in various classroom activity contexts and could lead to better support early childhood teachers.
What are the possible risks or discomforts involved from being in this study?

This study involves minimal risks. Teaching concerns some very personal, philosophical, and emotional decisions. Describing these experiences could cause emotional distress. If at any time you wish to stop the interview, please inform the interviewer. Your request will be granted. Although we will be careful to protect your privacy, breach of confidentiality is a risk of being in this study. Also, there is always a chance of unknown risks. You should report any problems to the research staff.

Any information that is being collected during the study will not be used to judge their teacher performance.

How will your privacy be protected?

Your name will not be tied to your interview – a pseudonym will be assigned to you. Once your interview is complete, transcripts and audio recordings will be stored on a password protected site, only accessible to the researchers. Transcripts created from the audio recordings at the interview will use a pseudonym (a name other than your name) to protect your identity as a participant. Audio recordings will be kept for the life of the study then destroyed.

Participants will not be identified in any report or publication about this study. Although every effort will be made to keep research records private, there may be times when federal or state law requires the disclosure of such records, including personal information. This is very unlikely, but if disclosure is ever required, UNC-Chapel Hill will take steps allowable by law to protect the privacy of personal information.

What if you want to stop before your part in the study is complete?

You can withdraw from this study at any time, without penalty. The investigators also have the right to stop your participation at any time.

Will you receive anything for being in this study?

For being in this study, you will receive a $50 Amazon gift card and an annotated list of curriculum resources to help you facilitate language and literacy in your classroom. The study’s results also will be shared with you.

Will it cost you anything to be in this study?

It will not cost you anything to be in this study.

Who is sponsoring this study?

This study is supported by the National Association of Early Childhood Teacher Educators (NAECTE).

What if you have questions about this study?
You have the right to ask, and have answered, any questions you may have about this research. If you have questions about the study, complaints, concerns, or if a research-related injury occurs, you should contact the Principal Investigator, Wonkyung Jang at 919-360-3560 or wkjang@live.unc.edu.

What if you have questions about your rights as a research participant?

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject, or if you would like to obtain information or offer input, you may contact the Institutional Review Board at (919) 966-3113 or by email to IRB_subjects@unc.edu.

Participant’s Agreement:

I have read the information provided above. I have asked all the questions I have at this time. I voluntarily agree to participate in this research study.

Signature of Research Participant ____________________________________________
Date ________________

Check the line that best matches your choice:

_____ OK to record me during the study
_____ Not OK to record me during the study"

Signature of Research Team Member Obtaining Consent _______________________
Date ___________________
APPENDIX H. INTERVIEW GUIDE

[Create a warm and friendly environment; give interviewee consent form.]

Thank you for taking the time to meet with me today. My name is Wonkyung “Won” Jang and I am a doctoral student in Education at the University of North Carolina at Chapel Hill. Our meeting today is part of a study about teachers’ talk in various classroom activity contexts.

I asked to meet with you today because I value your insight and expertise.

I have several categories of questions. I understand your time is valuable, and have planned approximately 45-60 minutes for this discussion once we get started.

This interview will be confidential. I will audio-tape this discussion to accurately capture what you say. The digital audio recording will go straight to UNC and will not be shared with anyone. Your name will not be shared in any documentation or reports that come out of this discussion. At any time, you are welcome to ask me to turn off the recorder.

Do I have your permission to proceed? If so, please read and sign the consent form in front of you.

*If yes:

Before we start, do you have any questions? [Discuss any questions from participant.]

One reminder, this process is completely voluntary so if at any time you want to stop the interview, please let me know.

Please provide the information below.

1. How many years have you been a teacher at [NAME OF SCHOOL/CENTER]?
2. How many years have you been a teacher in total?
3. What is the highest degree you have received?
4. How many pre-K classrooms are in [NAME OF SCHOOL/CENTER]?
5. How many students are in your pre-K classroom?
6. How many dual language learners are in your pre-K classroom?
First, I would like to ask you a set of questions focusing on teachers’ talk in early childhood classrooms.

1. Can you describe an event or reason for talk in your classroom in general?

2. How do you talk to your children in different activity settings (large-group activity, small-group activity, and free choice/center time)?

   - What do you expect (large-group activity, small-group activity, and free choice/center time) to be like?
     - What do you talk about in each activity setting?
     - What amount of time do you spend talking with children in each activity setting?
     - How do you interact with children in each activity setting? What type of talk do you use?

   - Many studies showed that children learn more from hearing complex teacher talk:
     - First, complex talk includes elaboration. Teachers elaborate on what a child says, for example, if the child says, “milk” and the teachers says “You opened the carton of milk yourself”, “Do you like milk?”, or “Where does the milk come from?”.
     - Secondly, complex talk includes decontextualized talk. This involves language removed from “here and now,” like recalling an experience from previous days or talking about future events. For example, if a teacher says “Yesterday, we had apples for snack,” when no apples are present for a child to reference.

   - Do you have any question about complex talk?

   - Do you think there are any differences in this type of talk across activity contexts?
     - In what activity setting (among large-group activity, small-group activity, and free choice/center time) do you frequently use this type of talk? How and why?

   - What are some of the key benefits of teacher talk in each activity setting?
   - What are some of the key challenges of teacher talk in each activity setting?
   - How do your talk in that activity setting meet (or not meet) your expectations?

3. How do you talk to your children during instruction in different content areas (literacy, math, social studies, science)?

   - What do you expect instruction in (literacy, math, social studies, science) to be like?
     - What do you talk about in each content area?
     - What amount of time do you spend talking with children in each content area?
     - How do you talk in each content area? What type of talk do you use?
Do you think there are any differences in complex talk across content areas?
- In what content area (among literacy, math, social studies, science) do you frequently use this type of talk? How and why?
- What are some of the key benefits of teacher talk in each content area?
- What are some of the key challenges of teacher talk in each content area?
- How do your talk meet in that content area (or not meet) your expectations?

4. What was the deciding factor or event that led you to talk in those ways? What are some of the key motivations?

- Please describe how you knew that you needed to talk like that.
- What were some pragmatic reasons?
- Why was so much complex talk involved in large-group, science, and social studies activities? What makes it easier (or harder) to have more frequent complex talk in these activities?
- Do you think your educational level and teaching experience are associated with this phenomenon? How and why?

Next, complex talk may be a socially constructed concept, subjective in nature and based on values, beliefs and interest. Additionally, this may be contextualized in relation to time, place, and culture.

5. How do you perceive your complex talk influencing children’s language and literacy skills?
APPENDIX I: TEACHER SURVEY – INSTRUCTIONAL ORIENTATION

For this school year as a whole, please indicate how often each of the following READING and LANGUAGE ARTS skills is taught in your class. Circle one number on each line.

**Language and Comprehension**

<table>
<thead>
<tr>
<th>Not taught</th>
<th>Taught as part of general classroom instruction</th>
<th>Taught only to selected students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Too basic-students should know this (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Too advanced-covered in later grades (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Major focus of literacy instruction (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minor focus of literacy instruction (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Included-but only for struggling readers (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Included-but only for advanced readers (6)</td>
<td></td>
</tr>
</tbody>
</table>

- **Building vocabulary using multiple methods, including active sensory experiences**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6

- **Drawing connections between a story and children’s lives**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6

- **Describing characters, settings, and major events in a story**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6

- **Making predictions about what might happen in a story**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6

- **Describing the overall structure of a story, for example how the beginning introduces the story or how the ending concludes the action**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6

- **Communicating complete ideas orally**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6

- **Identifying differences in the points of view of characters in a story**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6

- **Applying vocabulary knowledge to develop a concept or explain a phenomenon/process**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6

- **Knowing common prepositions such as over and under, up and down**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6

- **Retelling stories, including main ideas and details such as characters, settings, and major events**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
<table>
<thead>
<tr>
<th>Activity</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describing similarities and differences between two reading selections</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Describing how characters in a story respond to major events and challenges</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Using sentence-level context to gain meaning of word or phrase</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Making inferences in reading a story about characters’ motivations and feelings</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Asking and/or answering questions to demonstrate understanding of key details in a text</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Identifying the main topic of a paragraph of informational text</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Identifying word relationships (antonym, synonym, homonym)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
APPENDIX J: TEACHER SURVEY – MODERNITY/TRADITIONAL BELIEF SCALE

Thinking about children’s behavior, please circle the answer that indicates how strongly you agree with the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree (1)</th>
<th>Mildly Disagree (2)</th>
<th>Not Sure (3)</th>
<th>Mildly Agree (4)</th>
<th>Strongly Agree (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Children should always obey the teacher.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Preparing for the future is more important for a child than enjoying today.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Children will not do the right thing unless they must.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Children should be kept busy with work and study at home and at school.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. The major goal of education is to put basic information into the minds of the children.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. In order to be fair, a teacher must treat all children alike.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. The most important thing to teach children is absolute obedience to whoever is in authority.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. Children must be carefully trained early in life or their natural impulses will make them unmanageable.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. Children’s learning results mainly from being presented basic information again and again.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

*Shortened Modernity Scale* - traditional beliefs scale (Schaefer & Edgerton, 1985).
## APPENDIX K: LANGUAGE INTERACTION SNAPSHOT (LISn)

### LANGUAGE INTERACTION SNAPSHOT (LISn) I

**CHILD ID:** ________  **CODING PERIOD:** START: ____ : ____ AM/PM  **ENTER THE SNAPSHOT NUMBER FOR THIS CHILD:** ____  **END: ____ : ____ AM/PM**

<table>
<thead>
<tr>
<th>CODE</th>
<th>E = English; O = Other language; M = Multiple languages in one utterance</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. FOCUS CHILD TALKS TO</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. To Lead Teacher</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>b. To Other Adult</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>c. Other Children/Group</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td><strong>B. LEAD TEACHER VERBAL COMMUNICATION DIRECTED TO FC/FC WITH GROUP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Repeats or confirms</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>b. Elaborates or builds (also code one of four below)</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>c. Gives directions</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>d. Requests language (contextualized)</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>e. Provides information, names, labels (contextualized)</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>f. Provides/elicits information (decontextualized)</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>g. Reads</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>h. Sings</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>i. Other Talk</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td><strong>C. OTHER ADULT VERBAL COMMUNICATION DIRECTED TO FC/FC GROUP</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Repeats or confirms</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>b. Elaborates or builds (also code one of four below)</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>c. Gives directions</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>d. Requests language (contextualized)</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>e. Provides information, names, labels (contextualized)</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>f. Provides/elicits information (decontextualized)</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>g. Reads</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>h. Sings</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
<tr>
<td>i. Other Talk</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
<td>EOM</td>
</tr>
</tbody>
</table>

**FOR OFFICIAL USE ONLY**

**TOTAL TALK**

**NOTES:**

---

172
APPENDIX L: LISn OBSERVATION PROCESS

- 30 sec cycle
- 5 Minute Snapshot
- setting + activity

Focal Child 1

Focal Child 2

6 x Focal Child 3

Focal Child 4

Focal Child 5
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NAEYC. (2020). *Developmentally appropriate practice.*


