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This study examined teachers' use of four categories of mental state talk (verbalizations of mental processes using emotion terms, cognition terms, desire terms, and perception terms) in approximately hour-long observations in 34 Head Start classrooms. Transcriptions of teacher-child interactions were coded utterance by utterance for teachers' expression of the four categories of mental state talk terms, the sentence type the term was used within, the referent of the mental state term, and the classroom activity context within which the teacher was interacting with children. Results indicate that teachers used varying amounts of overall mental state talk and categories of mental state talk, and teachers' used of mental state talk differed depending on the sentence type, referent, and classroom activity contexts. Teachers were more likely to use emotion and cognition terms within statements than within questions, and teachers were more likely to refer to their own emotions than to children's emotions. Differences in teachers' use of categories of mental state talk were found to be associated with teachers' characteristics and observed classroom quality as assessed by the CLASS; teachers in classrooms rated higher in Emotional Support (specifically, Positive Climate and Regard for Student Perspectives) used more emotion terms. Future research and implications for teachers' professional development are discussed.

TEACHERS' EXPRESSION OF MENTAL STATE TALK  
IN HEAD START CLASSROOMS

by

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## CHAPTER I

### INTRODUCTION

Research suggests that caregivers' expression of mental state talk during interactions with children facilitates children's comprehension of mental states, theory of mind development (the understanding of the existence of the mind and the distinction between one's mental state and another's mental state [Wellman, Cross, & Watson, 2001]), emotional understanding, and interactional skills (Ensor & Hughes, 2008; Jenkins, Turrell, Kogushi, Lollis, & Ross, 2003; Ruffman, Slade, Devitt, & Crowe, 2006; Taumoepeau & Ruffman, 2008). Mental state talk includes verbal speech that references one's or another's internal state (Frampton, Perlman, & Jenkins, 2009) through the use of specific mental state terms, often categorized into emotion terms (happy, sad, love), cognition terms (think, decide, believe), desire terms (want, hope), and perception terms (look, hear) that describe how a person is feeling or thinking. Mental state talk is the use of mental state terms in verbalizations within speech, and is studied through observing and coding caregiver speech during observations in homes, laboratories, or classrooms.

Individuals use mental state talk in speech across a variety of contexts, including home environments and classroom environments. The current study assessed teachers' expression of mental state talk in Head Start classrooms, drawing on the existing mental state talk literature focused on parent-child interactions. The parenting literature regarding mental state talk addresses associations between parents' expression of mental

state talk and child outcomes, as mentioned above; however, research has yet to assess child outcomes associated with teachers' use of mental state talk. Although research has begun to examine teacher expression of mental state talk in teacher-child interactions in classrooms (Degotardi & Sweller, 2012; Frampton et al., 2009), literature predominately assesses the frequency of teacher expression of composite measures of mental state talk and associations with teacher characteristics, and has not addressed the influence of classroom activity contexts or classroom quality. Teachers represent extra-familial significant others (Howes & Hamilton, 1992) with whom children spend significant periods of time in contexts intended for learning and development; consequently, teachers' expression of mental state talk should be further studied. Examining teachers' use of mental state talk in early childhood education classrooms may reveal associations between teachers' mental state talk, teachers' characteristics, and classroom quality that could inform subsequent studies to uncover associations between teachers' mental state talk and children's social development, emotional development, or academic achievement.

The current study will first discuss how social development theory and systems theory guide the study of teachers' mental state talk in classrooms; specifically, these theories inform the examination of the relationship among teacher expression of mental state talk and teacher characteristics, classroom activity contexts, and classroom quality. Second, the current study will present an overview of the literature regarding the study of teacher-child relationships and interactions, teacher language use in classrooms, teacher expression of mental state talk in classrooms, and, the effects of parental expression of

varying categories of mental state talk on child development to build a rationale for the potential importance of mental state talk and children's development in classrooms.

Third, the study's goals, research questions, methods, and results will be presented. In sum, the goal of the current study was to contribute to the literature regarding teacher practices in classrooms through the examination of teacher expression of mental state talk in early childhood education classrooms. Specifically, the current study examined teachers' use of specific categories of mental state talk, the influence of teacher characteristics and classroom activity contexts on teachers' use of mental state talk, and the association between teachers' mental state talk and classroom quality.

## CHAPTER II

### THEORETICAL BASIS

Social development theory suggests that children learn through exposure to adult language (Vygotsky, 1987). The expression of language occurs within interpersonal interactions; therefore, teacher language use during teacher–child interactions may be particularly important to child development. Additionally, an extension of systems theory to classroom contexts proposed by Pianta (1998) suggests that child learning occurs within teacher–child interactions as systems within classroom environments. The current study used an integration of social development theory and systems theory to describe the importance of teachers’ language use within teacher–child interactions in classroom contexts.

#### *Vygotsky’s Social Development Theory*

Vygotsky describes development as the connection of external words to internal thoughts through exposure to speech in social interactions (Vygotsky, 1987). Social development theory identifies three factors that affect development within social interactions, including interpersonal relationships, cultural-historical influences, and individual factors (Tudge & Scrimsher, 2003). Vygotsky suggests that teacher–child relationships in classrooms represent one type of interpersonal relationship that can affect child development. Vygotsky’s explanation of human development as a strengthening of the link between language and thinking combined with his emphasis on

the importance of teacher–child interactions for child development illustrates a potential relationship between teachers’ language use in teacher–child interactions and child development.

Vygotsky argued that teacher–child interactions are especially important to child development because “internal speech and reflective thought arise from the interactions between the child and persons in her environment” (Vygotsky, 1978, p. 90). Teachers have the opportunity to facilitate child development within what Vygotsky calls the zone of proximal development (Vygotsky, 1978). The zone of proximal development is conceptualized as a process of maturation through which children learn higher psychological functions through relationships and interactions with adults who have already mastered such higher psychological functions (Vygotsky, 1978). Teachers can promote child development within the zone of proximal development through communication within teacher–child interactions. Vygotsky also discussed the influences that culture can have upon interpersonal interactions. Although one’s expressions of mental states, particularly of emotions, are affected by one’s culture and socialization influences (Cole & Tan, 2007), the current study could not address the influence of culture in mental state talk use within teacher–child interactions.

Teachers’ use of language within classroom communication is particularly significant to children’s development because teacher–child interactions are contexts in which teachers use external words as symbols to represent internal feelings and mental states. Vygotsky argues that there is a significant link between language and thinking, because the external speech children hear is translated into children’s internal speech, and

internal speech then organizes thoughts (Vygotsky, 1978). The relationship between language and thinking relates to the study of mental state talk because mental state talk represents the linguistic expression of internal thought. Vygotsky discusses the connection between language and thinking in terms of child development; however, the association between language and thinking extends through adult life. The relationship between language and thinking is especially relevant to teacher practices in classrooms because teachers' reflectiveness (insightfulness and perspective-taking regarding teacher-child interactions in classrooms) is important in creating effective classroom environments (Jay & Johnson, 2002). Teacher reflectiveness is relevant to teacher expression of mental state talk because teachers who are more reflective upon their internal thoughts and feelings, and are more aware of children's perspectives, may express mental state talk more often.

Vygotsky's position underscores the link between language and thinking, and addresses the importance of interpersonal interactions during child development; therefore, research must seek to understand how relationships between teachers' language in teacher-child interactions can affect child development. First, research must assess what teachers contribute within teacher-child interactions that may facilitate child development and strengthen children's links between language and thinking; teachers' use of mental state talk may potentially facilitate the development of this connection. An extension of systems theory in classroom contexts illustrates how teachers and teacher language fit into classrooms as systems.

### *Systems Theory in Classroom Contexts*

Systems theory can be applied to describe teacher–child interactions within classrooms because teachers and children are individual systems interacting within classroom systems. Systems theory stems from research on families, but can be extended to inform teacher–child systems within classroom settings (Pianta, 1998). The systems framework is concerned with how groups are organized into systems (such as teacher–child interactions) within systems (the classroom as a whole), and describes that each part of a system is connected to other parts of the system, the system as a whole, and the system’s surrounding contexts (Steinglass, 1987; White & Klein, 2002). Pianta (1998) extends systems theory to classroom contexts, arguing that day-to-day teacher–child interactions exist as systems developing within the larger and more ongoing systems of teacher–child relationships and classroom environments. Pianta discusses that children and teachers are interconnected parts of classrooms and emphasizes the importance of interpersonal relationships in classrooms. There are multiple levels of systems in classroom environments, including teachers and children as individual systems, and teacher–child interaction systems within classroom systems.

In Pianta’s model, he diagrams the dyadic systems of teacher–child relationships and argues that interactional patterns within dyadic teacher–child relationships regulate child behavior in classrooms and affect children’s cognitive skills. In Pianta’s model of teacher–child relationships, there are different levels of responsibilities between teachers and children. Teacher–child relationships are asymmetrical relationships because, as teachers are more mature than children, teachers have greater influence on children’s

development and on the development of the teacher–child relationship as a whole. Teacher–child relationships are the continuous bonds that exist between teachers and children, and are made up of the day-to-day interactions between teachers and children. The current study focused on teacher language during teacher–child interactions because teacher–child interactions are contexts in which child learning occurs. It is important to note, however, that child characteristics affect teacher–child interactions within individuals. Although child characteristics are important facets of understanding classrooms, the current study focused on what teachers bring to teacher–child interactions. According to Pianta (1998), teacher–child interactions are made up of the individual characteristics of teacher and child, and feedback processes between teacher and child.

*Individual characteristics.* Children and teachers act as individual systems that adapt and change within the contexts of teacher–child interactions. Teachers and children each bring unique characteristics and aspects of their experiences into dyadic teacher–child interactions (Pianta, 1998). Teachers’ characteristics are influential in teacher–child relationship systems because teachers affect teacher–child interactions that occur within relationships and classroom contexts (Pianta, 1998); therefore, the current study focused on the influence of teachers’ characteristics on teachers’ use of mental state talk within teacher–child interactions.

*Feedback processes.* One central concept of systems theory that is especially important in its extension to classrooms is the concept of feedback. Feedback occurs when a systems’ output returns to the system as input (White & Klein, 2002). Pianta

(1998) refers to feedback processes in classrooms as patterns of behavior in interactions and the quality of responses. Feedback processes include any exchange of information through behaviors or communication through language. Pianta argues that teacher–child interpersonal relationships are made up of patterned feedback processes that build structures for interactions in current and later relationships. These relationships consist of interpersonal interactions where teachers and children develop shared meanings through interactive behaviors and “information exchange processes” (Pianta, 1998, p. 73). Within these teacher–child interactions, teachers facilitate children’s labeling of emotion states and assist in children’s understandings of the link between emotion and behavior (Pianta, 1998). In an extension to Pianta’s position, I posit that the discussion of mental states that occurs within teachers’ interactive behaviors is uniquely important to child development and to teacher–child interactions in classrooms.

Pianta (1998) argues that teachers have substantial effects on children through teachers’ influences on classroom environments and within teacher–child interactions as a part of the classroom system. Additionally, Vygotsky theorized that teacher language within teacher–child interactions affects children’s development of the links between language and thinking. A synthesis of Vygotsky’s theoretical position and Pianta’s extension of systems theory to classroom contexts reveals that teacher–child interactions affect children’s experiences in classrooms, and the language used by teachers during teacher–child interactions may be particularly important to child development; therefore, teachers’ mental state talk in teacher–child interactions should be further studied.

## CHAPTER III

### LITERATURE REVIEW

#### *Teacher–Child Relationships and Interactions in Classroom Contexts*

Teacher–child relationships are ongoing bonds that exist between teachers and children, and are made up of the daily interactions between teachers and children. Teachers are integral components of child learning in classroom contexts, in part because teacher–child interactions in early education settings have significant effects on children’s later learning and development. For example, research suggests that teacher–child relationships and teacher–child interactions can affect children’s later academic performance in school and incidence of behavior problems (Hamre & Pianta, 2001; Mashburn, Pianta, Hamre, Downer, Barbarin, Bryant, Burchinal, Early, & Howes, 2008). Furthermore, teacher–child interactions can affect children’s social, language, and academic skills (Burchinal, Howes, Pianta, Bryant, Early, Clifford, Barbarin, 2008; Curby, LoCasale-Crouch, Konold, Pianta, Howes, Burchinal, Bryant, Clifford, Early, & Barbarin, 2009). Teacher–child interactions happen continuously in classrooms, and occur in both academic and social contexts. The interactions between teachers and children are complex; however, one feature of teacher–child interactions is teachers’ use of mental state talk. The current study framed teacher expression of mental state talk as language expressed during teacher–child interactions within the larger contexts of teacher–child relationships.

One broad facet of classroom environments that is suggested to affect later child outcomes includes the teacher–child relationship. Hamre and Pianta (2001) examined kindergarten children’s classroom behavior and teachers’ ratings of teacher–child relationships in a sample of 179 children. Teachers completed the Student–Teacher Relationship Scale to assesses teachers’ perceptions of relationships with chosen target students. Additionally, students’ academic records, standardized test results, work habits, and disciplinary records were obtained from first through eighth grade. Results suggest that relational negativity in teacher–child relationships in kindergarten predicts later academic and behavior problems for children. Relational negativity was operationalized to include levels of conflict (for example, “this child easily becomes angry at me”) and dependency behaviors (such as “this child is overly dependent on me”). Specifically, teachers’ ratings of relational negativity levels in kindergarten predicted children’s language arts and math grades through fourth grade, standardized test scores through sixth grade, and behavioral outcomes through eighth grade. Moreover, children who had more negative relationships with kindergarten teachers had less positive work habits through fourth grade. The positive associations between teacher–child relational negativity in kindergarten and later behavior and academic problems were stronger for children who exhibited more behavior problems in kindergarten, suggesting a more powerful effect of teacher–child relationships for at risk children. The results of Hamre and Pianta (2001) emphasize the importance of positive teacher–child relationships in terms of later child academic and behavioral outcomes; however, teacher–child relationships are built upon day-to-day teacher –child interactions. Thus, specific

teacher–child interactions within teacher–child relationships may be particularly important in the study of teachers’ behaviors in classrooms.

Types of teacher–child interactions in classrooms are suggested to affect children’s social competence. Curby et al. (2009) examined the relationship between five profiles of teacher–child interactions in prekindergarten classrooms and children’s social competence and academic growth one year later. Profiles were determined by rating teacher–child interactions on ten dimensions within three domains of the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2007), a tool that examines teacher–child interactions in classrooms (classroom quality is often measured through using the CLASS to assess teacher–child interactions). Domains and dimensions of the CLASS used in Curby et al. include Emotional Support (positive climate, negative climate, teacher sensitivity, and over-control), Organizational Support (behavior management, productivity, and instructional learning format), and Instructional Support (concept development, and quality of feedback; this study did not include the language modeling dimension). Teachers were separated into five profiles according to observed teacher–child interactions. The results of Curby et al. suggest that children’s receptive vocabulary and math skills improve most over time for children who had teachers with the highest levels of concept development during teacher–child interactions (within the Instructional Support domain of the CLASS). Additionally, children who had teachers with the highest levels of the Emotional Support measure of the CLASS exhibited more social competence (measured by the Teacher–Child Rating Scale) one year later than children with less emotionally supportive teachers. The results underscore the

importance of teacher instruction and emotional support within teacher–child interactions in terms of children’s later academic and social skills. Mashburn et al. (2008) found similar results in a study of the effects of teacher–child interactions on children’s academic, language, and social development in prekindergarten classrooms. Classroom quality was assessed in three domains including program design, overall classroom quality (evaluated by the Early Childhood Environment Rating Scale and the Early Childhood Environment Rating Scale-Revised), and teachers’ emotional and instructional interactions with children (assessed using the CLASS). Their results indicate a positive relationship between teachers’ instructional interactions and children’s academic and language skills, and a positive association between teachers’ emotional interactions and children’s social skills (Mashburn et al., 2008).

Teachers’ levels of sensitivity within teacher–child interactions in classrooms can also affect children’s academic and social skills. Burchinal et al. (2008) assessed 240 prekindergarten classrooms in a study of the relationships between teacher sensitivity and children’s language, academic, and social skills. Teacher sensitivity was measured using the Early Childhood Environment Rating Scale-Revised (ECERS-R) and the CLASS. Data collectors assessed child language, academic, and social outcomes using the Peabody Picture Vocabulary Test 3<sup>rd</sup> Edition (PPVT-III), the Oral & Written Language Scale (OWLS), the Woodcock Johnson III Tests of Achievement (both the Applied Problems Subset and Letter Word Identification Subset), the Comprehensive Test of Phonological Processing (CTOPP), and the Teacher–Child Relationship Scale (TCRS). Burchinal et al. found a positive association between teachers’ sensitivity levels and

children's language, pre-academic, and social skills into kindergarten. The results of Burchinal et al. suggest that teacher sensitivity in teacher-child interactions can have an impact on child development. Teacher sensitivity is especially pertinent to the study of mental state talk because, just as sensitive mothers express higher amounts of mental state talk than insensitive mothers (McElwain, Booth-LaForce, & Wu, 2011), more sensitive teachers may express higher amounts of mental state talk than insensitive teachers.

Teachers' importance in early childhood education environments has been well-documented, as evidenced by studies of the effects teacher relationships, interactions, and sensitivity levels within interactions on various child outcomes (Burchinal et al., 2008; Curby et al., 2009; Hamre & Pianta, 2001; Mashburn et al., 2008). Studies illustrate that teacher-child relationships in general are important for child development, and styles of teacher-child interactions have significant effects on child development. Furthermore, detailed accounts of language use within teacher-child interactions are becoming increasingly important in the study of teacher-child relationships (Degotardi & Sweller, 2012; Dickinson, Darrow, & Tinubu, 2008; Frampton et al., 2009; Gest, Holland-Coviello, Welsh, Eicher-Catt, & Gill, 2006).

Teachers' expression of language within teacher-child interactions is especially important in Head Start classrooms because research suggests that children in families of low socioeconomic status hear less general language in the home, and are exposed to less parental expression of mental state talk than children in families of high socioeconomic status (Hoff, 2003). Specific characteristics of teacher language within subcontexts of

classrooms have been studied in Head Start classrooms. Gest et al. (2006) examined the types of talk Head Start teachers used in free play, meal time, and book reading contexts during 5 to 10 minute segments. The authors measured teachers' levels of child-directed statements (comments answering child or giving information), directives (controlling child behavior), questions, pretend talk (giving objects non-real characteristics), and decontextualized talk (talking of objects or people not present). Teachers' sensitivity (availability, warmth, conversational balance, and responsiveness) was also assessed. Results of Gest et al. suggest that teachers' levels of pretend talk are highest in free play contexts, and teachers that express high levels of developmentally appropriate challenging talk are rated as more sensitive and warmer teachers. This study underscores the link between teacher sensitivity and amounts of different types of language use in Head Start classrooms. The results of Gest et al. also propose that teachers use different types of language in varying classroom activity contexts. Furthermore, Dickinson et al. (2008) examined teachers' richness and variation of vocabulary, sophisticated language use, further discussion of topics discussed in class, thought-provoking questions, and cognitively stimulating responses in Head Start classrooms. Teachers' use of such language practices is suggested to support children's language development. The authors found that teachers most often utilized thought provoking questions and extended topic discussion, but teachers responded to children's questions and articulated language modeling techniques least often (Dickinson et al., 2008). Additionally, teachers were most likely to use intentional instruction techniques during interactions with children in block areas. Although Dickinson et al. did not assess teachers' mental state talk, the

results of the study illustrate the variations in teachers' use of language in Head Start classrooms, particularly in regard to classroom activity contexts.

It is evident that teacher–child interactions can affect child development. The language that teachers use within teacher–child interactions in classrooms is related to teachers' sensitivity and responsivity (Gest et al., 2006); therefore, research regarding more specific types of language in classrooms is needed. Because teacher–child interactions are associated with children's social, language, and academic skills (Burchinal et al., 2008; Curby et al., 2009), teachers' vocalizations of mental states within teacher–child interactions could be particularly important to children's development and learning in classroom contexts. Parental expression of mental state talk facilitates a variety of adaptive child outcomes; thus, teacher mental state talk should be further studied. A few studies have evaluated mental state talk in teachers' language use within teacher–child interactions in classrooms, as described below.

#### *Teacher Expression of Mental State Talk*

Previous studies have documented effects of parents' use of mental state talk to their children. It is likely that the developmental outcomes associated with parental expression of mental state talk, such as the understanding of mental states, emotion understanding, social understanding, and theory of mind understanding (Ensor & Hughes, 2008; Jenkins et al., 2003; Ruffman et al., 2006; Taumoepeau & Ruffman, 2008), are similarly facilitated through teacher expression of mental state talk. Improvements in socioemotional understanding and theory of mind understanding promote perspective-taking in children, which increases children's ability to empathize with others (Hinnant &

O'Brien, 2007), thus potentially decreasing child peer-to-peer conflict. These associations are particularly important in classroom settings because peer relationships in classrooms are integral parts of classroom environments. If teacher expression of mental state talk promotes child development similarly to parental expression of mental state talk, children in classrooms with teachers who use high amounts of mental state talk will be more able to exhibit perspective-taking skills. Recent research assessing mental state talk in classrooms addresses the frequency of teacher use of mental state terms in classrooms, and describes the relationships between teacher expression of mental state talk and teacher characteristics.

Frampton et al. (2009) assessed the relationship between teacher expression of mental state talk and quality of teacher–child interactions in a sample of 393 teachers in 103 child care classrooms. Frampton et al. also evaluated teachers' perspective-taking discourse (explanations of others' perspectives) and activity-relevant questioning (questions regarding children's activities) in the classroom. The authors used live coding techniques to measure levels of teacher expression of mental state talk (operationalized to include emotion terms, cognition terms, and desire terms) during 20-second snapshots over 2.5 hour periods for each classroom. The authors evaluated each teacher in each classroom for 20 seconds before moving on to code another teacher; this process was repeated for the 2.5 hours in each classroom. The sample included measurements of the amounts of mental state talk spoken by permanent, part-time, and volunteer staff. Each mental state term spoken by teachers was recorded in order to achieve a composite number of instances of teachers' use of mental state talk during each 20-second

observation for each teacher. Frampton et al. assessed 3,401 snapshots in total, and mental state talk was observed in 22% of the snapshots. Mental state talk was the most utilized type of teacher talk out of all three categories; activity relevant questioning was observed in only 12% of the snapshots, and perspective-taking discourse was in only 3% of the snapshots. Additionally, amounts of mental state talk were related to positive caregiver interaction style ( $r = .27, p < .001$ ), signifying that teachers who had more positive interactions with children also expressed higher amounts of mental state talk. Caregiver interaction style was evaluated by observing the quality and content of teacher-child interactions during 45-minute periods, and rating each teacher using Caregiver Interaction Scale. The authors used the Caregiver Interaction Scale to measure emotional tone, responsiveness, and discipline styles of caregivers. The authors also examined child-staff ratio (measured once every 30 minutes), class size, and staff degree; however, none of these variables were found to be significant predictors of teacher expression of mental state talk. The proportion of children in each classroom receiving a child care subsidy was, however, a predictor of perspective-taking discourse; caregivers expressed significantly less perspective-taking discourse in classrooms with higher proportions of children receiving child care subsidies. Though the measure of perspective-taking discourse does not include mental state talk, it is interesting to note that the number of children receiving subsidies had an impact on teachers' language. General amount of mental state talk expression differed between and within classrooms; individual teachers in the same classroom exhibited different levels of mental state talk within the same classroom, although these differences were unexplained, as staff degree

was not a predictor of mental state talk expression. The variation among teachers' use of mental state talk highlights that expression of mental state talk may change due to a variety of teacher characteristics. The results of Frampton et al. demonstrate that teacher expression of mental state talk occurs within early childhood classrooms. Accordingly, mental state talk should be further studied in detail in classroom contexts in order to assess how teachers use mental state talk in classrooms.

Degotardi and Sweller (2012) examined teachers' use of mental state talk during one-on-one interactions with 9-20 month old infants in child care programs. The authors argued that teachers' ability to engage with infants on a mental level (i.e. teachers' consideration of infants as thinking beings) relates to teachers' ability to stimulate children's learning. Experimenters used utterance by utterance coding techniques to assess teacher expression of mental state talk in transcriptions of 10 minute teacher–infant interactions. Mental state talk was further separated into “non-belief talk” (including the use of emotions terms, desire terms, and perception terms) and “belief talk” (including the use of cognition terms). Teachers' sensitivity (emotional warmth and responsiveness) and stimulation levels (language and cognitive stimulation) were measured using the Observational Record of the Caregiving Environment. Results suggest that teachers' expression of belief talk (cognition terms) is positively associated with levels of teacher sensitivity. Degotardi and Sweller also assessed relationships between practitioner qualifications (highest level of education) and found that teachers' qualifications were not related to teachers' use of mental state talk. This finding suggests that, although sensitivity levels are often associated with higher levels of mental state

talk, the expression of mental state talk in their sample was not directly affected by education level.

### *Categories of Mental State Talk*

Mental state talk can be further segmented into the use of emotion terms, cognition terms, desire terms, and perception terms. Studies suggest that the expression of varying categories of mental state talk to children may facilitate different child outcomes, although multiple studies suggest overlap between categories and outcomes. Research that addresses child outcomes associated with exposure to mental state talk has been predominately conducted with samples of mothers. Studies of mental state talk in classrooms have yet to assess child outcomes; however, it is important to understand child outcomes associated with caregivers' use of mental state talk in order to support the examination of mental state talk in classrooms. Consequently, the following discussion of child outcomes associated with expression of each category of mental state talk stems from parental mental state talk literature.

*Emotion Terms.* Parental expression of emotion terms to children is suggested to facilitate child expression of emotion terms (Jenkins et al., 2003), increase children's emotion situation knowledge (the ability to accurately indicate another individual's emotional state), increase prosocial behavior, and decrease levels of physical aggression (Garner, Dunsmore, & Southam-Gerrow, 2008). These skills are particularly important in classroom settings because preschoolers' ability to identify other's emotions is suggested to facilitate later academic success (Denham, Bassett, Way, Mincic, Zinsser, & Graling, 2012). Additionally, children's exposure to emotion terms can affect child

aggression and social behavior (Garner et al., 2008), and children with higher levels of aggression in prekindergarten classrooms are more likely than their less aggressive peers to experience problems with peers and teachers in kindergarten classrooms (Ladd & Price, 1987).

Research suggests that a relationship exists between caregiver use of emotion terms and later child use of emotion terms; this relationship highlights that caregiver expression of mental state talk facilitates child understanding and discussion of mental states. Jenkins et al. (2003) studied a sample of 37 mothers and fathers initially with their two-year-old children, then two years later when their children were four-years-old. At both time points, parents were observed interacting with their children in their homes for 90 minutes during their normal nighttime routines. Observers audio recorded parents' and children's speech for 90 minutes during their nighttime routines. Experimenters followed the same procedure during the second time point two years later. The audio recordings of parent-child speech were transcribed and coded utterance by utterance for parent and child expression of mental state talk. The authors operationalized mental state talk to include the expression of emotion terms, cognition terms, and desire terms. The results of Jenkins et al. suggest that parental expression of emotion terms with their two-year-old children is related to change in amount of child expression of emotion terms at age four, controlling for children's language ability and amount of overall talk at age two. Children's expression of emotion terms represents children's ability to name emotions through language, which can lead to better self-regulation abilities (i.e. the skills needed to regulate emotions) and emotion understanding (Vallotton & Ayoub, 2011).

Garner et al. (2008) studied mothers interacting with their preschoolers during at-home picture book reading tasks. Observations lasted approximately seven minutes each, during which time mothers were instructed to discuss pictures in a storybook. Mother-child interactions were video recorded and later scored for the following four different categories of verbalizations: unelaborated comments about emotions (simple statements using emotion terms), explanations of emotions (statements regarding the cause of an emotion), references to positive emotions (use of terms that convey happiness/interest), and references to negative emotions (use of terms that describe unpleasant feelings). Children's understandings of emotional situations were assessed through the use of emotion producing vignettes. Children were instructed to identify the emotion felt by characters in a series of vignettes read aloud by experimenters. Child prosocial behavior and levels of aggression were measured through observations of twenty minute interactions between the target children and two other same-gender children in their preschools. The authors specifically documented physical aggression, relational aggression (hurting another child's feelings), and prosocial behavior (acts of helping, sharing, and comforting) with peers. Garner et al. found that mothers' explanations of emotions during picture-book reading tasks are positively associated with prosocial behavior with peers in preschool and emotion situation knowledge task performance, and negatively associated with physical aggression in children. These results reveal a relationship between discussion of emotion terms and behaviors in early classroom settings; it is possible that children's exposure to emotion terms in classroom settings may have greater direct effects on children's behaviors with peers in classrooms.

*Cognition Terms.* Parental use of cognition terms is suggested to improve children's understanding of mental states, emotional understanding, social understanding, and friendship interactions (Adrian, Clemente, & Villanueva, 2007; Ensor & Hughes, 2008; McElwain et al., 2011; Taumoepeau & Ruffman, 2008). The ability to understand others' emotions and beliefs is a helpful tool for children in early childhood education settings because understanding others' mental states facilitates perspective taking, which may contribute to decreases in conflict. The associations between use of cognition terms and child outcomes are similar to studies assessing parental expression of emotion terms, though it is important for the literature to examine cognition terms separately from emotion terms, because cognition terms may be expressed within different classroom activity contexts than emotion terms (such as a teacher saying "now *imagine* you are a firefighter" during dramatic play).

Taumoepeau and Ruffman (2008) examined the relationship between maternal mental state talk and children's later emotional understanding. The authors developed a longitudinal study of maternal mental state talk to 15-, 24-, and 33-month-olds. Taumoepeau and Ruffman's comparisons of 15- and 24-month-olds are presented in their 2006 paper discussing the effects of desire terms. In 2008, Taumoepeau and Ruffman assessed maternal expression of mental state talk during reading tasks at child age 24-months, then measured children's emotional situation knowledge via emotion tasks at 33-months. The emotion task consisted of experimenters reading children eight emotion-producing vignettes accompanied by faceless cartoons and instructing children to describe the emotions felt by each character. To assess maternal expression of cognition

mental state terms, mothers were instructed to involve their children in a picture-book reading task. Mothers' utterances during the picture-book tasks were coded for all incidences of mental state talk, separated by term category into emotion terms, desire terms, and cognition terms. Results suggest that mothers' use of cognition terms (specifically, references to others' thoughts and knowledge) at 24 months predicts children's emotion task performance at 33 months ( $r = .37, p < .01$ ) and children's general mental state talk at 33 months.

Exposure to cognition terms is also suggested to affect social understanding and false belief understanding (the understanding that others have beliefs that may not be reality). False belief understanding develops during preschool years (Wellman et al., 2001), and exposure to mental state talk is suggested to support such development. Ensor and Hughes (2008) examined 120 mothers initially with their two-year-old children, and followed up with participants one and two years later. The authors studied mothers' mental state talk during 30-minute home observations at child age two and age three, and assessed children's false belief understanding, emotion understanding, and social understanding at all three time points (ages two, three, and four). During home visits, families were video recorded during meal preparation. Videos were later transcribed and coded for maternal expression of categories of mental state talk (including emotion terms, cognition terms, and desire terms). Children's false belief understanding was assessed while children read peep-through picture books. Each page of the picture-book had a hole through which the child could only see a portion of a picture on the next page. The pictures were created to be misleading; the actual picture on the next page was not of

what children would expect. After children saw the actual picture on the next page, children were asked what they would predict another child would expect to see on the next page. This assessment measures how well children can differentiate between what they know to be true and what others may believe to be true. Experimenters measured children's emotion understanding by instructing children to label the emotions of puppets displaying emotional facial expressions. The authors assessed children's social understanding through observing social interactions in children's play groups and nursery schools. The results of Ensor and Hughes suggest that mothers' cognitive references to children are correlated with children's social understanding, false belief understanding, and emotional understanding at two, three, and four years of age. These skills are important in early childhood education settings because children's sociocognitive abilities at age four are related to communication and conflict within peer-to-peer interactions (Dunn & Cutting, 1999).

Additionally, maternal use of cognition terms is suggested to affect children's understanding of others' mental states. Adrian et al. (2007) examined mothers' expression of cognition terms to their three- to five-year-old children during picture-book reading tasks. The authors assessed children's understanding of mental states using unexpected transfer tasks, white lie and irony tasks (to determine children's understanding of non-literal meaning), deception tasks (to assess if children can hide their thoughts), and certainty tasks (to examine if children comprehend the difference between "believe" and "know"). In an unexpected transfer task, children are shown a scene in which one character watches another character put a ball into a box and leave the room.

The remaining character then moves the ball from the box to under a blanket. Children then watch the first character return to retrieve the ball. At this time, children are asked where the first character will look for the ball. This task assesses if children can differentiate between their own knowledge and someone else's knowledge, which examines children's understanding of the existence of separate mental states between individuals. Adrian et al. report that amount of maternal expression of cognition terms during picture-book tasks at the first time point is associated with children's understanding of mental states at the second time point. It is possible that children's exposure to cognition terms may facilitate the understanding that individuals have separate minds.

Children's experience with caregivers' use of cognition terms not only affects children's internal representations of mental states, exposure to the expression of cognition terms is suggested to affect children's behaviors during friendship interactions. McElwain et al. (2011) studied mothers' expression of mental state talk to their 24 month children during 15-minute play interactions in a laboratory setting. The play sessions were video recorded and later coded for mothers' use of emotion terms, cognition terms, and desire terms. When children were 54 months old, mothers were instructed to complete the Quality of Child's Friendship questionnaire to assess mothers' reports of children's friendships. Results suggest that maternal cognition talk to 24-month-olds is associated with higher levels of mother-reported positive friendship interactions at 54-months of age. Specifically, the authors found that maternal cognition talk mediates the positive association between secure maternal attachment and positive friendship

interactions. Mothers who used more cognition terms also had more secure attachments with their children, leading to more positive friendship interactions. This study is relevant to teacher–child interactions because teachers can represent interim attachment figures, acting as secure bases to children in classrooms (Verschuere & Koomen, 2012). Because mothers’ expressions of cognition terms is related to secure attachments, it stands to reason that teachers’ use of cognition terms can facilitate secure teacher–child attachments and teacher–child relationships, and improve social skills in children.

*Desire Terms.* Caregiver expression of desire terms are fundamental in the study of early childhood development because research suggests that children express and understand desire terms (such as “I want”) before other types of mental state talk (Bartsch & Wellman, 1995). It is possible that desire terms are most easily understood at early ages; therefore, caregiver expression of desire terms to young children could potentially facilitate the understanding of other mental state terms and mental states in general.

Symons, Fossum, and Collins (2006) longitudinally studied 43 mother–child dyads during free play tasks in order to examine the relationship between mothers’ use of mental state talk and children’s theory of mind understanding. Theory of mind understanding is defined as the understanding of the existence of the mind and the distinction between one’s mental state and another’s mental state (Wellman et al., 2001), and is particularly important to child development because theory of mind understanding is associated with affective perspective taking (Harwood & Farrar, 2006). Children in this study were two years of age at time one and five years of age at time two. The authors coded maternal speech for emotion terms, cognition terms, and desire terms

expressed during the free play tasks with their two-year-old children. In order to assess later child theory of mind understanding, the authors administered false belief tasks when children were five years of age. Symons et al. found that only mothers' expression of desire terms during free play tasks at age two were associated with more child theory of mind understanding at age five. The authors argue that cognition talk may play a role in child theory of mind understanding later in life; however, at age two, parental discussion of desires may be most salient to children's developmental level, potentially because they are the most easily understood type of mental state talk.

Taumoepeau and Ruffman (2006) found that mothers' expression of desire terms during picture-book tasks is positively associated with children's later emotion task performance. The emotion task is the same task as described in Taumoepeau and Ruffman (2008); children are read emotional vignettes and instructed to describe the emotional state of the characters. The authors found mothers' references to desires to children when children were aged 15 months predicted child emotion task performance at 24 months. The results of this study support the hypothesis that the understanding of desire terms facilitates the understanding of other types of mental states. It is possible that mothers' desire talk at age 15 months increases child understanding of desire terms, which increases child understanding of emotion terms, thereby improving emotion task performance at older ages.

*Perception Terms.* Research regarding caregiver expression of perception terms is limited. No studies to date examine the unique effects of caregiver expression of perception terms on child outcomes; however, one study has assessed how mothers' use

of perception terms are influenced by infants' visual joint attention abilities (gaze and point following). Slaughter, Peterson, and Carpenter (2008) studied how mothers' expressions of perception terms to their 9-, 12-, and 15-month old infants changed over time as infants engage in more joint visual attention. Results suggest that as joint visual attention increases, mothers' expression of perception terms decreases. Caregivers' verbal references to perceptual states may be most salient to the development of attention in early life, and the importance of such terms may decrease as children age. Although the results of Slaughter et al. do not address child outcomes associated with maternal expression of perception terms, it is important to note that mothers change the language they express based on the skills of their children, much like teachers use scaffolding techniques to children in classrooms.

A few studies of mental state talk include perception terms in composite measures of mental state talk. For example, Degotardi and Torr (2007) included references to perceptions in their composite measure of maternal expression of non-belief mental state talk (which also included references to emotions and desires). The authors report that non-belief mental state talk occurs more often than belief mental state talk (operationalized to include the expression of cognition terms), although it is not possible to separate how much of this type of talk includes the use of perception terms alone. This study underscores the importance of separating types of mental state talk in research, and demonstrates that the study of perception terms is limited in the mental state talk literature. The study of perception terms is significant to classroom environments

because many classroom activities involve discussions of perceptions such as sight or hearing.

Research regarding parental expression of mental state talk demonstrates positive effects of mental state talk on child development, including the expression and understanding of mental state talk, emotion understanding, social understanding, and theory of mind understanding (Ensor & Hughes, 2008; Jenkins et al., 2003; Ruffman et al., 2006; Taumoepeau & Ruffman, 2008). Many of the mental state talk studies assess parental mental state talk to children younger than preschool aged children (McElwain et al., 2011; Taumoepeau & Ruffman, 2006). The developmental outcomes discussed in the parental mental state talk literature continue to develop during pre-kindergarten years, although it is important to note that mental state talk may have greater effects upon development during earlier ages. Because teachers represent extra-familial caregiving relationships (Howes & Hamilton, 1992), teachers' expression of mental state talk in classroom settings may facilitate similar child outcomes as found in the parental mental state talk literature. Expression of mental state talk is suggested to have unique effects on child development; therefore, it is important to understand mental state talk used in classrooms. The study of teacher expression of mental state talk is emerging; research should assess the specific ways that teacher use multiple categories of mental state talk, and should examine how teacher characteristics and classroom quality are associated with teachers' use of mental state talk in early childhood education classrooms.

## CHAPTER IV

### THE CURRENT STUDY

The current study extended the research of parental expression of mental state talk to assess teacher expression of mental state talk during interactions with children in classroom contexts. Research regarding familial expression of mental state talk suggests that mental state talk spoken by parents can facilitate child development such as the understanding of mental states (Adrian et al., 2007), theory of mind development (Ruffman et al., 2006), emotion understanding (Taumoepeau & Ruffman, 2008), and social abilities (Ensor & Hughes, 2008). Additionally, teacher–child interactions can affect children’s social, language, and academic skills (Burchinal et al., 2008; Curby et al., 2009); therefore, teachers’ use of mental state talk may be a specific type of language used in teacher–child interactions that can facilitate child development. Research examining mental state talk spoken in classroom settings is emerging (Degotardi & Sweller, 2012; Frampton et al., 2009); however, additional research is needed to examine teachers’ use of specific categories of mental state talk, and to evaluate the associations between teacher expression of mental state talk and teacher and classroom characteristics. The current study contributes to the teacher mental state talk literature by describing the use of four categories of mental state talk and assessing the associations between mental state talk and teacher characteristics, classroom activity contexts, and classroom quality.

The first goal of the current study was to assess which categories of mental state talk were used most frequently in Head Start classrooms. Research indicates that caregiver expression of different categories of mental state talk may facilitate unique child development outcomes; therefore, it is important for research to separate the use of each type of mental state talk. Recent studies in early childhood education settings have utilized composite measures of mental state talk in their assessments (Degotardi & Sweller, 2012; Frampton et al., 2009). Consequently, the current study defined specific types of mental state talk and described the use of these different categories of mental state talk by teachers.

The second goal of the current study was to further examine teachers' expression of mental state talk, specifically evaluating the sentence types teachers use mental state talk within, the mental states to which teachers most often refer, and the classroom activity contextual factors that can affect teachers' expression of mental state talk. Research demonstrates that classroom characteristics can affect teacher-child interactions (Dickinson et al., 2008; Gest et al., 2006); therefore, classroom activity contexts may influence teacher expression of mental state talk. Classroom activity contexts that were examined in this study included the types of classroom activities that were occurring during teacher-child interactions and the number of children with whom teachers were interacting at the time of mental state talk expression.

The third goal of this study was to examine the relationship between teacher characteristics and teacher expression of mental state talk. In Pianta's (1998) model of systems theory extended to classroom contexts, he argues that teachers bring their own

characteristics and experiences to teacher–child interactions; therefore, the current study examined the associations between teacher characteristics and teachers’ mental state talk in teacher–child interactions. This study included measures of teachers’ education level, years of teaching experience, career plans, major field of study, and professional organization membership in the operationalization of teacher characteristics. Burchinal, Cryer, Clifford, and Howes (2002) suggest that caregivers with more formal education are more sensitive with children, and caregiver sensitivity is suggested to be related to expression of mental state talk (McElwain et al., 2011). Accordingly, teachers’ education and experience may influence teachers’ use of mental state talk; teachers with certain credentials or experiences may express higher levels of mental state talk.

The fourth goal of the current study was to address the association between the quality of observed teacher–child interactions in classrooms and teacher expression of mental state talk. Studies suggest that children with more sensitive teachers have better academic and social skills (Burchinal et al., 2008); because these outcomes are also associated with children’s exposure to mental state talk in the parenting literature, it is possible that teachers who are more sensitive or emotionally supportive in their interactions with children use more mental state talk than teachers who are less sensitive in their interactions with children.

*Research Questions and Hypotheses*

*Research Question 1:* What categories of mental state talk terms (emotion, cognition, desire, or perception) do teachers most often use in the classroom?

*Hypothesis 1:* Teachers will most often express desire terms compared to other categories of mental state talk.

*Research Question 2:* How do teachers use mental state talk in preschool classrooms?

A. When teachers use mental state talk, in which types of sentences are the categories of mental state talk expressed?

*Hypothesis 2A:* Teachers will most often use mental state talk in questions compared to other types of sentences, and use of categories of mental state talk will vary across sentence types.

B. When teachers use mental state talk, do they most often refer to their own mental states or to children's mental states and does this differ by mental state talk category?

*Hypothesis 2B:* Teachers will most often refer to children's mental states compared to their own or others' mental states, and use of categories of mental state talk will vary across referents.

C. When teachers use mental state talk, in which classroom activities are the categories of mental state talk expressed?

*Hypothesis 2C:* Teachers will most often use mental state talk during centers/freeplay compared to other classroom activity, and use of categories of mental state talk will vary across classroom activities.

*D.* When teachers use mental state talk, are teachers in contexts with single children or multiple children and does this differ by mental state talk category?

*Hypothesis 2D:* Teachers will most often use mental state talk with multiple children as opposed to with single children, and use of categories of mental state talk will vary across the number of children.

*Research Question 3:* What teacher characteristics (i.e. years of teaching experience, education level, career plans, major field of study, and professional organization membership) are associated with teacher expression of mental state talk terms, and does this differ by the category of mental state talk terms?

*Hypothesis 3:* Teachers with more years of teaching experience, higher education, plans to be career early childhood education teachers, degrees in early childhood education, and memberships to professional organizations will express more mental state talk than teachers with less experience teaching, lower education, alternate career plans, no degree in early childhood education, and no membership to professional organizations.

*Research Question 4:* Is classroom quality associated with teacher expression of mental state talk, and does this association differ by mental state talk category?

*Hypothesis 4:* Teachers in classrooms rated higher on the Emotional Support domain of the CLASS will express more overall mental state talk, and will express more emotion terms specifically.

## CHAPTER V

### METHODS

#### *Participants*

Participants in the current study included 34 lead teachers in Head Start classrooms enrolling children ages three and four. Participants were predominately female (33 females and one male), and ranged in experience in teaching in Head Start (including Early Head Start) classrooms from less than one year to 19 years ( $M = 4.25$ ,  $SD = 3.82$ ). Participants' education levels ranged from associates degree ( $n = 4$ ) to graduate degree ( $n = 4$ ), most of whom had received bachelor's degrees ( $n = 16$ ). The reported racial identities of participants are as follows: Black or African American ( $n = 22$ ), White non-Hispanic ( $n = 4$ ), American Indian or Alaskan Native ( $n = 1$ ). Racial identity was not available for 7 of the participants.

This sample of teachers was drawn from participants in a larger study of professional development and implementation of evidence based practices, QeSTEP, within a large local Head Start agency. During the 2009-2010 and 2010-2011 academic years, teachers in each of the Head Start centers in Guilford County, North Carolina, participated in the QeSTEP professional development project. Head Start teachers were required to participate in the QeSTEP project for professional development, but only those who consented to participation in the research study were included in the current

study. During each year in QeSTEP, teachers received training on reflective supervision, evidence based practices, and teacher–child interactions. Classroom observations were conducted three times throughout the year, both through live observations and video recorded observations. Classroom observations were coded using the CLASS (Pianta, La Paro, & Hamre, 2007) during fall and spring observations. Teachers also received mentoring related to teacher–child interactions from project and Head Start staff. A total of 55 Head Start classrooms participated in QeSTEP. However, the current study assessed a 34-teacher subsample of these teachers due to technical problems with videos and mid-project teaching staff changes.

### *Procedure*

To assess teachers' expression of mental state talk, the first videos of classroom observations completed in the fall for QeSTEP were transcribed to include all teacher utterances and child utterances when teachers and children could be heard and understood. The current study assessed only fall observations, before teachers had received any mentoring. Classroom contexts were also transcribed every 30 seconds (or upon context transitions and changes) to note and the classroom activity that was occurring (i.e. freeplay/center time, routines, transitions, meal times, small group instructional or whole group instructional settings) and the number of children with whom the lead teacher was directly interacting (one-on-one, small group defined as two to four children, or large group defined as five or more children). Videos were transcribed using Child Language Analyses (CLAN) software (MacWhinney, 2003) so that each utterance spoken was transcribed and all classroom activity contexts were

noted. CLAN software counts the total number of words spoken, which were used to compare general amounts of teacher speech to use of mental state talk terms.

Each transcription was coded utterance by utterance for use of mental state talk terms. Each use of a mental state term was coded for mental state talk category (emotion term, cognition term, desire term, or perception term), the type of sentence in which the term was embedded (statement, question, direction or prompting question), to whom the mental state term referred (self, child or children, other adult in the room, or character/inanimate object/nonpresent person), activity context (routine, free play/centers, transition, meal time, whole group instructional, small group instructional, or non-child engagement), and group size (one-on-one, small group, or large group). Each code is further described below.

Videos were approximately one hour long ( $\bar{x} = 53:42$ , median = 1:00:13 and range: 23 minutes to 64 minutes, although the majority fell in the range of 45 to 60 minutes). One lead coder coded all 34 transcriptions using the Mental State Talk Coding Manual, described below. According to conventional protocol, inter-rater reliability was assessed on approximately 20% ( $n = 7$ ) of the transcriptions (Degotardi & Torr, 2007; McQuaid, Bigelow, McLaughlin, & MacLean, 2007). Codes across mental state talk category, sentence type, referent, activity context, and number of children interacting with the teacher were compared. Differences in codes and missed codes were discussed and conferenced codes were agreed upon. Across the 7 transcriptions, the average reliability of mental state talk category was 97%, sentence type was 84%, referent was 95%, activity context was 97%, and number of children in context was 89%. Coders

agreed on the existence of a mental state talk term on 75% of terms, on average. This method of calculating reliability based on percent agreement is consistent with other research of mental state talk (Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013).

### *Measures*

*Mental State Talk Coding System.* The Mental State Talk Coding System was adapted from the mental state talk coding system used in Armstrong and Cole (2009), and included revisions based on previous mental state talk literature around parenting such as Bartsch and Wellman (1995), Hutchins, Bond, Silliman, and Bryant (2009), Jenkins et al., (2003), and McElwain et al., (2011). The coding system was reviewed for face and content validity, and sections of five practice videos were coded by three study personnel.

Mental state term category. Coding of mental state terms was further separated into emotion terms, cognition terms, desire terms and perception terms. Emotion terms describe an emotional state or a feeling felt by an individual or group, and include but are not limited to: happy, sad, mad, love, like, hate, frustrated, and content. Cognition terms are terms that describe an internal cognition or thought process, and include but are not limited to: think, know, decide, believe, wonder, and pretend. Desire terms describe a sense of longing, and include but are not limited to: want, hope, wish, and would like. Finally, perception terms are terms associated with the five senses, such as see, look, watch, listen (Slaughter et al., 2008); the current study also includes physiological terms within perception terms, such as smell and taste (Hutchins et al., 2009). Mental state

terms used within conversational filler expressions such as, “You know what” or “Let me see” were not coded as mental state talk.

Sentence type. The type of sentence within which a teacher expressed a mental state term was also coded. Teachers expressed mental state terms in a variety of sentence types with different meanings, and this code assessed in what sentence type teachers most often used mental state talk. Sentence type was only coded when a sentence included a mental state term. Options included mental state terms used in statements, questions, directives, or prompting questions. Teachers’ use of mental state talk in statements included narration or information offering, such as “She wants to go outside.” Teachers’ use of mental state terms in questions included interactions in which teachers asked a child or multiple children a question in expectation of a response, such as “Do you like your cookie?” Mental state terms in directive statements were coded when teachers used mental state talk while managing child behavior using direct commands, for example, “I think you should wash your hands.” Directive sentences have previously been studied in the parental mental state talk literature; Brown, Donelan-McCall, and Dunn (1996) assessed mothers’ use of mental state talk in sentences “directing the interaction.” Additionally, Slaughter et al. (2008) assessed mental state talk in imperative statements which were defined as orders managing behavior (directives). It is important to include a measure of directive sentences because teachers who use mental state talk to manage behavior may interact differently with children than teachers who use mental state talk solely to discuss or label mental states. Lastly, prompting questions included a directive that was framed as a question. Teachers in classrooms occasionally framed behavior

guidance in terms of questions; for example, asking “Want to wash your hands?” when the teacher was clearly guiding the child to wash his or her hands. The “prompting question” code aimed to assess if teachers use mental state terms when guiding (not directing) behavior; however, prompting questions were used infrequently (55 times) in this study.

Referent. The referent code was to note which person’s mental state was referred to by the mental state term. Teachers referred to their own mental state (self), a child or multiple children’s mental states, another adult’s mental state, or the mental state of a character/inanimate object (non-person) or a person who is not present (non-present person); although the use of mental state talk in reference to another adult’s mental state and a non-person/non-present person were infrequent (11 times and 90 times, respectively). This measurement was to assess whose mental states teachers discuss most often in classrooms.

Activity context. Context plays a large part in teacher–child interactions (Dickinson et al., 2008; Gest et al., 2006); therefore, the activity contexts within which mental state talk was expressed were also coded. Codes included: routine (such as hand washing and clean up time), free play/centers, transitions (included transitions between activities), meal time, whole group instructional (included every child in the classroom), small group instructional (not every child involved), and non-child engagement (teacher was not involved with or around children; although, teachers’ use of mental state talk occurred only 11 times during non-child engagements).

Group size. Research suggests that the number of children a teacher interacts with at one time can affect teacher behaviors (Marinac, Ozanne, & Woodyatt, 2004); consequently, the number of children interacting with teachers when teachers expressed mental state talk was coded. Codes included: one-on-one, small group (two to four children), or large group (five or more children).

*The Classroom Assessment Scoring System.* The Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2007) measures classroom quality within three domains, Emotional Support, Classroom Organization, and Instructional Support. As part of QeSTEP, trained observers rated the classroom and teacher on ten dimensions within the three domains of the CLASS on a 1-7 scale (1-2 signifies a low score on that dimension, 3-5 signifies a mid-level score, and a 6 or a 7 signifies a high score). CLASS observations were conducted in three cycles of twenty minutes each during the morning, and typically included small group activities, large group activities, free play/center activities, routines, transitions, and snack times. Most cycles were completed consecutively, meaning all cycles were completed during one hour. CLASS scores from all three cycles were averaged on each dimension to give each teacher a mean CLASS score with each dimension. CLASS observers were trained and achieved reliability by coding trainer videos.

The Emotional Support domain assesses dimensions of Positive Climate (emotional connections between teachers and children), Negative Climate (expression of negative emotions), Teacher Sensitivity (teachers' responsiveness to children), and Regard for Student Perspectives (teachers' emphasis of student interests and points of view). The

Classroom Organization domain measures dimensions of classroom functioning, including Behavior Management (teachers' monitoring and directing behavior), Productivity (teachers' organization of routines and activities), and Instructional Learning Formats (teachers' facilitation of interesting and engaging learning opportunities). Finally, the Instructional Support domain includes measurements of teachers' Concept Development (facilitation of higher thinking skills), Quality of Feedback (responses to students' ideas), and Language Modeling (encouragement of students' language).

The current study was primarily concerned with how teachers' expression of mental state terms were related to the dimensions included in Emotional Support, with the exception of Negative Climate. The Negative Climate dimension has a restricted range in the data set and in previous studies as well (Pakarinen, Lerkkanen, Poikkeus, Kiuru, Siekkinen, Rasku-Puttonen, & Nurmi, 2010). However, associations between use of categories of mental state talk and ratings of concept development were also of interest, as teachers may use cognition terms when facilitating higher thinking skills.

*Teacher Characteristics.* Teacher characteristic information, such as teachers' years of teaching experience, education level, career plans, major field of study, and professional organization membership was also gathered through a survey. Teachers' years of teaching experience as lead teacher ranged from less than one year to 14 years ( $M = 4.90$ ,  $SD = 4.07$ ), and teachers' years in teaching in Head Start (including Early Head Start) classrooms from less than one year to 19 years ( $M = 4.25$ ,  $SD = 3.82$ ). Teachers' ranged in their education level from associates degree ( $n = 4$ ), to bachelor's degree ( $n = 16$ ), to some graduate school but no degree ( $n = 4$ ), to graduate degree ( $n =$

4). Teachers' ranged in their assessments of their career plans from plans to continue to be career early childhood educators (n = 11), to undecided if they will continue to be early childhood educators (n = 9), to planning another career outside of early childhood education (n = 6). Teachers ranged in their major field of study from early childhood education (n = 17), business (n = 1), psychology (n = 2) and "other" (n = 6); for the following analyses, teachers' major field of study was dichotomized into early childhood education (n = 17) and other degree (n = 9). Teachers were also asked if they were members of the National Association for the Education of Young Children (NAEYC) to examine teachers' professional development; 12 teachers indicated they were members of NAEYC, and 5 teachers indicated they were not members of NAEYC. Teachers who reported data for at least one variable of teacher characteristics were included in the analyses.

#### *Analysis Plan*

To examine the first research question, t-tests were conducted to compare teachers' rates of use of categories of mental state talk. To examine the second research question, chi square analyses were performed to assess the ways in which teachers express mental state talk. To address the third research question, correlations, t-tests, and one-way ANOVAs (Analysis of Variance) were conducted to assess the influence of teachers' characteristics on rate of mental state talk. To evaluate the fourth research question, correlations were conducted to assess relationships among teachers' CLASS dimension and domain scores and teachers' rates of overall mental state talk and rates categories of mental state talk terms.

## CHAPTER VI

### RESULTS

#### *Preliminary Analyses*

In order to standardize the expression of mental state talk to account for variations in length of teacher observations, a “rate” of mental state talk variable per minute was created. The lengths of teacher observations varied from 23 minutes to 64 minutes. Therefore, raw counts of instances of mental state talk were skewed in favor of teachers who had longer observations (i.e. teachers who were observed for longer periods of time had more instances of mental state talk by virtue of opportunity). Although language does not occur at a linear rate, converting speech into a rate standardized the occurrence of mental state talk to assist in subsequent analyses. To obtain each teacher’s rate of overall mental state talk, the total number of mental state terms coded (across all four categories) was divided by the length (in minutes) of the observation. To obtain teacher’s individual rate of category of mental state talk terms, the total number of each category of mental state talk was divided by the number of minutes of teachers’ observations.

Across all teachers’ speech, a total of 125,261 words were transcribed. A total of 4,213 teachers’ mental state talk terms were identified across all teachers, meaning 3.36% of all speech across all 34 observed classrooms was coded as mental state talk. This rate of mental state talk use is consistent with findings from previous mental state talk literature (Bartsch & Wellman, 1995). Ranges of percent of use of mental state talk for

each teacher were from 1.91% to 4.81%, indicating a range of occurrence of mental state talk between teachers.

### *Hypothesis Testing*

Table 1 shows the overall mean rate of mental state talk and mean rates for each category of mental state terms. Teachers' mean rate of mental state talk was highest for perception terms and lowest for emotion terms. T-tests were conducted to determine if mean rate differences existed among the four categories of mental state talk terms. A more conservative alpha level ( $p = .01$ ) was used to account for multiple comparisons. The results of the paired t-tests of teachers' mean rates of expression of categories of mental state talk revealed significant differences between categories. The mean rate of teachers' use of perception terms ( $M = 0.803$ ,  $SD = 0.346$ ) was significantly higher than the mean rate of desire terms ( $M = 0.636$ ,  $SD = 0.317$ );  $t(33) = 2.839$ ,  $p = .008$ , the mean rate of cognition terms ( $M = 0.585$ ,  $SD = 0.336$ );  $t(33) = 3.351$ ,  $p = .002$ , and the mean rate of emotion terms ( $M = 0.289$ ,  $SD = 0.219$ );  $t(33) = 8.637$ ,  $p = .000$ . The mean rate of teachers' use of emotion terms ( $M = 0.289$ ,  $SD = 0.219$ ) was significantly lower than the mean rate of perception terms ( $M = 0.803$ ,  $SD = 0.346$ );  $t(33) = -8.637$ ,  $p = 0.000$ , and the mean rate of desire terms ( $M = 0.636$ ,  $SD = 0.317$ );  $t(33) = -6.545$ ,  $p = 0.000$ . The mean rate of teachers' use of desire terms ( $M = 0.636$ ,  $SD = 0.317$ ) was similar to the mean rate of teachers' use of cognition terms ( $M = 0.585$ ,  $SD = 0.336$ );  $t(33) = 0.915$ ,  $p = 0.367$  (see Table 1).

To evaluate research question 2, chi square analyses were performed to examine if teachers' expression of mental state talk varied depending on sentence context, mental

state referent, activity context, or the number of children interacting with the teacher at the time of speech. The analyses in research question 2 were calculated within-teacher, based on 4,213 total mental state terms expressed across all teachers. Results indicate that overall mental state talk occurred most frequently in statements; however, results from a chi square test revealed a significant difference of frequency of mental state talk depending upon teachers' sentence type,  $\chi^2 = (9, N = 4213) = 1175.14, p = .000$  (frequencies of teachers' use of categories of mental state talk in each sentence type are presented in Table 2). A chi square comparison of column proportions, adjusting the significance level for multiple comparisons (Bonferroni method), showed that cognition terms and emotion terms were more likely to occur within statements than within questions, directives, or prompting questions; additionally, cognition terms and emotion terms were more likely to occur within questions than within directives. Desire terms were more likely to occur within questions than within statements, directives, or prompting questions. Perception terms were more likely to occur within directives than within statements, questions, or prompting questions, and were more likely to occur within statements than questions (all comparisons significant at the  $p < .05$  level, see Table 2).

Overall mental state talk occurred most frequently in references to children's mental states; however, results from a chi square test revealed a significant difference of frequency of mental state talk depending upon the referent of the mental state,  $\chi^2 = (9, N = 4213) = 441.08, p = .000$  (frequencies of teachers' use of categories of mental state talk for each referent are presented in Table 3). A chi square comparison of column

proportions, as described above, revealed that, when teachers used cognition terms, perception terms, and desire terms, teachers' were more likely to refer to the mental states of children than the mental states of themselves, other adults, inanimate characters, or non-present others; however, when teachers used emotion terms, teachers were more likely to refer to their own mental states than the mental states of children, other adults, inanimate characters/non-present others (all comparisons significant at the  $p < .05$  level, see Table 3).

Overall mental state talk occurred most frequently in free/play center contexts; however, results from a chi square test revealed a significant difference of frequency of mental state talk depending upon the activity context within which teachers were interacting,  $\chi^2 = (18, N = 4213) = 341.34, p = .000$  (frequencies of teachers' use of categories of mental state talk in each activity context are presented in Table 4). A chi square comparison of column proportions demonstrated that, when teachers expressed emotion terms, they were significantly more likely to be interacting with children in centers than in transitions, meal times, or small group instructional settings, more likely to be in whole group instructional settings than in meal times, and more likely to be in meal times than in routines, transitions, or small group instructional settings (all comparisons significant at the  $p < .05$  level, no other differences in emotion term use were found). When teachers expressed cognition terms, they were significantly more likely to be interacting with children in centers than in whole group instructional settings or small group instructional settings, more likely to be in whole group instructional settings than in small group instructional settings or transitions, and more likely to be in

small group instructional settings than in routines, transitions, and meal times (all comparisons significant at the  $p < .05$  level, no other differences in cognition term use were found). When teachers expressed desire terms, they were significantly more likely to be interacting with children in centers than in transitions, whole group instructional settings, or small group instructional settings, more likely to be in routines than in meal times, whole group instructional settings, and small group instructional settings, and more likely to be in transitions than in meal times, whole group instructional settings, or small group instructional settings (all comparisons significant at the  $p < .05$  level, no other differences in desire term use were found). Additionally, when teachers expressed perception terms, they were significantly more likely to be interacting with children in centers than in transitions or whole group instructional settings, more likely to be in whole group instructional settings than in transitions, meal times, and small group instructional settings, and more likely to be in routines than in transitions (all comparisons significant at the  $p < .05$  level, no other differences in perception term use were found, see Table 4).

Overall mental state talk occurred most frequently when teachers were interacting with small groups of children; however, results from a chi square test revealed a significant difference of frequency of overall mental state talk depending upon the number of children (i.e. one-on-one, small group two to four, or large group five or more children) interacting with the teacher at the time of speech,  $\chi^2 = (6, N = 4213) = 19.40, p = .004$  (frequencies of teachers' use of categories of mental state talk when interacting with different numbers of children are presented in Table 5). A chi square comparison of

column proportions revealed that, when teachers used emotion terms, they were equally likely to be in one-on-one interactions with children, small groups, and large groups. When teachers used cognition terms, they were significantly more likely to be in large groups of children than in one-on-one interactions (all comparisons significant at the  $p < .05$  level, no other differences in cognition term use were found). When teachers used desire terms, they were equally likely to be in one-on-one interactions with children, small groups, or large groups of children. The chi square comparison of column proportions revealed that, when teachers used perception terms, they were more likely to be with small groups of children than in one-on-one interactions with children (all comparisons significant at the  $p < .05$  level, no other differences in perception term use were found, see Table 5). Some of the results from research question 2 are highlighted in Table 6.

To address research question 3, analyses were conducted to determine if teachers' characteristics were significantly related to teachers' rates of expression of overall mental state talk and expression of mental state talk categories. Results from correlations of teachers' years of experience teaching and rates of overall mental state talk and categories of mental state talk revealed a significant association between teachers' years teaching Head Start or Early Head Start and teachers' rates of perception terms,  $r(25) = -0.412, p = .033$ ; teachers with more experience teaching used less perception terms. Table 7 illustrates that no other significant associations were found between teachers' years of experience teaching in Head Start or as a lead teacher and use of categories of mental state talk.

To compare teachers' education level, a one-way ANOVA was conducted (see Table 8). Results indicate that there were no significant differences in teachers' rate of overall mental state talk or categories of mental state talk depending on education level. To compare teachers' major field of study and professional organization membership, t-tests between the characteristic variables and categories of mental state talk were conducted (see Tables 9 and 10). Teachers who were members of NAEYC used a significantly higher rate of emotion terms per minute,  $t(15) = 3.596, p = .003$  and a higher rate of cognition terms per minute,  $t(15) = 2.970, p = .010$  than teachers who were not members of NAEYC. Other comparisons between teachers' education level, major field of study, and professional organization membership and teachers' rates of mental state talk did not show significant differences in rates of mental state talk, although a trend toward significance was noted for overall mental state talk,  $t(15) = 2.070, p = .056$  for teachers who were members of NAEYC.

To examine differences in use of mental state talk terms and teachers' career plans, a one-way ANOVA was conducted. Results show a significant difference in rates of emotion terms between teachers who view themselves as long-term career early childhood educators and teachers who do not view themselves as career early childhood educators,  $F(2, 23) = 4.444, p = .023$  (see Table 11). A Bonferroni post-hoc test revealed that teachers who planned to be career early childhood teachers used significantly less emotion terms than teachers who were planning on pursuing another career (Mean Difference =  $-.293, SE = .104, p = .030$ ). No other differences between teachers' career plans and rates of mental state talk terms were found.

To examine research question 4, correlations were conducted to determine relationships among teachers' CLASS dimension and domain scores and teachers' rates of overall mental state talk and each category of mental state talk terms. Results from the correlations between teachers' CLASS dimension scores and rates of mental state talk demonstrated significant positive associations between teachers' rate of use of emotion terms and Positive Climate,  $r(31) = 0.353, p = .044$ , and Regard for Student Perspectives,  $r(31) = 0.454, p = .009$ . Teachers in classrooms rated higher on Positive Climate and Regard for Student Perspectives had higher rates of use of emotion terms. A trend was noted between teachers' rate of use of emotion terms and Teacher Sensitivity,  $r(31) = 0.338, p = .055$ . Additionally, teachers in classrooms with high scores of Positive Climate also had high rates of the use of desire terms,  $r(31) = .343, p = .05$ . No other significant associations were found between CLASS dimension scores and rates of use of mental state talk. For CLASS domain scores, a significant association was found between the domain score of Emotional Support and teachers' use of emotion terms,  $r(31) = 0.438, p = .012$ ; overall, teachers in classrooms rated higher overall in Emotional Support had a higher rate of emotion terms used per minute (see Table 12).

## CHAPTER VII

### DISCUSSION

The goal of the current study was to examine teachers' use of mental state talk, including the use of specific categories of mental state talk (i.e. emotion terms, cognition terms, desire terms, and perception terms). The associations between mental state talk and teacher characteristics, classroom activity contexts, and classroom quality were also examined. The findings show that teachers use varying rates of mental state talk in Head Start classrooms, and use of each category of mental state talk differs in relation to various classroom contextual factors, including teacher characteristics and classroom quality.

Because few studies have examined mental state talk use in early childhood education classrooms, the first goal of the current study was to assess which categories of mental state talk were most often expressed in Head Start Classrooms. Surprisingly, perception terms were expressed most frequently by teachers. This result was predominately driven by teachers' common use of the word "look" to guide children's visual attention during teacher-child interactions; for example, teachers said things like, "look at this book" and "see this picture?" frequently. This finding is of interest because the results of Slaughter et al. (2008) suggest that caregivers' references to perceptual states may facilitate the development of attention in early life, however, the importance

of perception terms may decrease with children's age; therefore, the high use of perception terms in these prekindergarten classrooms may not be facilitating children's development of attention. As hypothesized, desire terms (such as "want") were used more than cognition terms and emotion terms. The most striking finding from the first research question is that emotion terms (such as "happy", "angry", "frustrated") were used at the lowest rate, indicating that teachers may not be spending time discussing emotions and facilitating the expression of emotions in classrooms. This finding is important, as children in this age group are increasing their labeling of emotions and understanding of emotions (Denham & Couchoud, 1990; Ridgeway, Waters, & Kuczaj, 1985). Previous research has shown that teachers are able to facilitate children's emotion identification and emotion understanding through discussions of emotions in preschool classrooms (Ahn, 2005); therefore, teachers have significant roles in supporting children's emotional development. Additionally, teacher support of emotion development in classrooms is salient to children's development because children's emotion knowledge in preschool is associated with children's later school adjustment (Denham et al., 2012) and school competence (Garner & Waajid, 2008). Emotion knowledge is particularly important in prekindergarten classrooms, as research suggests that children's emotion knowledge is also associated with increases in prosocial behavior and decreases in levels of physical aggression with peers in preschool settings (Garner et al., 2008).

The second goal of the current study was to examine how sentence types, mental state referents, activity settings and the number of children interacting with teachers are

associated with teachers' expression of mental state talk, both for overall use as well as use of different categories. Frequencies of teachers' overall mental state talk suggest that teachers most often use mental state talk within statements; referencing children's mental states; in freeplay/center contexts; and around small groups of children. The hypothesis that teachers would most often use mental state talk within questions was not supported. This lack of support could be associated to the use of more statements by teachers in their overall speech. The overall frequencies of mental state talk use did not control for the total number of different types of statements used or the length of time teachers spent in each context (i.e. mental state talk may be used more during center time in this sample because teachers spent the most time in centers). The most notable findings from the second research question are between-category findings (as discussed below) because these results did take into account the frequency of occurrence within each factor; as hypothesized, teachers' use of mental state talk differed across sentence types, referents, activity contexts, and numbers of children interacting with teachers, depending on the category of mental state talk.

For sentence type, interesting differences between categories of mental state talk were found. Cognition terms and emotion terms were more likely to be used within statements than within questions, directives, or prompting questions. These results suggest that teachers most often describe thoughts and feelings in terms of observational statements such as "You forgot to hang up your coat" or "I love that drawing you made" rather than using them to facilitate children's discussions of their own thinking and emotions or questioning children about how they are feeling and thinking. Desire terms

were most often used in questions, indicating that teachers often ask about children's wants or needs in the classroom, perhaps indicating a strong focus on choice and child-directedness in these classrooms. For example, teachers often used desire terms in questions such as, "do you want to go to blocks or to dramatic play?" Perception terms were most likely used within directives, in instances such as "look at that tower your friends made" to direct children's attention. Given the low incidence of prompting questions, no significant differences were found among the frequencies of use of different categories of mental state talk within this sentence type. As hypothesized, there were differences in use of categories of mental state talk across sentence types; this finding suggests teachers use categories of mental state talk to accomplish a variety of goals within their verbal interactions with children in the classroom.

As hypothesized, teachers' use of mental state talk in reference to mental states differed by the category of mental state talk. When examining the referent of mental states, teachers were most likely to use cognition terms, perception terms, and desire terms in reference to children's mental states; however, teachers' were most likely to use emotion terms to refer to their own mental states. These results indicate that teachers most often use mental state terms in reference to children's mental states with the exception of reference to emotions, for which teachers are more likely to refer to their own emotions rather than children's emotions. This result, coupled with the finding that emotion terms are the least often used category of mental state talk, suggests that teachers are least likely to discuss children's emotions using emotion terms than any other category of mental state talk in the classroom. Classrooms are contexts in which teachers

have the opportunity to facilitate children's labeling of emotion states (Pianta, 1998), and children's identification of emotions is suggested to facilitate later academic and social skills (Denham et al., 2012; Mashburn et al., 2008); therefore, this finding is noteworthy. Although no research to date has examined direct effects of teachers' use of emotion mental state talk on child outcomes, parental mental state literature documents positive associations between parents' expression of emotion terms and child expression of emotion terms (Jenkins et al., 2003), children's emotion situation knowledge, and prosocial behavior (Garner et al., 2008). Consequently, teachers' lack of discussion of children's emotions in this sample is potentially problematic for children's development of emotion understanding. However, this study found that teachers used mental state talk most often to discuss children's cognitions, desires, and perceptions, indicating that teachers do utilize mental state talk in reference to children's mental states. This finding is important because teachers' references to children's cognitions and desires may facilitate children's understanding of mental states, theory of mind, and social understanding, as seen in parenting literature (Adrian et al., 200; Ensor & Hughes, 2008; Symons et al., 2006).

As expected, differences in teachers' mental state talk emerged when expression of different categories of mental state talk were compared by activity context. Teachers were more likely to use emotion terms in freeplay/center contexts than during transitions, meal times, or small group instructional settings. It is noteworthy, however, that teachers were more likely to use emotion terms during meal times than in routines, transitions, and small group instructional settings, suggesting that meal times were potentially times to

have unplanned conversations around feelings and likes or dislikes. Teachers were more likely to express cognition terms during freeplay/center contexts than during small or whole group instructional contexts, suggesting that teachers discuss cognitions more during non-planned and more child-guided activities than during planned instructions. This finding may indicate that teachers expand upon children's thinking during child-guided activities, which is an important practice in classrooms because teachers' promotions of children's thinking can help children build positive attitudes about thinking and can develop children's critical thinking skills (Salmon, 2008). Desire terms were more likely to be expressed in routines and transitions than in small or whole group instructional settings. This finding indicates that teachers may discuss children's wants and needs when letting children choose how to clean up or wash their hands (during routines) and allowing children to choose the activities in which they want to participate (during transitions). The discussion of children's desires during routines and transitions could potentially make these classroom activities positive experiences for children by helping children acknowledge their desires for specific activities and giving children the ability to guide their own behavior. Teachers were more likely to express perception terms in whole group instructional settings than in small group instructional settings, indicating that teachers use this category of mental state talk more around large groups of children than small groups of children in designated instructional settings, again perhaps pointing to the heavy reliance on "look" to guide children's attention. When comparing the likelihood of each category of mental state talk in each activity context, emotion terms were the only category of terms that were more likely in meal times than in other

activity contexts, cognition terms were the only category of terms that were more likely to occur within small group instructional settings than other activity contexts, and desire terms and perception terms were the only categories of terms that were more likely in routines than other activity contexts. These variations underscore the nuanced differences between teachers' expression of categories of mental state talk in classroom activities, potentially because different classroom activities necessitate the use of separate categories of mental state talk. Previous research has also found variations in other types of teacher talk depending on classroom activities (Dickinson et al., 2008; Gest et al., 2006).

The number of children interacting with the teacher was also a factor in teachers' use of mental state talk. Although the rate of emotion term use and the rate of desire term use were similar within one-on-one, small group, and large group interactions, the rates of cognition terms and perception terms differed depending upon the number of children interacting with the teacher at the time of speech. Teachers were similarly likely to use cognition terms with large groups of children and with small groups of children; however, teachers were more likely to use cognition terms within large groups than within one-on-one interactions, indicating that teachers discuss thoughts more on a collective level than with just one individual child. This finding may be because teachers often plan large group instructional activities, and teachers may be more purposeful in their discussions of thoughts during planned activities than during spontaneous one-on-one teacher-child interactions. Moreover, teachers were more likely to use perception terms within small groups than within one-on-one interactions, suggesting that teachers

use orienting perception terms more during interactions with multiple children than with one child, potentially to orient children's attention in when in groups.

As hypothesized, teacher characteristics influenced teachers' use of mental state talk. In a model of systems theory extended to classroom contexts, Pianta (1998) argues that teachers bring their own characteristics and their own experiences to teacher-child interactions; therefore, the associations found between teacher characteristics and teachers' mental state talk in teacher-child interactions are noteworthy. Specifically, teachers with more years of teaching experience expressed less perception terms than teachers with less teaching experience. This finding may be because terms like "look" and "watch" were used quite frequently as directives in classrooms, and it is possible that teachers with more teaching experience use other methods to focus children's attention. However, teachers' with more years of teaching experience were not more or less likely to use any other type of mental state talk compared to teachers with less years of teaching experience, indicating that teaching experience may not be associated with expression of mental state talk for all categories. Teachers' behavior management strategies (such as focusing attention) may change with experience in classrooms; through teaching experience, teachers may gain strategies beyond verbal directives to orient and capture children's attention. However, the amounts that teachers use cognition, emotion, and desire terms are potentially more associated with teachers' perceptions about children (such as teachers' acknowledgement of children's perspectives) than with teachers' years of teaching experience; teachers may gain new behavior management strategies through

experience, but teachers may not develop a greater understanding or appreciation of children's thoughts, feelings, and wants as they gain more experience.

The current study hypothesized that teachers who were members of NAEYC would use more overall mental state talk; however, the results indicate that teachers' membership in NAEYC was related to teachers' overall mental state talk at the trend level, and membership more significantly related to teachers' use of specific categories of mental state talk. Teachers who were members of NAEYC used significantly more emotion terms and cognition terms than teachers who were not members of NAEYC. Membership in NAEYC may indicate that teachers are involved in professional development; therefore, this finding may suggest that teachers who are able to access professional development and choose to access professional development may have had opportunities to learn and develop teaching strategies around children's emotions and cognitions more than teachers who do not have access to professional development. Additionally, the trend-level finding that teachers who were members of NAEYC used more overall mental state talk suggests that teachers' professional development may increase teachers' use of mental state talk.

Teachers' use of all categories of mental state talk, except emotion terms, were similar across teachers planning to be career early childhood educators and teachers who were not planning to be career early childhood educators; this finding was not expected. Teachers who indicated plans to be career early childhood educators used fewer emotion terms than teachers who were not planning on careers as early childhood educators. Teachers' career plans may not reflect the mechanism that stimulates teachers to use

various categories of mental state talk, and may not be reflective of teachers' values of children's perspectives; therefore, there could be other underlying teacher characteristics, not included in the current study, for why teachers who plan to be career early childhood educators use less emotion terms than teachers who do not plan such careers.

The null findings in regard to teacher characteristics are interesting to note; teacher education level was not related to teacher use of mental state talk. This finding could potentially be because of limited educational variability within this sample. However, previous research has also failed to find a relationship between teachers' education and teachers' expression of mental state talk (Degotardi & Sweller, 2012; Frampton et al., 2009), indicating that the use of mental state talk could potentially be less directly related to education and more related to teachers' professional development, the quality of teacher child-interactions, or through other teacher characteristics not included in the current study, such as teachers' SES. It is possible that teacher-child interaction quality is based more upon teachers' perceptions (such as teachers' acknowledgement of children's perspectives) than knowledge gained through formal education, thereby supporting a possible greater effect of teacher perceptions of children on teachers' use of mental state talk. For example, the results of Pianta, Howes, Burchinal, Bryant, Clifford, Early, and Barbarin (2005) suggest that teachers' who had more adult-centered perspectives about interactions with children were rated lower in CLASS measures of Instructional Support when controlling for teacher education, indicating that teachers' acknowledgement of children's perspectives may play a unique role in teacher-child interactions over and above education level. Consequently,

teachers' acknowledgement of children's perspectives may be more salient than teachers' education in predicting teachers' use of mental state talk. Professional development may facilitate teachers' perceptions of child development and children's perspectives, possibly affecting teachers' use of mental state talk. Additionally, there are mixed findings in the literature regarding the effects of teacher education level on children's academic skills (Early et al., 2007); therefore teachers' education level may not be directly related to teachers' mental state talk.

As expected, observed classroom quality was associated with teachers' use of mental state talk. Teachers' rates of use of emotion terms were related to ratings of classrooms' Regard for Student Perspectives, Positive Climate, and Teacher Sensitivity. The Regard for Student Perspectives, Positive Climate, and Teacher Sensitivity dimensions are all within the overarching domain of Emotional Support, which was significantly related to teachers' rate of emotion terms. As hypothesized, these results suggest that teachers who use more emotion terms in their interactions with children are also in classrooms which are rated as more emotionally supportive. Emotional support is significant in classrooms because research suggests that teachers' emotional support is related to children's social competence in prekindergarten classrooms (Curby et al., 2009; Mashburn et al., 2008) and emotional support facilitates lower levels of aggression and higher levels of behavioral control (Merrit, Wanless, Rimm-Kaufman, Cameron, & Peugh, 2012). The trend-level finding of the association between teachers' emotion terms and Teacher Sensitivity is supported by the results of McElwain et al. (2011); their findings suggest that caregiver sensitivity is associated with expression of mental state

talk. However, McElwain et al. found an association between maternal expression of cognition talk and maternal sensitivity, and the current study suggests a relationship between teachers' expression of emotion talk and teachers' sensitivity. It is possible, given the differences in associations between cognition and emotion talk and caregivers sensitivity, that distinct categories of mental state talk are related to sensitivity differently depending upon the caregiver (i.e. parents or teachers). Additionally, Degotardi and Sweller (2012) found a similar association between teachers' sensitivity levels and teachers' mind-minded talk. Burchinal et al. (2008) underscore the importance of teacher sensitivity in classrooms, as teacher sensitivity in prekindergarten classrooms is related to children's language and social skills in kindergarten. It is possible that teachers' use of emotion terms in reference to children's emotions may be a mediating factor in the relationship between teachers' sensitivity in prekindergarten and children's social skills in kindergarten; teachers' may be facilitating emotion knowledge that is important in social interactions later in life.

Furthermore, teachers' rates of use of desire terms were associated with ratings of Positive Climate in the classroom, indicating that teachers that facilitate warm and emotional connections with children in the classroom discuss children's wants more than those who do not create emotional connections. Teachers' rates of cognition terms were not associated with any CLASS dimension score under the Instructional Support domain. Particularly, it could be expected for teachers' rates of cognition terms to be associated with scores within Concept Development; however, this association was not found. It is possible that teachers do not outwardly express cognition terms when facilitating higher

thinking skills; teachers may set up activities to facilitate higher order thinking without teachers' explicit use of cognition terms. It is also conceivable that teachers' use of cognition terms may be facilitating other types of cognitive development, such as the understanding of the existence of mental states, which are not captured by the CLASS. For instance, research suggests that mothers' use of cognition terms is related to children's later understanding of mental states (Adrian et al., 2007), indicating that cognition terms may not be explicitly used when facilitating higher thinking skills, but cognition terms may be used when helping children understand that others have thoughts and beliefs separate from their own.

#### *Limitations and Future Directions for Research*

Although the current study is the first to detail the use of specific categories of mental state talk in Head Start classrooms, this study is not without limitations. The current study did not account for the appropriateness or intent of teachers' use of mental state talk; for example, teachers' speech would be coded as mental state talk if a teacher said "do you want the apples?" in a positive tone, and if a teacher said "do you want to go to time out?" in a negative tone. The current study did not assess child characteristics (such as temperament) or child behaviors (such as non-compliance) that may affect teachers' use of mental state talk in classrooms; therefore, this study cannot account for child-specific factors that influence teachers use of mental state talk. Because teacher-child interactions are bidirectional, future research should examine child factors that affect teachers' use of mental state talk in classrooms. Children's responses were not coded in this study, limiting the conclusions that can be drawn regarding the relationship

between teacher use of mental state talk and children's language expression or children's general language abilities. Future research should examine the bidirectional relationship between teachers' mental state talk and children's mental state talk in classrooms. Additionally, expressions of mental states are influenced by cultural socialization practices, especially in terms of emotion expression (Bugental & Grusec, 2006; Cole & Tan, 2007). The current study, however, did not have the cultural or ethnic variability needed to assess the influence of culture or ethnicity on teachers' use of mental state talk, as the sample of this study was primarily teachers who identified as African American. Although the role of teacher ethnicity has not been studied in regard to teachers' use of mental state talk, research suggests that parents' ethnicity may affect emotion socialization, which could affect how mental states are discussed. African American mothers of 5-year-old children rated their children's expression of negative emotions as less acceptable than European American mothers (Nelson, Leerkes, O'Brien, Calkins, & Marcovitch, 2012), and African American mothers rated the expression of sadness in particular as less appropriate than European American mother's ratings (Matsumoto, 1993). These findings suggest that African American caregivers may discourage children's expression of negative emotions, which may affect caregivers' use of mental state talk about specific emotions. Future research should examine how teachers' and children's ethnic and cultural backgrounds, specifically culture-specific emotion socialization practices, may affect use of mental state talk in classrooms.

When examining how teachers express mental state talk in terms of sentence type, referent, activity context, and number of children, the current study assessed each code

separately. For example, although the current study found that teachers are most likely to refer to their own emotions rather than children's emotions, this study did not examine this relationship in regard to any of the other contexts discussed in research question two; thus, this study does not assess if this relationship may change based on sentence type, activity context, or the number of children interacting with the teacher. Future research may be able to answer these questions by searching for interactions between these variables. Furthermore, the current study only coded teacher speech when the utterance included a mental state term, and therefore did not account for the overall occurrence of types of sentences used or the time spent in the various activity contexts within these classrooms.

The current study could not collect data regarding child outcomes of teachers' use of mental state talk. Although the parental mental state talk literature indicates that parental expression of mental state talk facilitates children's understanding of mental states (Adrian et al., 2007), theory of mind development (Ruffman et al., 2006), emotion understanding (Taumoepeau & Ruffman, 2008), and social abilities (Ensor & Hughes, 2008), research has yet to examine the specific effects of teachers' use of mental state talk on child outcomes. It is possible that teachers' mental state talk may help children develop different skills than parental mental state talk. For example, the current study suggests a relationship between teachers' expression of emotion talk and teachers' sensitivity; however, McElwain et al. (2011) suggest a relationship between mothers' cognition talk and mothers' sensitivity. This difference in the relationships between sensitivity and mental state talk indicates a possible distinction between mothers' and

teachers' expressions of various categories of mental state talk. Moreover, the current study suggests that teachers use emotion terms least compared to all other categories of mental state talk in classrooms. Because the parental mental state talk literature indicates associations between parents' expression of emotion terms and child expression of emotion terms (Jenkins et al., 2003), children's emotion situation knowledge, and prosocial behavior (Garner et al., 2008), future research should examine the specific effects of teachers' use of emotion terms in classrooms. Research suggests that parents' elicitations of children's talk about emotions may be more influential in prosocial development than children's mere exposure to emotion terms (Brownell et al., 2013); therefore, future research should attempt to differentiate between teachers' labeling of emotion terms and teachers' active facilitations of children's understanding of emotion terms. The low rate of emotion term use in the current study could be problematic to children's development in these classrooms if future research finds similar positive associations between teachers' emotion talk and child outcomes as seen in parental mental state talk literature. Research should seek to understand the varying effects of teachers' use of mental state talk on children in classroom settings.

Finally, the coding manual used for the current study was adapted from other coding manuals, including those used to assess parental mental state talk. The manual should be further explored by reexamining the terms coded within each mental state talk category. Additionally, the coding manual should be used in future research to further assess its validity in coding teacher-child interactions.

### *Contributions of the Study*

The current study adds to the current teacher mental state talk literature by examining a detailed account of four categories of mental state talk (emotion terms, cognition terms, desire terms, and perception terms) in approximately one-hour-long teacher–child interactions, and accounting for teacher and classroom characteristics. The current study is likely to be the first to use approximately hour-long continuous observations of teacher–child interactions in the study of mental state talk. The length of observation allowed for this study to examine teachers in more detail than available in snapshots or shorter observations. Moreover, this length of observation allowed for the examination of various activity contexts in which teachers and children interact. An additional strength of this study is the use of video recordings that permitted the recording of all audible teacher utterances and allowed for the capture of contextual factors such as activity contexts and the number of children interacting with teachers.

This study also separated the use of four categories of mental state talk, emotion terms, cognition terms, desire terms, and perception terms. Although no associations were found between teacher characteristics or classroom quality and rates of overall mental state talk (aside from the trend-level relationship between NAEYC membership and overall mental state talk), associations between teacher characteristics and classroom quality and specific categories of mental state talk were found, underscoring the importance of separating categories of mental state talk for analysis. Recent research regarding teachers' mental state talk in early childhood education classrooms have primarily used composite measures of mental state talk (Degotardi & Sweller, 2012;

Frampton et al., 2009); the current study is the first of its kind to assess associations among four separate categories of mental state talk in early childhood education classrooms. The current study also examined teachers' use of mental state talk in detail, comparing teachers' use of four categories of mental state talk across sentence types, mental state referents, and activity contexts. This detailed analysis of teachers' use of categories of mental state talk allows for a clearer understanding of how teachers use different categories of mental state talk in classrooms.

The current study assessed the relationship between teachers' mental state talk and a variety of teacher characteristics in order to examine the effects of teacher experiences on teachers' expression of mental state talk. Although recent research examines teachers' education level in relation to teachers' mental state talk, the current teacher mental state talk literature had not yet assessed the association between teachers' years of experience teaching, professional organization membership, or career plans until the current study. The findings from this study suggest that there is a possible association between teachers' professional development and teachers' use of mental state talk.

Furthermore, the current study is the first to assess the use of four categories of mental state talk in relation to classroom quality using the CLASS. The findings from this study related to the CLASS underscore the role that teachers' use of mental state talk, specifically the use of emotion terms and desire terms, may play in creating emotionally supportive classroom environments that value children's autonomy and children's perspectives. Although previous studies have examined teachers' sensitivity and interaction styles and mental state talk (Degotardi & Sweller, 2012; Frampton et al.,

2009), the current study was able to examine more specific aspects of teacher–child interactions through the use of the CLASS.

### *Implications*

Although the current study cannot address child outcomes associated with teachers’ expression of mental state talk, the finding that teachers’ use of emotion terms was associated with teachers’ levels of Emotional Support indicates that teachers in classrooms with higher levels of emotion terms also create more emotionally supportive environments. Teachers who used more emotion terms were in classrooms rated higher on their Regard for Student Perspectives, indicating that teachers who emphasize children’s points of view are more likely to use emotion terms in their interactions with children. This has implications regarding pre-service teacher development and teacher professional development. The results of the current study highlight that teacher professional development may be an influential pathway to support teachers’ use of mental state talk. Teacher preparation programs and professional development programs could facilitate teachers’ acknowledgements of children’s perspectives in order to increase teachers’ discussion of mental states in classrooms, potentially leading to similar child outcomes as seen in the parental mental state talk literature. Through professional development, teachers may gather information and strategies to be mindful of the language they use with children and the potential effects language can have on children’s development. Research has not yet shown that teachers’ use of mental state talk improves child outcomes, however, the current study does suggest that teacher–child interaction quality is associated with teachers’ use of mental state talk. There is research

that supports the relationship between teacher–child interaction quality and child development (Curby et al., 2009; Mashburn et al., 2008); therefore, it is plausible that teachers’ use of mental state talk may facilitate positive child outcomes. Future research which includes measures of child outcomes associated with teachers’ expression of mental state talk may capture the specific categories of mental state talk that predict child development; thus, these categories could be the focus of professional development.

Teachers’ use of mental state talk is a small but important portion of teachers’ language use in classrooms. Teachers’ use of language within teacher–child interactions is important to children’s development because teacher–child interactions are contexts in which teachers use external words as symbols to represent internal feelings and mental states. Vygotsky argues that external speech heard by children is translated into children’s internal speech which organizes thoughts; therefore, there is a connection between language development and thinking development in children (Vygotsky, 1978). Teachers’ use of language in classrooms is particularly of interest because research suggests that teachers’ language in classrooms is related to teachers’ sensitivity (Gest et al., 2006), which is related to children’s language and social skills (Burchinal et al., 2008). Although teachers’ use of mental state talk is a small facet of all teacher language used in the classroom, it is particularly important to study because it could potentially relate to similar child outcomes supported by both the literature around teacher–child interactions and parental mental state talk.

In sum, the current study demonstrates that teachers express mental state talk in Head Start classrooms, and teachers’ use of mental state talk can vary depending on

teacher characteristics, classroom activity contexts, and classroom quality. Because teacher–child interactions can have positive effects on children’s development (Burchinal et al., 2008; Curby et al., 2009), and research on parental mental state talk indicates positive child outcomes associated with mental state talk, future research should examine child outcomes associated with teachers’ expression of mental state talk in classrooms. The current study is a first step to understanding teacher talk in early childhood classrooms, specifically focusing on how teachers express mental state talk in prekindergarten classrooms. Because the current study has found preliminary indications of a relationship between teachers’ expression of mental state talk and classroom quality, particularly teachers’ use of emotion terms and teachers’ emotional support, further research regarding the effects of teachers’ expression of mental state talk is merited.

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APPENDIX A

TABLES

Table 1. Overall Rates of Mental State Talk Terms per Minute and Comparisons Between Categories of Terms

	Mean Rate (terms/minute) (SD)	Range (terms/minute)	Comparisons between Type of Term	Significance
Overall MST	2.313 (0.908)	0.742 – 4.248		
Perception Terms	0.803 (0.346)	0.130 – 1.628	P > D P > C P > E	t = 2.839, p = .008** t = 3.351, p = .002** t = 8.637, p = .000***
Desire Terms	0.636 (.317)	0.148 – 1.487	D ≈ C D > E	t = .915, p = .367 t = 6.545, p = .000***
Cognition Terms	0.585 (0.336)	0.126 – 1.704	C > E	t = 5.009, p = .000***
Emotion Terms	0.289 (0.219)	0.016 – 0.957		

Note: N = 34, \*\*p < .01, \*\*\*p < .001

Table 2. Frequency of use of Categories of Terms by Sentence Type Crosstabulation

Category		Type				Total Counts
		Statement	Question	Directive	Prompting Question	
Cognition Term	Count (Expected Count)	562 <sub>a</sub> (420.3)	413 <sub>b</sub> (392.6)	112 <sub>c</sub> (261.8)	2 <sub>c</sub> (14.2)	1089
Emotion Term	Count (Expected Count)	327 <sub>a</sub> (194.1)	154 <sub>b</sub> (181.4)	22 <sub>c</sub> (120.9)	0 <sub>b, c</sub> (6.6)	503
Perception Term	Count (Expected Count)	449 <sub>a</sub> (557.3)	274 <sub>b</sub> (520.6)	713 <sub>c</sub> (347.2)	8 <sub>a, b</sub> (18.9)	1444
Desire Term	Count (Expected Count)	288 <sub>a</sub> (454.3)	678 <sub>b</sub> (424.4)	166 <sub>a</sub> (283.0)	45 <sub>c</sub> (15.4)	1177
Total Counts		1626	1519	1013	55	4213

*Note:* Each subscript letter denotes significance across mental state talk category (denoted in rows) by sentence type (shown in columns). If a category of mental state talk differs at the .05 level when comparing its use in different sentence types, each cell will have different subscript letters. For example, the use of cognition terms differs when comparing cognition term use in statements to cognition term use in questions because each of the two cells have different subscript letters; however, the use of cognition terms in directives and prompting questions are not significantly different at the .05 level, due to an overlap of the same subscript letter in both cells.

Table 3. Frequency of use of Categories of Terms by Referent Crosstabulation

Category		Referent				Total Counts
		Self (Teacher)	Child(ren)	Other Adult	Inanimate/NonPresent	
Cognition Term	Count	460 <sub>a</sub>	624 <sub>b</sub>	2 <sub>a, b, c</sub>	3 <sub>c</sub>	1089
	(Expected Count)	(344.3)	(718.6)	(2.8)	(23.3)	
Emotion Term	Count	239 <sub>a</sub>	206 <sub>b</sub>	2 <sub>a, b</sub>	56 <sub>c</sub>	503
	(Expected Count)	(159.0)	(331.9)	(1.3)	(10.7)	
Perception Term	Count	369 <sub>a</sub>	1048 <sub>b</sub>	6 <sub>a, b</sub>	21 <sub>a</sub>	1444
	(Expected Count)	(456.5)	(952.8)	(3.8)	(30.8)	
Desire Term	Count	264 <sub>a</sub>	902 <sub>b</sub>	1 <sub>a, b</sub>	10 <sub>a</sub>	1177
	(Expected Count)	(372.1)	(776.7)	(3.1)	(25.1)	
Total Counts		1332	2780	11	90	4213

*Note:* Each subscript letter denotes significance across mental state talk category (denoted in rows) by referent (shown in columns). If a category of mental state talk differs at the .05 level when comparing the referent of its use, each cell will have different subscript letters. For example, the use of cognition terms differs when comparing cognition term use in reference to self to cognition term use in reference to children, because each of the two cells have different subscript letters; however, the use of cognition terms in reference to self and the use of cognition terms in reference to other adult are not significantly different at the .05 level, due to an overlap of the same subscript letter in both cells.

Table 4. Frequency of use of Categories of Terms by Activity Context Crosstabulation

Category		Activity Context							Total Counts
		Routine	Centers	Transition	Meal	WholeGroup	SmallGroup	NonChild	
Cognition Term	Count	65 <sub>a, b, c, d</sub>	664 <sub>c, d</sub>	55 <sub>b, d</sub>	51 <sub>a, b, c, d</sub>	149 <sub>a</sub>	100 <sub>e</sub>	5 <sub>a, b, c, d, e</sub>	1089
	(Expected Count)	(65.7)	(719.4)	(81.7)	(49.6)	(124.3)	(45.5)	(2.8)	
Emotion Term	Count	18 <sub>a, b, c, d</sub>	372 <sub>c, d</sub>	15 <sub>a, b</sub>	45 <sub>e</sub>	50 <sub>b, d</sub>	2 <sub>a</sub>	1 <sub>a, b, c, d, e</sub>	503
	(Expected Count)	(30.3)	(332.3)	(37.7)	(22.9)	(57.4)	(21.0)	(1.3)	
Perception Term	Count	88 <sub>a, b, c, d, e</sub>	965 <sub>d, e</sub>	63 <sub>f</sub>	60 <sub>c, e, f</sub>	214 <sub>b</sub>	52 <sub>a, c, d, e, f</sub>	2 <sub>a, b, c, d, e, f</sub>	1444
	(Expected Count)	(87.1)	(953.9)	(108.3)	(65.8)	(164.9)	(60.3)	(3.8)	
Desire Term	Count	83 <sub>a</sub>	782 <sub>a, b</sub>	183 <sub>c</sub>	36 <sub>b, d</sub>	68 <sub>d</sub>	22 <sub>d</sub>	3 <sub>a, b, c, d</sub>	1177
	(Expected Count)	(71.0)	(777.5)	(88.3)	(53.6)	(134.4)	(49.2)	(3.1)	
Total Counts		254	2783	316	192	481	176	11	4213

*Note:* Each subscript letter denotes significance across mental state talk category (denoted in rows) by activity context (shown in columns). If a category of mental state talk differs at the .05 level when comparing its use in different activity contexts, each cell will have different subscript letters. For example, the use of cognition terms differs when comparing cognition term use in whole group instructional settings to cognition term use in small group instructional settings, because each of the two cells have different subscript letters; however, the use of cognition terms in small group instructional settings and in non-child engagements are not significantly different at the .05 level, due to an overlap of the same subscript letter in both cells.

Table 5. Frequency of use of Categories of Terms by Number of Children Crosstabulation

Category		# of Children			
		One on One	Two to Four	Five or More	Total Counts
Cognition Term	Count	76 <sub>a</sub>	668 <sub>a, b</sub>	345 <sub>b</sub>	1089
	(Expected Count)	(90.2)	(688.1)	(310.7)	
Emotion Term	Count	35 <sub>a</sub>	344 <sub>a</sub>	124 <sub>a</sub>	503
	(Expected Count)	(41.7)	(317.8)	(143.5)	
Perception Term	Count	139 <sub>a</sub>	883 <sub>b</sub>	422 <sub>a, b</sub>	1444
	(Expected Count)	(119.6)	(912.4)	(412.0)	
Desire Term	Count	99 <sub>a</sub>	767 <sub>a</sub>	311 <sub>a</sub>	1177
	(Expected Count)	(97.5)	(743.7)	(335.8)	
Total Counts		349	2662	1202	4213

*Note:* Each subscript letter denotes significance across mental state talk category (denoted in rows) by number of children (shown in columns). If a category of mental state talk differs at the .05 level when comparing its use in interactions with different numbers of children, each cell will have different subscript letters. For example, the use of cognition terms differs when comparing cognition term use in one-on-one interactions and cognition term use with five or more children, because each of the two cells have different subscript letters; however, the use of cognition terms in one-one-one interactions and interactions with two to four children are not significantly different at the .05 level, due to an overlap of the same subscript letter in both cells.

Table 6. Central Comparisons from Research Question Two

Category	Research Question			
	Sentence Type	Referent	Activity Context	Number of Children
Overall Frequency	Statements	Children's	Freeplay/Centers	Small Group
Cognition Terms	Statements > All	Children's > Teachers'	Centers > Whole & Small Instructional	Large > One-on-One
Emotion Terms	Statements > All	Teachers' > Children's	Meals > Small Instructional	Similar Across All
Perception Terms	Directives > All	Children's > Teachers	Whole Instructional > Small	Small > One-on-One
Desire Terms	Questions > All	Children's > Teachers	Transitions > Whole & Small Instructional	Similar Across All

*Note:* All comparisons are significant at the .05 level.

Table 7. Correlations Between Rates of Mental State Talk Terms and Years of Teaching Experience

	Years as lead teacher (n = 27)	Years teaching Head Start or Early Head Start (n = 27)
Overall MST	-.221	-.368
Cognition terms	-.112	-.150
Emotion Terms	-.032	-.068
Perception Terms	-.173	-.412*
Desire Terms	-.288	-.369

\*p < .05

Table 8. Comparisons of Rates of Mental State Talk and Education Level

	Associates Degree (n = 4)		Bachelor's Degree (n = 16)		Some Graduate School (n = 4)		Graduate Degree (n = 4)		F	Sig
	M	SD	M	SD	M	SD	M	SD		
Overall MST	1.765	.931	2.456	.967	1.954	.619	2.654	.463	1.089	.373
Cognition Terms	.358	.187	.644	.383	.515	.168	.642	.215	.932	.440
Emotion Terms	.346	.265	.258	.197	.208	.117	.449	.371	1.009	.406
Perception Terms	.638	.396	.857	.342	.556	.244	.950	.254	1.494	.242
Desire Terms	.424	.184	.697	.359	.675	.412	.643	.065	.774	.520

\*p < .05

Table 9. Comparisons of Rates of Mental State Talk and Major Field of Study

	Early Childhood (n = 17)		Other (n = 9)		t	Sig
	M	SD	M	SD		
Overall MST	2.296	.896	2.392	.862	.262	.796
Cognition Terms	.538	.245	.681	.423	1.100	.282
Emotion Terms	.292	.259	.280	.164	.131	.897
Perception Terms	.832	.335	.775	.382	.394	.697
Desire Terms	.634	.317	.656	.357	.159	.875

\*p < .05

Table 10. Comparisons of Rates of Mental State Talk Terms and Membership in a Professional Organization (NAEYC)

	Member (n = 12)		NonMember (n = 5)		t	Sig
	M	SD	M	SD		
Overall MST	2.745	.489	1.864	.886	2.070	.056
Cognition Terms	.707	.208	.405	.185	2.970*	.010
Emotion Terms	.423	.169	.155	.129	3.596**	.003
Perception Terms	.759	.272	.772	.378	.067	.947
Desire Terms	.856	.351	.533	.345	1.752	.100

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

Table 11. Comparisons of Rates of Mental State Talk and Teachers' View of Early Childhood as Long Term Career

	Career (n = 11)		Other Career (n = 6)		Undecided (n = 9)		F	Sig
	M	SD	M	SD	M	SD		
Overall MST	2.011	.861	2.850	.612	2.150	.944	2.016	.156
Cognition Terms	.554	.425	.703	.234	.484	.229	.807	.459
Emotion Terms	.207	.160	.500	.282	.225	.199	4.444*	.023
Perception Terms	.734	.333	.881	.234	.753	.423	.366	.697
Desire Terms	.516	.248	.766	.298	.687	.405	1.377	.272

\*p < .05

Table 12. Correlations of Rates of Mental State Talk and CLASS Dimension and Domain Scores

CLASS Dimension	Overall MST	Cognition Terms	Emotion Terms	Perception Terms	Desire Terms
Positive Climate (n = 33)	.234	.011	.353*	.066	.343*
Negative Climate (n = 33)	-.210	-.220	-.257	-.038	-.146
Teacher Sensitivity (n = 33)	.102	.058	.338	-.070	.073
Regard for Student Perspectives (n = 32)	.187	.114	.454**	-.077	.183
Behavior Management (n = 32)	-.010	.085	.189	-.115	-.126
Productivity (n = 33)	-.025	.105	.134	-.196	-.061
Instructional Learning (n = 33)	.056	.077	.171	-.100	.071
Concept Development (n = 33)	-.016	.071	-.109	-.052	.013
Quality of Feedback (n = 33)	.061	.031	-.075	.070	.117
Language Modeling (n = 33)	-.052	.000	-.095	-.121	.054
Emotional Support (n = 32)	.212	.102	.438*	-.038	.237
Classroom Organization (n = 32)	.059	.148	.217	.123	-.007
Instructional Support (n = 33)	-.003	.035	-.099	-.039	.067

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