FACTORS AFFECTING ADULT TALK IN THE INCLUSIVE CLASSROOM AND
THE SOCIALLY COMPETENT BEHAVIOR OF PRESCHOOLERS WITH
AUTISM SPECTRUM DISORDER

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ABSTRACT

DWIGHT W. IRVIN: Factors Affecting Adult Talk in the Inclusive Classroom and the
Socially Competent Behavior of Preschoolers with Autism Spectrum Disorder
(Under the direction of Brian A. Boyd)

Difficulty with social competence is a core deficit of autism spectrum disorder
(ASD). Research on typically developing children suggests the amount of adult talk they
are exposed to can positively affect their social competence. With growth in the number
of children with ASD entering the inclusive preschool classroom, there is a need to
understand how adult talk in this context influences their development of social
competence. This study aimed to determine: (1) the types and amounts of adult talk
children with ASD receive in the preschool classroom; (2) the relationship between child
characteristics (i.e., autism severity, language, cognitive ability and behavior) as well as
setting characteristics (i.e., adult-child ratio and activity area) and adult talk; and (3) the
link between adult talk and the socially competent behavior displayed by children with
ASD. The data for this study were drawn from a larger study comparing the efficacy of
comprehensive treatment models serving preschool-aged children with ASD. Children
(ages 3-5) with ASD who were enrolled in business-as-usual (BAU) (n= 23) or LEAP
(n= 43) inclusive preschool classrooms made up the sample. Preschoolers were
videotaped for roughly 30 minutes during normal center time activities. Videotapes were
coded post-hoc by observers naïve to the purposes of the study using adapted versions of
two coding schemes: Kontos' (1999) Teacher Talk classification and the Code for Active

Student Participation and Engagement-III. The results indicate that child (i.e., autism severity, cognitive ability) and setting (i.e., activity area) affected the types of talk children received. Further, preschoolers who received higher amounts of certain types of adult talk (e.g., supporting peer relations) had more concurrent displays of socially competent behavior. In examining children's social competence over time, it was found that higher amounts of supporting object play and positive social contacts talk positively affected certain indicators of children's social competence (e.g., social motivation), as reported by teachers. Alternatively, children who received large amounts of behavioral management talk at the beginning of the school year were perceived by teachers to have worsening social competence (e.g., social awareness) by the end of the year. Implications future research and practice are discussed.

DEDICATION

This one is for Bop-Bop.

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Chapter 1: Introduction

This chapter begins with an overview of autism spectrum disorder (ASD) and the importance of adult talk in the inclusive preschool classroom. The rationale for investigating factors affecting the adult talk children with ASD experience as well as any resulting socially competent behavior will then be discussed. Next, the purpose of the study and the specific research questions addressed are presented. The chapter concludes with the contribution this study will make to research, early childhood pedagogy and educational policy.

Autism spectrum disorder is characterized by deficits in communication and social interaction, in addition to the presence of restricted and repetitive behaviors (*DSM*; APA, 2000). Communication difficulties may include a delay or lack of development of spoken language and gestures as well as difficulty initiating or maintaining conversation and echolalia. Social impairments may be displayed by a lack of spontaneous sharing with others, a lack of social reciprocity and difficulties relating to others (APA, 2000). Restricted and repetitive behaviors (RRBs) may be exhibited in the form of repetitive use of objects (e.g., flipping eyelids on dolls), sensory differences (e.g., hyperresponsiveness), circumscribed interests, a strict adherence to routines and/or repetitive motor mannerisms (e.g., hand flapping) (Lord, & Bishop, 2010). For children with ASD attending preschool, these impairments are likely to interfere with the adoption of classroom behaviors that teachers may perceive as valued in an educational setting

(e.g., following directions, sharing) as well as immediate and sustained interactions with peers and adults (i.e., their social competence).

The prevalence of autism spectrum disorder is increasing at an alarming rate, with recent estimates suggesting that one out of 88 children will be diagnosed with the disorder by the age of 8 (Center for Disease Control, 2012). With this increase, it is perhaps not surprising that figures from the Department of Education suggest that by 2007 the number of preschool children with ASD receiving educational services under Individuals with Disabilities Act (IDEA), Part B had more than doubled since 2002 (Data Accountability Center, retrieved February 2011). Current research provides evidence that the type of preschool setting (i.e., an inclusive vs. self-contained classroom) affects child outcomes (Brown, Odom, McConnell, & Rathel, 2008; Odom, & Wolery, 2003). For instance, when children with disabilities are able to observe and interact with socially competent peers in the inclusive classroom, they may learn skills needed to more appropriately engage in social interactions (Brown et al., 2008; Garfinkle, & Schwartz 2002) and preschool activities (Bailey, McWillaim, Buysee, & Wesley, 1998). However, some research is mixed, as Rafferty, Piscitelli, and Boettcher (2003) found that children with severe disabilities demonstrated more socially competent behavior in an inclusive setting, but also exhibited more behavioral problems than in comparison to a self-contained setting. Nevertheless, Odom and colleagues (2004) reviewed studies taking place in an inclusive preschool setting, which were published between 1990 and 2002, and found largely positive results for children with ASD. Their findings suggest that children with ASD who attended an inclusive classroom demonstrated gains in peer imitation skills as well as social, language and cognitive skills.

With research supporting the benefits of an inclusive classroom (Odom, & Wolery, 2003; Tomalinson, & Hyson, 2009), it is perhaps not surprising that preschoolers with disabilities are spending more time in this setting (Carlson et al., 2008). Bricker (1995), however, warns that simply placing children with disabilities in a classroom with typically developing peers will not necessary facilitate meaningful inclusion. Instead, she urges adults to intentionally support children with disabilities' activity involvement as well as their interactions with typically developing peers and vice versa. For children with ASD, support from adults may be especially important since participation in certain preschool activities as well as actual interactions with adults and peers may be stilted or absent, both of which could negatively impact children's development of social competence. Research suggests that classroom strategies which support social competence that can be utilized during naturally occurring activities and routines, placing little burden on adults are more likely to be seen as acceptable by practitioners and, in turn, implemented (e.g., Schwartz, 2000). Increasing certain types of verbalizations (e.g., verbalizations designed to support children's play with objects) adults provide to young children with ASD that positively impact their social development would likely be considered a strategy that meets these qualifications.

Adult talk is often conceptualized as the type and frequency of verbalizations directed at students (Hestenes, Cassidy, & Niemeyer, 2004; Kontos, & Wilcox-Herzog, 1997). Extant research suggests that adult talk is related to typically developing children's development of social competence (Massey, 2004; Phillips, McCartney, & Scarr, 1987) as well as overall classroom quality (Burchinal et al. 2008; Pianta et al., 2005). Previous studies have suggested that adult-child ratio (Bronson, Hauser-Cram, &

Warfield, 1997), activity area (Kontos, 1999), and the type of setting (i.e., inclusive versus self-contained) (File, 1994) affect the adult talk children experience in classrooms. In addition, child characteristics, such as age (Girolametto, Weitzman, Leishout, & Duff, 2000b), extent of problem behavior (Dobbs, & Arnold, 2009), and disability type (Chow, & Kasari, 1999), have been identified as child factors that can influence the adult talk directed at young children.

With regard to the adult talk preschoolers with ASD experience, there are two studies that have explored this link. Dykstra and colleagues (in press), using objective child assessment measures and the Language Environment Analysis (LENA)[1] system, considered the relationship between characteristics of preschoolers with ASD (e.g., cognitive ability) and the frequency of adult words, child vocalizations, and child turns. Compared to an earlier study examining the language children with ASD receive in the home (see Warren et al., 2010), their results demonstrated that preschoolers received more adult input and had more conversational turns in the classroom. These findings may stem from the larger number of individuals a child can interact with in the early childhood setting and/or the focused interventions taking place at preschool. Further, these authors also found that students with more severe language and cognitive impairments received fewer adult words. Reszka (2010) accounted for the verbal and non-verbal input directed at children with ASD based on roughly 30-minute videos collected during center time activities in preschool classrooms. Adult behavior categories

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[1] The LENA system includes a digital language processor (DLP) and speech recognition software. The DLP records up to 16 hours of the natural audio environment. The software provides data about adult word counts, child vocalizations and child turns. This device has been shown to effectively capture the language and audio environment of children in the preschool setting (see McCauley, Esposito & Cook, 2011 for reliability estimates).

examined included adult support (e.g., directive statements, reminders), adult comment (e.g., questions about home life) and adult approval. The results indicated that adult support for children with ASD was present 30.5% of the time, but that the frequency of adult comments (1%) and approval (1.7%) were quite low. Further, Reszka reported that: 1) adult approval was the only behavior that resulted in increased social behavior among children with ASD toward adults; and 2) no form of adult behavior increased children's positive social behavior toward peers. Thus, there are some preliminary studies that provide information about the adult talk students with ASD experience in the preschool classroom and child characteristics that affect this input; however, additional research is needed to ensure these links are accurate.

Problem Statement

Studies suggest that adult talk affects both children's social competence as well as overall classroom quality and is influenced by a number of child and environmental factors. Researchers investigating adult talk and the factors that affect it have often relied on samples of typically developing children and/or those with various types of disabilities, some of which include children with ASD, to support their claims. There are a few studies that have used a sample of preschoolers with ASD to examine the adult talk these children experience (Dykstra et al., in press; Reszka, 2010), and of these investigations some limitations are apparent. The quality of adult talk (e.g., supporting peer relations vs. supporting object play) directed at children with ASD and how more specific types of talk impact their immediate social behavior remains unclear. In addition, the child characteristics (e.g., autism severity) and environmental factors (e.g., adult-child ratio, activity area) that may be related to certain types of adult talk were not fully

considered, since Dykstra and colleagues' study only examined the frequency of adult verbalizations. Lastly, the link between adult talk and changes in socially competent behavior over time was not an aim of either these two studies Therefore, whether the findings from previous studies hold true for children with ASD remains largely unknown, especially since the disorder's symptoms often result in interactions with others that are different in both quantity and quality.

The Significance of the Study

Knowledge about the adult talk children with ASD experience and their subsequent socially competent behavior will contribute to both research and practice. A better understanding of the link between adult talk and children's subsequent socially competent behavior could be used by researchers to create and refine existing interventions aimed at ameliorating social impairments. Knowledge of both children's everyday social behavior, as captured through real-time observational tools, and the classroom factors that influence the social development of children with ASD will be a product of this study, two areas cited as needing researchers' attention (see Charman, 2011). A better understanding of the amount and types of talk children with ASD experience could be used by researchers to build professional development tools to help practitioners: (a) reflect on the types of talk they currently use in the preschool classroom, which has shown to be an effective mechanism for improving teacher-student interactions (e.g., Rimm-Kauffman, Voorhees, Snell, & LaParo, 2002); and (2) then create a preschool language environment that potentially fosters social competence. Lastly, identifying and ensuring that children with ASD receive the adult talk needed to ameliorate social impairments may be lead to improvements in other core symptoms.

The findings of this study also have implications for two additional areas: educational policy and early childhood pedagogy. Information about child and environmental factors affecting adult talk could be used to advocate for educational policies that put quality standards into place to ensure children with ASD experience a stimulating preschool language environment. Incorporating the results of this study into early childhood education courses could help ensure pre-service teachers are better prepared to provide children with ASD with talk that supports social competence in the classroom. Taken together, the resulting research on adult talk and children with ASD may positively impact these children and the adults they interact with in the classroom.

Chapter 2: Literature Review

The purpose of this chapter is to provide a more in-depth discussion of young children's social competence as well as adult talk in the preschool classroom and the factors that can affect its occurrence. This chapter will be divided into five sections: (1) definitions and the importance of social competence as well as the characteristics of children with ASD that may affect peer and adult relations in the early childhood classroom; (2) adult talk in the preschool setting; (3) Bronfenbenner's bio-ecological model and its appropriateness for investigating the adult talk directed at children with ASD; (4) child characteristics and environmental features related to adult talk; and (5) a summary of the chapter as well as a restatement of the study's purpose and research questions.

Literature Review Parameters

This literature review has several parameters that must be noted. Studies included were located using the following databases: Academic Search Premier, EbscoHost, ERIC, PsychInfo and WilsonWeb. In addition, a search in Google scholar was conducted to identify studies that might have been missed in the electronic databases. Adult talk, teacher talk, autism, social competence, and young children are examples of keywords used to locate studies. Studies examining the adult talk experienced by young children both with and without disabilities in the classroom were included, since research on the verbalizations children with ASD receive is scant. The literature search captured studies

published between the years of 2001 and 2011. Reference lists from these studies and selected book chapters were hand-searched to locate additional relevant articles. Excluded studies were those that did not include at least one child between the ages of 3 to 5 and those that did not assess verbalizations from adults in the classroom setting.

Social Competence and Young Children

Definitions of social competence. Research on social competence emerged in the first half the 20th century and resulted primarily in descriptive studies of peer relations (Guralnick, 1986; Ladd, 2005). However, from the 1960s onward, investigations in this area substantially increased, likely resulting from the newly established entitlement programs (e.g., Head Start) and mandates that began to bring children with disabilities into the public education system (Guralnick, 1986). The growth of interest in social competence among researchers has led to no shortage of social competence definitions (Dodge, 1985). As a result, only the following two conceptualizations of social competence, believed to be relevant for this study, will be discussed: (a) skills-based approach and (b) performance-based approach (see Odom, & McConnell, 1985 and Rose-Kransor, 1997 for more detailed reviews).

A skills-based approach considers social competence as the absence or presence of specific skills needed for the classroom (Gresham, 1997; Odom, & McConnell, 1985; Rose-Krasnor, 1997). An early attempt to formulate a definition of social competence using this approach took place when a panel of child development experts was convened in 1973 (Anderson, & Messick, 1974). The discussion that enfolded focused on disassociating the concept of social competence from notions of IQ, which was common at the time. The results of this meeting led to a definition of social competence that

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included 29 indicators related to behaviors, language, fine and gross motor skills and many others.

In a more recent study, McClelland and Morrison (2003) provided a narrower conception of social competence that included only peer-related and learning-related social skills. Peer-related skills are those a student needs to accomplish their interpersonal goals (Guralnick, 1990) and relate to initiation and maintenance of interactions (Missall, & Hojnoski, 2008). Examples of these skills include entering a peer group, gaining access to a toy and suggesting play ideas (Strain, 2001). Learning-related social skills, on the other hand, are needed for academic performance and may closely align with behaviors valued by teachers, but are not necessary for positive relations between peers. Examples of learning-related social skills include listening to and following directions, organizing work materials and staying on-task (McClellnad, & Morrison, 2003).

A performance-based approach relies on a summary of judgments of those individuals with access to the child's immediate environment in order to determine his or her ability to interact appropriately and effectively with others (McFall, 1982; Odom, & McConnell, 1985). This approach also relies on multiple methods to gather information that can then be used to make a judgment about a child's social competence (e.g., observations, interviews). The use of different methods and individuals produces a more holistic description of a child's social competence than reliance on one source of information (Odom, McConnell, & Brown, 2008).

For this study, social competence is conceptualized as an amalgam of the aforementioned definitions. Specifically, social competence is the degree to which

children display the appropriate peer and learning-related skills in the preschool classroom as judged by teachers and trained observers.

The importance of social competence. Children's development of social competence has become an important indicator of their social and academic success in school and other living and learning environments (Gurnalick, 1990; Katz, & McCellan, 1997). Children who do not develop the foundational skills needed to interact with peers and teachers may miss opportunities to learn and refine social skills (Diamond, Hong, & Brody, 2008). Children's inability to develop social competence may put them at risk for depression, delinquency and mental health problems as they move toward adulthood (Parker, & Asher, 1987).

Conversely, children with and without disabilities who develop the skills needed to interact with peers and adults may incur a number of benefits. When children with disabilities are accepted by peers, they are afforded opportunities to increase communication and cognitive skills (Guralnick, 1990). Children with and without disabilities believed to be socially competent are thought to have better relationships with teachers (Diamond, Hong, & Brody, 2008; Pianta, & Stuhlman 2004) and more meaningful friendships (Buysee, Goldman, West, & Hollingsworth, 2008). Specific to teacher-student interactions, research suggests that a close teacher-student relationship is associated with typically developing children's social competence concurrently and in later grades (Hamre, & Pianta, 2001; Peisner-Feinberg et al., 2001). Further, positive relationships with teachers can also provide children with the skills needed to control emotions and exercise self-control, which can lead to better school adjustment (Howes, & Ritchie, 2002; Mashburn, & Pianta, 2006). Finally, positive teacher-student relationships

have been associated with higher levels of typically developing children's acceptance among their peers (Howes, & Ritchie, 2002; Jennings, & Greenberg, 2009).

Social competence and children with ASD. Researchers have suggested that a number of underlying social processes are related to the social impairments of children with ASD, which in turn, affect their social competence. Carter, Ornstein-Davis, Klin and Volkmar (2005) provided an overview of these underlying social processes, which include an absence or deviation in: eye gaze modulation when interacting with others, interest in human speech, joint attention, play and interpretation of others' mental states. Eye and facial gaze with others, the authors suggest, provides children with information about their environment (e.g., emotional states of family members) and is a skill in which children with ASD appear to have difficulty. Children with ASD may have a lack of interest in human speech sounds, which is thought to be essential for interpersonal communication exchanges; rather, these children sometimes have a preference for non-human sounds (e.g., computer warbles) (Kuhl, Coffey-Corina, Padden, & Dawson, 2005).

Joint attention, Carter and colleagues (2005) add, allows children to begin to share another person's experience of an object and is often displayed by young children through pointing or showing objects. An absence or deviation of this skill, common with children with ASD, has been associated with difficulties interacting with others. Challenges in the area of imitation are common for children with autism and appear to have a detrimental effect on play abilities. Further, the play that children with ASD engage in is often characterized as nonfunctional object use and an absence of or limited pretend play. Difficulty participating in play is of great concern, since this activity allows children to practice and refine social skills needed for the classroom (Strain, Schwartz, &

Bovey, 2008). Finally, children with ASD often have difficulties interpreting others'

mental states as well as using affect appropriately (Carter et al., 2005), an ability that has

been shown to directly relate to typically developing preschoolers' social competence

concurrently as well as in kindergarten (Denham et al., 2003).

Coupled with the disruption in social processes, other difficulties that stem from

the disorder can also interfere with interactions with others in the preschool setting.

Circumscribed interests have been described as "the interests or preoccupations of

individuals with ASD that become unusual in their intensity," (Boyd, Conroy, Mancil,

Nakao, & Alter, 2007, p. 1551) and have been found to negatively impact social relations

between peers and teachers (South, Ozonoff, & McMahon, 2005). Impairments in

executive function (e.g., executing transitions during center time), communication and

adaptive skills can also contribute to perceptions of social incompetence in the classroom

(Charman, 2011). Restricted and repetitive behaviors (RRB) (e.g., spinning wheels on a

toy car for long periods of time) can cause a child to miss opportunities to interact with

peers in the classroom and, therefore, hinder social development (Richler, Huerta,

Bishop, & Lord, 2010). In a recent study, Watson and colleagues (2011) found that

children with ASD who have more severe sensory differences also have increased social

impairments.

Research suggests that the characteristics associated with autism spectrum

disorder do indeed impact the quality of interactions children with this disorder have with

their peers in the early childhood classroom (Strain, Schwartz, & Bovey, 2008). Odom et

al. (2006) investigated social acceptance and rejection in 16 inclusive programs in four

states. These authors noted that out of the 80 children included in the study, 28% were

categorized as socially rejected. Children experiencing rejection were those having autism, an emotional/behavioral disorder or attention-deficit disorder, whereas children in the accepted group were those with a speech and/or orthopedic impairment. Diamond and Tu (2009) found typically developing children were less likely to seek out a child who has a disability for play if they perceived their condition to be controllable (e.g., autism) versus uncontrollable (e.g., a physical disability).

There is also reason to believe that when these children do not adopt teacher values and goals, the result may be strained teacher-student relationships (e.g., Wentzel, 2004). In the preschool classroom, as discussed earlier, teachers' value learning-related skills such as self-regulation (McClelland, & Morrison, 2003) and appropriate play with objects as well as peer-related skills such as sharing and appropriately requesting to enter group play (Missall, & Hojnoski, 2008). The ability of children with ASD to adopt valued classroom behaviors may be limited because of the symptoms associated with ASD. This failure to display desirable classroom behavior may, therefore, result in less emotional and social input from adults compared to typically developing children (Lord, & Bishop, 2010). Thus, the features of autism spectrum disorder and others' perceptions of those impairments may result in fewer supportive, meaningful relationships with adults.

In sum, for the purposes of this study, social competence is conceptualized as the degree to which children display the appropriate peer and learning-related skills for the preschool classroom as judged by teachers and trained observers. The evidence presented in this section demonstrates that children's development of social competence has a multitude of benefits for them in and outside the school setting. Because of an absence or

deviation of underlying social processes as well as other symptoms related to the disorder, children with ASD may not be viewed as socially competent. The resulting social incompetence may lead to an absence of or strained relations with peers and/or teachers in the early childhood classroom, which is associated with a number of negative outcomes. Although these potential outcomes are concerning, the review by Charman (2011) indicates that as children move from preschool to elementary school these impairments appear to lack stability. The task of researchers is then to locate the internal and external factors contributing to this variability. The subsequent section will take up this call and consider one factor (i.e., adult talk) that may impact children's socially competent behavior. The section will begin with an overview of the classroom quality research and then discuss its limitations. Next, the conceptions of adult talk will be presented as well as the various types of talk children can receive will be addressed.

Adult Talk in the Early Childhood Classroom

   Quality and teacher-student interactions. Researchers have suggested that classroom quality, defined in terms of process and structure, is linked to children's development of social competence (Burchinal et al., 2008; Pianta, 2005; Vandell, 2004). According to Mashburn, et al. (2008), process quality can be conceptualized as "children's direct experiences while they are enrolled [in preschool] programs, such as the ways a teacher implements activities and lessons and the nature and qualities of interactions between adults and children and between children and their peers" (p. 733). A common conception of process quality takes into account the level of emotional (e.g., encouraging students to talk about their feelings) organizational (e.g., clear expectations) and instructional support (e.g., positive feedback) provided to children (see Pianta, &

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Hamre, 2009). Mashburn et al. referred to structural quality as "aspects of programs that have typically been targeted by regulation or financing and include the nature and level of teacher training and experience, adoption of certain curricula, class size, adult to child ratio, and whether or not the program offers additional services to children and their families" (p. 733).

The level of process quality in the early childhood classroom is associated with children's level of social competence (Burchinal et al., 2008; Vandell, 2004). As an example, Mashburn and colleagues (2008) conducted a study assessing childcare quality and outcomes of typically developing, which included 671 preschools in 11 states. These authors found that higher levels of process quality were associated with higher levels of children's social competence as reported by teachers, whereas children in classrooms with low levels of process quality were found to be less socially competent. Interestingly, researchers also have found evidence that the level of process quality in preschool is associated with parent perceptions of their child's social competence in the home (Brophy-Herb, Lee, Nievar, & Stollak, 2007).

Although childcare quality studies are useful for beginning to understand the relationship between teacher-child interactions and children's development of social competence, there are some inherent limitations: (a) assessment of process quality is often done at the classroom level and, therefore, limits the examination of specific environmental (e.g., activity areas) and child factors (e.g., language ability) that could be affecting teacher-student interactions; (b) global measures may not capture all of the information needed to develop professional development tools that can be used to improve teacher-student interactions and, in turn, classroom quality; and (c) information

about the frequencies and types of verbalizations made by teachers are not typically collected.

Types and frequency of adult talk. Research focused on teacher verbalizations provides more specific evidence about the relationship between teacher-student interactions and young children's social competence as well as child and environmental factors linked to those verbalizations. Type and frequency of verbalizations have been described as the two factors comprising teacher talk (Hestenes, Cassidy, & Niemeyer, 2004; Kontos, & Wilcox-Herzog, 1997) and, in the case of this study, adult talk.[2] (See Table 1.1 for categories and examples of adult talk).

Although most types of adult talk, in general, occur infrequently in classrooms, studies suggest children with and without disabilities often experience certain types of talk more frequently. Kontos (1999) investigated the amount of various forms of teacher talk (i.e., supporting peer relations, supporting object play, positive social contacts [e.g., praise], behavior management, personal/practical assistance, talking to adults, reading to the child) preschool-aged, typically developing children experienced in classrooms. She found that during free play activities teacher verbalizations around supporting object play (39%) and personal/ practical assistance (19%) were common. In another preschool study, Brown, Odom, Li, and Zercher (1999) investigated the adult support, adult approval, adult comment, and group discussion directed at children with and without disabilities. Their results indicated that group discussion/directions (e.g., managing the classroom) were the most frequent adult verbalization toward children with (20.9%) and

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[2] The term adult talk is being employed since the literature review relies on studies that included teachers, support staff and paraprofessionals. In addition, the current study takes into account verbalizations from various adults in the classroom, not just teachers.

without disabilities (26.1%). This finding resembles the one by Tsao, Skinner, West, &

Vitztum-Komanecki (2008), where group discussion/directions ranged from 11.85% to

20.96% across various types of integrated preschool settings. File (1994) captured the

verbalizations teachers used in inclusive classrooms to support cognitive and social play,

involvement in non-play (e.g., self-care) and no involvement. She reported that talk

around cognitive play (e.g., how to play with objects) was somewhat frequent (15%).

Thus, directives and verbalizations centered on supporting object play appear to be two

relatively common forms of talk children experience in the classroom.

Table 1.1. *Conceptions of Adult Talk*

Authors	Categories and Examples of Adult Talk
Pianta et al. (2008)[a]	Process Quality **Emotional support**- follows child's lead, respectful of students' feeling, use of affect **Instructional Support**- provides students with quality feedback, helps students develop concepts (e.g., connecting learning materials to student interests) **Organizational Support**- redirecting children's challenging behaviors, providing clear expectations and understanding of the classroom rules.
Wilcox-Herzog, & Kontos (1998)	**Directives**- student is told what do (e.g., Time to clean-up) **Non-elaboratives-** closed and declarative questions (e.g., Is the pizza hot?) **Elaboratives-** Open questions, elaborative statements and suggestions (e.g., What are you building with those blocks?)
Girolametto et al. (2000a)	**Directives-** attention calls, behavioral management, commands **Interaction-prompting responses-** open-ended questions, clarification questions, encouraging turn-taking **Language modeling questions-** labeling, imitations extensions, adult describing his/her own activity
Tsao et al. (2008)[a]	**Direct adult support**- directive statements, verbal cues, test-like questions (e.g., what color is the stove) **Adult comment-** questions about child's home life, adult imitates child sounds (e.g., beep-beep, during truck play) and reading to the child **Adult approval-** praise or appreciation of student's behavior **Group discussion-** reading aloud to a group of students, telling a story, asking children to clean-up centers

[a] Coding scheme includes verbal and nonverbal forms of adult communication

On the other hand, there are some types of talk young children experience

infrequently. For example, Kontos (1999) found that children received lower amounts of

talk aimed at supporting peers (2%) and managing behavior (5%). Powell, Burchinal, File, and Kontos (2008) investigated the praise/acknowledgement, social talk, verbal directions, gesture/demonstration and questioning types of talk that preschool children experience. These authors reported that verbalizations related to social talk (i.e., personal or home topics) and praise/acknowledgement (e.g., you worked hard to make that tower with blocks!) occurred 3% of time. Brown and colleagues (1999) reported that adult comments (e.g., talk focused on home life) occurred less frequently for both children with (2.4%) and without disabilities (1.4%). File (1994) investigating classrooms serving children with disabilities, found low levels of supporting social play (2%) (e.g., Tap John on the shoulder if you want to play blocks with him). Thus, the amounts of talk around supporting peer relations, praise and adult comments (e.g., events outside of the school) appear to be relatively low across studies.

Although there seems to be some consistent results in the adult talk literature, there are also some mixed findings. For instance, Kontos (1999) reported that positive social contacts (e.g., praise, talk related to home life) were relatively frequent (16%) compared to the study by Brown and colleagues categories of praise (2.82%) and talk related to events outside the classroom (3.8%). Wilcox-Herzog and Kontos (1998) reported teacher's use of directives were infrequent (2%), whereas Powell and colleagues found that directives were quite abundant (32%). These studies, along with variation in both frequent and infrequent types of adult talk, suggest there may be some additional factors contributing to dissimilar findings.

Methodological decisions affecting adult talk findings. Conceptions of the types of adult talk as well as the time in which the observations take place may affect study

outcomes. With regard to how talk is defined, Kontos (1999) has separate categories for talk related to classroom rules (i.e., behavioral management) and instructions for engaging with toys (i.e., supporting object play), for example. Powell and colleagues (2008), on the other hand, have a talk category titled verbal directives that encompasses both specific instructions for a task as well as providing the child with behavioral expectations. Kontos' results demonstrated that behavioral management took place on a much lower level (5%) than those reported in the Powell and colleagues study (32%). Reszka (2010) found that in classrooms serving children with disabilities adult support was the most common behavior (30.5%) adults directed toward children with ASD. Brown and colleagues (1999), however, found that adult support was less frequent (20.2%) than group instructions and directives (47%). This result may be a product of the large amount of time children in Brown et al.'s study spent in circle/group time (15-16%), whereas students in Reszka's investigation where found in circle-time/group time less often (5.3%). It is reasonable to hypothesize that these definitional differences as well as the times researchers choose, or allow teachers to choose, for observation contribute to these divergent results.

The unit of analysis as well as the sampling method utilized also appear to be factors that can impact findings. Wilocx-Herzog and Kontos (1998) found that when the child was the unit of analysis, teachers did not direct talk to typically developing focal students 81% of the time. Alternatively, Kontos (1999) found that when the teacher was the unit of analysis, they appear to be talking to children quite frequently (68%) during free play. She suggests that the discrepancy between the amounts of talk individual children receive and the frequency of overall adult verbalizations relates to children

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outnumbering teachers in the classroom. Scan-sampling[3] and momentary interval

sampling[4] appear to be the two common approaches to observational coding in studies

examining the adult talk young children experience. For example, the main components

of Kontos' category of positive social contacts included praise/encouragement and talk

about a child's home life. Brown et al. (1999) had separate categories for

praise/encouragement (i.e., adult approval) and talk outside of school (i.e., adult

comment). Kontos reported that children received positive social contacts (16%) talk

more frequently than Brown and colleagues' categories of adult approval (2.82%) and

adult comment (3.8%). Although some dissimilarity among these categories may still

exist, these divergent results are likely related to, at least in part, the use of different

observational coding procedures. Note, researchers also suggest that the types and

amounts of adult talk is likely to be affected by a number of bio-ecological factors (e.g.,

activity area, child characteristics) (e.g., Girolmetto, & Weitzman, 2002) and these will

be discussed in a later section.

In sum, the type and frequency of verbalizations children receive from adults in

the classroom are at the core of the various conceptions of teacher/adult talk. Although

studies offer similar findings with regard to the amount of certain types of talk children

experience, the conceptualization of specific types of talk, the time in which the children

were observed, the unit of analysis and the sampling procedure utilized may impact the

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[3] This is a procedure were a target child is randomly observed for a given amount of time (e.g., 2-seconds) followed by a recording period (e.g., 15- seconds). Once a specific set of variables are assessed, the observer conducts the same action for the next target child (for more details refer to Altmann, 1974).

[4] Momentary interval sampling is a procedure where the coder observes a focal child for a specific period of time (e.g., 15-seconds) and, typically, code on a number of variables (e.g., teacher behaviors, group make-up), at a given moment during the interval (Yoder, & Symons, 2010).

study results. The studies reviewed in this section demonstrate that some types of talk appear to occur less frequently (e.g., supporting peer relations). Alternatively, children seem to receive more talk related to supporting object play and in the form of directives/instruction. The next section will discuss the research on how various types of talk are associated with young children's social competence. The first portion of this section will begin with an overview of the relationship between adult talk and children's development of social competence. Subsequently, a discussion on the link between adult talk and children with ASD will take place as well as the limitations of these studies.

The Effects of Adult Talk on Children's Social Competence

It can be deduced from research that adult talk is associated with the social and learning related skills young children with and without disabilities need to be considered socially competent. Phillips and colleagues (1987) suggested that typically developing children's sociability, an example of a peer-related social skill, was significantly impacted by the amount of teacher verbalizations. Sontag (1997) found that children were more likely to talk to peers and adults when prompted by teachers in both integrated and self-contained classrooms; and Mahoney and Wheedan (1999) found that teachers' responsiveness (e.g., response-mands) toward children with disabilities was associated with their initiation of social behaviors. Other researchers have suggested that the positive social behaviors teachers model affect the impressions students have of one another and may be imitated by students (Gallagher, Dadisman, Farmer, & Huss Hutchins, 2007; Stanulis, & Manning, 2002).

With regard to learning related skills, the results of the Powell, Burchinal, File, and Kontos (2008) study indicated that children were more likely to display on-task

behaviors during academic activities when teachers provided praise. Wilcox-Herzog and Kontos (1998) found that teachers' use of elaboratives and non-elaboratives toward typically developing preschool-aged children were associated with more object play. Further, intervention studies have demonstrated that social skills packages (e.g., The Incredible Years Programs) that encourage adults to use effective behavior management techniques, such as redirection and clear expectations, can improve young children's problem solving skills (Webster-Stratton & Reid, 2008). Finally, verbalizations from adults that help children transition to different activities (e.g., don't forgot to grab your transition card) can help encourage independence and lower disruptive behaviors among children with disabilities (Fox, Hemmeter, Snyder, Binder & Clarke, 2011).

Studies also have identified several additional competencies associated with adult talk that contribute to social competence. For instance, teachers' use of conversational control questions (e.g., Wh-questions, clarification questions) has been reported to produce more diverse and complex language among children (Girolametto et al., 2000a), with research suggesting that children's language (Schneider, & Goldstein, 2008) and play abilities (Strain et al., 2008) may contribute to positive interactions with their peers. Denham and colleagues (2003) further reported that preschooler's emotional knowledge was related to their perceived social competence in kindergarten. Frampton, Perlman, and Jenkins (2009) found that teachers' use of metacognitive language is also associated with emotional knowledge, specifically children's ability to take the perspective of others.

Alternatively, studies have found that certain types of adult talk may not contribute to children's displays of socially competent behavior. Studies suggest that teachers typically ask simple questions as opposed to elaborative or non-elaborative

questions (Hestenes et al., 2004; Wilcox-Herzog, & Kontos, 1998), and it is these latter

forms of talk that are believed to promote a higher level of object play among young

children (Wilcox-Herzog, & Kontos, 1998). Further, adults' use of praise and questioning

(e.g., what color is the block?) has been shown to have no effect on involvement in play

activities (Powell et al., 2008). Indeed, teacher directiveness can led to children becoming

more involved with their teachers than peers (Harper, & McClusky, 2004). Several

studies report that children who engaged in peer play were more likely to do so in the

absence of teachers (Harper, & McCluskey, 2004; Kontos & Keyes, 1999; Kontos,

Moore, & Giogetti, 1998). Mahoney and Wheedan (1999) speculated that directive

instructional practices may not support exploration, persistence and problem-solving in

the classroom. Adding to these findings, Powell and colleagues found an adult's use of

directives is linked with fewer displays of on-task behavior during academic activities.

Adult talk and the social behavior of children with ASD. As mentioned earlier,

few studies exist that have examined the link between adult talk directed specifically at

preschoolers with ASD and their social behavior. Dykstra and colleagues (in press) used

the LENA to capture two language samples (six months apart) of children with ASD,

each approximately three hours in duration. The authors found that these children

received an average of 1,700 words and had 60 conversational turns with adults across

both time points, which were more words and conversational turns found in a previous

study examining the language environment of home (see Warren et al., 2010). They

speculated that this result may be a product of children having more individuals to

interact with in the preschool classroom. Reszka (2010), relying on momentary interval

sampling[5], found that adult support (e.g., directive statements, reminders) was the most common form of adult behavior (30.5%), whereas the amount of adult comments (e.g., what did you do this weekend) (1%) and approval (1.7%) children with ASD received were quite low. The researcher added that when an adult was in an activity area with a student with ASD, teacher-student interactions were absent 61% of time. Although Reskza also pointed out that the social engagement of preschoolers with ASD with peers did not improve, regardless of whether adults were interacting with the focal child. Conversely, some researchers have found for preschoolers with ASD, that their social initiations and positive social interactions with peers occurred more frequently when the adult was disengaged (i.e., allowing children to naturally interact) than when actively or passively engaged, particularly when these children were in small groups (Boyd, Conroy, Asmus, McKenney, & Mancil, 2008).

In sum, a high quality early childhood educational experience is associated with children displaying more socially competent behavior, and adult talk can be considered an essential component of quality. Researchers focused more specifically on adult verbalizations have demonstrated that certain types of talk differentially impact children's social competence. Common coding procedures to examine adult talk include scan and momentary interval sampling, and although informative, have some inherent limitations that were described earlier. With regard to children with ASD, investigations are needed to better assess the quality of adult talk these children receive and the social behavior they direct both toward peers and adults following any occurrences of talk. Further, the

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[5] For this study, the momentary interval sampling procedure was as follows: roughly 30 minute long videos were divided up into 10-second intervals, and at the end of each interval, behaviors of interest were coded based on that final moment.

use of partial interval sampling[6] may be appropriate for these investigations because it could produce more accurate adult talk estimates than momentary interval and scan sampling procedures (for a detailed discussion of partial interval sampling see Yoder, & Symons, 2010). This knowledge could help researchers determine whether high levels of verbalizations related to object or cognitive play, for example, are being directed at children with ASD and, if so, the resulting effects on student's social behaviors. Clearly, there is evidence suggesting adult talk impacts children's socially competent behavior. Knowledge about factors affecting adult verbalizations, therefore, becomes essential for supporting adults working with children with ASD and ensuring the preschool language environment for children with ASD is one that fosters social competence. The section to follow will offer a theoretical framework to examine child and environmental factors that are thought to affect adult talk.

Bronfenbrenner's Bio-Ecological Model

In 1979, Bronfenbrenner's seminal work, *The Ecology of Human Development*, has allowed researchers to investigate environmental influences on children's development. This ecological model consists of four nested levels: microsystem, mesosystem, exosystem and marcosystem. The microsystem is the setting where complex interactions take place between an individual and those who surround her (e.g., classroom, home). The mesosystem is where interactions between two or more microsystems that contain the person take place (e.g., teacher-parent meeting resulting in a behavioral plan for a preschooler). An exosystem is a setting that does not itself contain

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[6] With this procedure, the coder is only allowed a single behavior per interval, but that behavior can happen at any point during a given interval (Yoder, & Symons, 2010).

the child but in which events that occur can affect the microsystem the child inhabits (e.g., a stressful work environment for the caregiver). The marcosystem consists of overarching institutional and ideological patterns that permeate the micro-, meso- and exosystems, which affect beliefs, resources, hazards and lifestyle choices among a culture/subculture. In other words, this level acts as the "societal blueprint for a particular culture or subculture" (Bronfenbrenner, 2005, p. 81).

Bronfenbrenner and Morris's (1998) chapter in the *Handbook of Child Psychology* expands this ecological model to a bio-ecological model with the addition of proximal processes, which are described as:

> progressively more complex reciprocal interaction between an active, evolving biopsychological human organism and the persons, objects and symbols in its immediate external environment…. Examples of enduring patterns of proximal processes are found in feeding or comforting a baby, playing with a young child, child-child activities, group or solitary play, reading, learning new skills parent-child and child-child activities, group or solitary play, reading, learning new skills…. (p. 996).

Development, according to the authors, is fueled by the absence or presence as well as the degree of consistency, frequency and complexity of proximal processes. The form of proximal processes is influenced by features of the microsystem, which is affected by characteristics of the macro-, exo- and mesosystem. In the case of the early childhood education classroom, these influences on proximal processes include the person characteristics of the child (e.g., disability) and peers and adults (e.g., education level) with whom the child interacts as well as environmental characteristics of the classroom (e.g., contents of center areas).

In sum, Bronfenbrenner's bio-ecological model, an extension of his ecological model, is an ideal framework for examining factors that affect children with ASD's development of social competence because it accounts for multiple influences both within and outside of the child. In addition, the model provides a framework for considering the influences of environmental and person characteristics on adult talk. For this study, several bio-ecological features within the preschool microsystem will be discussed in relation to adult talk in the next section. The adult talk directed toward preschoolers with ASD during free play and children's resulting behaviors will represent proximal processes, which in turn, are believed to affect the adoption of socially competent behaviors. As Bronfenbenner's model suggests, proximal processes are affected by environmental and person characteristics. Environmental features of the preschool that will be examined include activity area and child to adult ratio. Person characteristics of children with ASD will include severity of autism, language (expressive and receptive), cognitive ability, challenging behavior and their socially competent behavior.

It must be noted that there are additional person and environmental characteristics that affect adult talk. For early childhood educators, there is evidence that education (e.g., Burchinal et al., 2008), training (e.g., Boyd et al., 2008), beliefs (e.g., Wilcox, & Ward, 2004) and depression (e.g., Hamre, & Pianta, 2004) affect their talk toward young children. Group arrangement and composition are additional environmental features that have been shown to influence adult talk in the preschool classroom (see, for example, Hestenes et al., 2004). Unfortunately, these factors will not be examined in the current

study due to the constraints of data collection and will therefore need to be addressed in future research.

Child Characteristics and Adult Talk

      Adult talk and disability/delay. The types of adult talk children receive appear to be affected by disability/delay, age and behavior. Studies suggest children with disabilities are the recipients of different amounts and types of adult talk compared to their typically developing peers. Hestenes and colleauges' (2004) study of adult talk in inclusive classrooms relied on two-hour recordings of 186 preschoolers and found that individual children were the recipients of 18,206 statements or questions. Typically developing children (11,105), the authors note, received more adult talk than children with disabilities (7,005). In congruence with this finding, Kontos et al. (1998) suggested that the probability of a teacher interacting with a child with a disability is less than with a typically developing child. The authors speculated this result is likely related to the substantial amount of time children with disabilities spent in groups.

      Regarding the types of adult talk children experience, one study found that teachers in integrated classrooms use more behavioral management and attention calls and less language modeling with students with a language and/or developmental delay as compared to typically developing children (Girolametto, Hoaken,, van Lieshout, & Weitzman, 2000a). Similarly, File (1994) and Hestenes et al. (2004) found that teachers used more directive statements with young children with disabilities than typically developing children. In order to examine task-related statements and questions young children with varying levels of disability received, Chow and Kasari (1999) collected observations of teachers at three time points over the school year that were, on average,

40-minutes each. Their results indicated that children with more severe disabilities experienced more task-related utterances (e.g., John, you need a blue marker for this art activity) from teachers than those with mild disabilities. Dykstra et al. (in press) examined the amounts of adult talk preschoolers with ASD received and found that students with lower language and cognitive abilities were the recipients of fewer adult words. Children with disabilities also have been reported to receive adult talk that relates more to cognitive (e.g., labeling, estimates) tasks than social development (Hestenes et al., 2004). In congruence with these findings, File (1994) found that teachers were six times more likely to support cognitive play (e.g., how to play with toys) than social play and that more support for cognitive play led to lower levels of social play in integrated settings. This is of concern because if adult talk directed at children with ASD follows this pattern, social impairments may be receiving little attention during everyday activities in the preschool classroom. Alternatively, Brown and colleagues (1999) found that teachers were providing children with disabilities more adult support (15.2% vs. 5.2% vs.), adult approval (2.2% vs. 0.62%) and adult comments (2.4% vs. 1.4%) than children without disabilities. Nevertheless, since the impairments children with ASD possess may not lead to ongoing, meaningful adult-student interactions, it is not unforeseeable that children with this disorder may receive less adult talk than their typically developing peers.

Adult talk and age. Studies are mixed as to the link between child age and adult talk in the mainstream classroom. On one hand, researchers have found that adults talk to children in similar ways regardless of age. Rivera, Greenberg, and Weitzman (2005), for example, examined the questions (i.e., open-ended, closed, topic-continuing, and topic-

initiating) used by early childhood educators in their conversational interactions with toddlers and preschoolers as well as children's responses. These authors found that teachers' questions did not differ by age or type (i.e., the number of open vs. closed-ended questions). Girolametto, Weitzman, Leishout, and Duff (2000b) examined caregiver directiveness among early childhood educators and found that both toddlers and preschool age children received a similar amount of directives from teachers.

Conversely, studies have found that adults use different types of talk based on children's age. For instance, Wilcox-Herzog and Kontos (1998) found that teachers used more elaboratives and non-elaboratives with younger children. Girolametto and colleagues (2000b) found that young children were the recipients of more attention calls and preschoolers were asked more WH questions. In another study by Girolametto and Weitzman (2002), early childhood educators responsiveness did not vary based on age or language abilities, but language modeling (e.g., simple labeling) was used more frequently with toddlers than preschoolers. In addition, teachers' mean length of utterance (MLU) was longer with preschoolers than toddlers, and preschoolers received more closed- and open-ended questions.

Adult talk and challenging behavior. Dobbs and colleagues (2004, 2009) examined the link between typically developing children's challenging behavior and adult talk in two studies. The results from their most recent study showed that teachers gave more commands to preschoolers they perceived as having more externalizing behaviors, and may have been providing more praise to young children who had more internalizing behaviors (Dobbs, & Arnold, 2009). In the earlier study, teachers also were found to provide children with challenging behaviors with more commands, regardless of

whether misbehavior actually occurred (Dobbs, Arnold, & Doctoroff, 2004). The authors

speculated that teachers were using preemptive measures to address undesirable

behaviors from occurring. Interestingly, children who exhibited unwanted behavior were

found to receive the same amount of positive verbalizations (e.g., praise, compliments) as

children who did not misbehave. Although not directly measured, these studies offer

some support to the notion that adults believe certain types and amounts of talk support

children's development of social knowledge (e.g., acceptable social behavior) and, in

turn, their social adjustment (Crick & Dodge, 1994).

In sum, young children who have a delay/disability may receive less talk from

adults, and when they are the recipients of adult verbalizations, the talk may be more

directive and/or related to supporting cognitive abilities. Although some studies suggest

that preschoolers are receiving more elaboratives and non-elaboratives, a clear

relationship between age and adult talk does not exist at this time. Preschoolers with

challenging behavior appear to receive different amounts of certain types of adult talk

(i.e., commands, praise) compared to peers who do not misbehave. Although there is

evidence that age, disability/delay and challenging behavior affects adult talk, researchers

have not examined the specific relationship between adult verbalizations and an autism

spectrum disorder diagnosis as well as the challenging behavior often associated with it.

Environmental Features and Adult Talk

Adult-child ratio. The research on the relationship between adult talk and child

to staff ratio is mixed. Pianta et al. (2005) in a study of pre-kindergarten classrooms in six

states found that child to staff ratio was not related to process quality, a finding that

parallels Mashburn et al.'s (2008) study. Frampton et al. (2009) also did not find an

association between metacognitive language used by adults and adult-child ratio. Other studies, however, indicate that adult-child ratio may affect the adult verbalizations that facilitate or limit opportunities for children to develop socially competent behavior. Cassidy and Buell (1996) suggested that low adult to child ratio may be responsible for teachers' use of more restrictive language with children. Hauser-Cram, Bronson, and Upshur (1993) reported mixed results in that high adult to child ratios in the inclusive classroom were associated with increased adult control and reduced levels of peer play, but fewer instances of negative interactions among children. In a related study, lower adult to child ratios were linked to higher levels of social behavior among children, likely because children were spending more time with peers (Bronson, Hauser-Cram, & Warfield, 1997).

For the inclusive classroom, parents and practitioners sometimes consider high teacher-child ratios as essential for creating a high quality inclusive classroom (Buysse, Skinner, & Grant, 2001). Hestenes and colleagues (2008) examined teacher-student interactions in inclusive classrooms and found that high adult to child ratios did result in higher quality of interactions between teachers and students, a finding in congruence with a study by File and Kontos (1993). Although research is not available on the effect of adult to child ratio in classrooms containing a substantial number of children with ASD, it seems likely that the patterns of adult verbalizations could differ from the aforementioned investigations because of the unique features children with this disorder possess. Specifically, adult-child ratio may not impact adult verbalizations, since children with ASD may be less likely to initiate a social interaction with an adult.

Activity area and type. Researchers have found that the types of adult talk also vary by activity area. Kontos (1999) reported that, on average, during free play teachers spent most of their time in constructive play (41%), manipulatives (23%) and non-play activities (20%) (e.g., activities outside of typical play activities). Teachers spent the least amount of time in dramatic play (12%). With regard to the types of adult talk used in different activity areas, supporting play with objects (19%), positive social contacts (6%) and practical/personal assistance (7%) were higher in the constructive play area than in manipulatives, non-play and dramatic play areas.

Studies also have shown that adults modify their talk depending on the type of activity (File, 1994; Kontos, 1999). For instance, Girolametto et al. (2000a) found book reading elicited more behavior management, whereas during play-dough the talk adults provided was more child-centered (e.g., talk that encourages child to interact with the adult). Mahoney and Wheeden (1999) examined the way in which teachers talk to young children with disabilities, some of whom had an ASD diagnosis, and found the amount of directiveness (e.g., mands, turn dominance) was more frequent in instructional activities, whereas responsiveness (e.g., supportiveness, turns linked to child behavior) was more likely during free play. With children with ASD often possessing limited play skills and exhibiting higher levels of inappropriate object play (Carter et al., 2005), the adult talk they receive could be more directive in the form of personal/practical assistance, regardless of activity area, compared to typically developing peers or children with a disability other than ASD.

In sum, previous studies suggest there are a number of child and environmental factors associated with adult talk toward children in the early childhood education

classroom. More specifically, children with disabilities appear to be the recipients of different amounts of talk compared to their typically developing peers. However, there appears to be a trend toward children with disabilities receiving more directive talk and less talk than typically developing children. A clear relationship between age and adult talk does not exist. A high adult-student ratio, though espoused by researchers, practitioners and parents, appears to affect adult talk in ways that may or may not contribute to children's display of socially competent behavior. Activity area is associated with varying types of adult talk, although directiveness appears to be more prevalent during academic activities, whereas talk in non-academic areas (e.g., play dough) produces more elaboratives and child-centered comments. Based on the studies reviewed in this section, it is clear that more research on the child and ecological factors that affect adult talk directed toward children with ASD is needed.

Summary

The concept of adult talk consists of the types and amounts of adult verbalizations children receive in the classroom. Using scan sampling and momentary interval sampling, researchers have found that adult talk directed at young children is often directive and related to instructions or aimed at supporting object play as opposed to supporting peer relations. That said, there are some divergent findings which may stem from the use of different conceptions of talk, sampling procedures and/or observation times. Knowledge about the adult talk children experience is vital, since it is linked to children's development of social competence and overall classroom quality. For this study, social competence is defined as the degree to which children display the appropriate peer and learning-related skills in the preschool classroom as judged by

teachers and trained observers. Young children's development of social competence impacts a number of outcomes (e.g., relationships with peers) both within and outside of the classroom. Research suggests that a number of child characteristics (i.e., age, disability, behavior) and environmental features (i.e., adult to child ratio, classroom setting) can affect the adult talk children receive, which may then influence their socially competent behavior. Support for child and environmental factors affecting the adult talk children experience and the subsequent effects on children's social development (i.e., proximal processes) is present in Bronfenbrenner's bio-ecological model.

Currently, there are two only studies (i.e., Dykstra et al., in press; Reszka, 2010), with which the author is familiar, that have specifically examined the verbalizations children with ASD receive in preschool classroom settings. Although these two studies add to the literature, they both have some limitations. For instance, the investigation conducted by Dykstra and colleagues captured the number of words adults provided to children, but did not examine the quality of those verbalizations. Similarly, Reszka's study included an adult support category, but did not separate out adult behaviors that support peer relations and object play, for example. This broad category of adult support also does not offer information about how specific types of adult talk affect children's immediate displays of socially competent behavior. Further, the momentary interval sampling used only accounted for adult interactions and the social behavior children with ASD displayed when they happened simultaneously at the end of a 10-second interval, which could have resulted in an underestimate of adult talk as well as child social behaviors, if behaviors were short in duration (Yoder, & Symons, 2010). Lastly, neither of the studies provided information on how environmental and child characteristics affect

specific types of adult talk children with ASD experience or the impact of adult talk on children's social competence over time.

The purpose of this study then becomes threefold. First, the nature of adult talk directed at children with ASD in the preschool classroom will be described. Second, the child and setting characteristics believed to be related to adult talk will be investigated. Finally, the association between adult talk and immediate and subsequent displays of socially competent behavior by young children with ASD will be determined. Specific research questions include:

(1) What are the types and amounts of adult talk children with ASD receive in the preschool classroom?

(2) How are child characteristics including autism severity, language, cognitive ability and behavior associated with adult talk in classrooms serving preschoolers with ASD?

(3) How are setting characteristics (i.e., adult-child ratio and activity area) related to adult talk in classrooms serving preschoolers with ASD?

(4) What is the association between adult talk and concurrent as well as longitudinal displays of socially competent behavior by young children with ASD?

Chapter 3: Method

Data Collection

The data for this study were drawn from a larger, four-year federally-funded research project titled, "The Comparison of Two Comprehensive Treatment Models for Preschool-Aged Children with Autism and Their Families." The purpose of this multi-state project was to examine the comparative efficacy of two comprehensive treatment models (CTM). The states involved in this project were Colorado, Florida, North Carolina, and Minnesota. The CTMs investigated were the Treatment and Education of Autistic and Communication-handicapped Children (TEACCH) (Mesibov, Shea, & Schopler, 2005) and Learning Experiences: Alternative Program for Preschoolers and Parents (LEAP) (Strain, & Hoyson, 2000) classroom models. Both CTMs were being compared to classrooms termed "Business as Usual" (BAU), generally indicating those classrooms that do not subscribe to a particular theoretical framework or program philosophy. One of the reasons TEACCH and LEAP models were selected to study was they provide a natural contrast in that TEACCH primarily uses self-contained classroom settings to educate students with ASD and LEAP is an inclusive program.

As part of the larger project, research staff collected information on teachers, children, families and classrooms at three time points over the course of their approximately 1½-year enrollment in the study. I began assisting with the project in January of 2010, and my role was to collect parent-reported measures, set-up the

Language Environment Analysis (LENA) system in order to collect natural language samples in children's classrooms and videotape children with ASD during center time. In addition, I helped code those videos for a number of eco-behavioral variables (e.g., group composition, adult behavior). Lastly, I assisted with the analysis of LENA adult and child vocalization data.

Participants & Setting

This study only included LEAP and BAU classrooms. TEACCH classrooms were excluded because of the low frequencies of adult talk around supporting peer relations, a primary interest of this study.

Teachers. To participate in the comparison of treatment models study, all teachers had to be certified to teach in their respective state, and have taught using one particular type of CTM (i.e., TEACCH, LEAP, or BAU) for at least 1½-years prior to study enrollment. In addition, LEAP teachers must have attended a: (a) formal training provided by the model developer or received intense supervision and training by someone who had been formally trained; and (b) booster LEAP training session in the summer prior to their start in the study. Across both classroom types, teachers had an average of 11.1 years of experience in the classroom. Teacher (LEAP n = 22; BAU n = 11) and student demographic information can be found in Table 3.1.

Table 3.1. *Teacher and Student Demographics*

		LEAP		BAU	
Teacher Demographics		Frequency	%	Frequency	%
Teacher Race	White	21	95.5	11	100
	Black	1	4.5	0	0
Teacher Ethnicity	Non-Hispanic	18	81.8	7	63.6
	Hispanic	4	18.2	4	36.4
Teacher Gender	Female	21	95.5	11	100
	Male	1	4.5	0	0
Teacher Degree	Associates	1	4.5	1	9.1
	Bachelors	6	27.3	5	45.5
	Masters	14	63.6	5	45.5
	Above Masters	1	4.5	0	0
Student Demographics					
Child Race	Asian	2	3.7	1	4.5
	Black	5	9.3	0	0
	Multi-racial	1	1.9	0	0
	White	46	85.2	21	95.5
Child Ethnicity	Hispanic	22	40.7	11	50
	Non-Hispanic	32	59.3	11	50
	Missing	0	0	1	2.5
Child Gender	Male	43	79.6	22	97.5
	Female	11	20.4	0	0

Students. This study will include students who were enrolled in BAU inclusive

(n= 23) or LEAP (n= 53) classrooms, that is, classrooms that contained same-aged

typically developing peers. The ratio of typically developing preschoolers to children

with ASD in LEAP (8.2 to 3.6) and BAU (7.4 to 2.1) were similar. Children participating

in the study were from Colorado (n= 26), Florida (n= 38) and Minnesota (n= 12) and

were between the ages of 3-5 years old (M = 48.9 months). North Carolina children were

excluded from this study because the classrooms they were enrolled in were not

inclusive. Inclusion criteria for students with ASD were that the child: (a) had to be

between 3 and 5 years old at the start of the study; (b) had not been previously enrolled in

one of the comparison CTMs (e.g., a child in a LEAP classroom could not have been

enrolled in a TEACCH classroom); and (c) have an educational or clinical diagnosis of

developmental delay or Autism Spectrum Disorder (i.e., Autistic Disorder, PDD-NOS,

Asperger's Syndrome). The Autism Diagnostic Observation Schedule (*ADOS*; Lord,

Rutter, Dilavore, & Risi, 1999), a gold-standard diagnostic observational tool, was used

to confirm study eligibility for all children. There were two children that did not meet

diagnostic criteria on the ADOS, but were kept in the analyses because they met the ASD

cut-off on the Social Communication Questionnaire (*SCQ*; Rutter, Bailey, & Lord, 2003).

There was no exclusion for race or ethnicity; however, parents of children with ASD had

to be semi-proficient in English because of the reading and language abilities required to

complete some questionnaires. See Table 3.2 for child assessment scores.

Classrooms. For this study, inclusive classroom data (i.e., LEAP and BAU

inclusive classrooms) from years 2 – 4 and primarily at time point 1 (pre-test) will be

used in the analysis. It should be noted that there are no LEAP or BAU inclusive

classrooms located in the state of NC, therefore, data collected from classrooms in that

state will not be used. The number of classrooms participating in this study is as follows:

BAU (n= 11) and LEAP (n= 22), with an average of two children recruited per classroom. Classrooms included in the study had to be operating in a public preschool. At each of the three study sites that contained LEAP and BAU classrooms, there was an attempt to recruit both classrooms types from within the same school district to control for such variables as the geographic location of the classroom (e.g., urban vs. rural) or socioeconomic status of the surrounding community.

Table 3.2. *Child Assessment Descriptives*

	LEAP					BAU				
	N	*M*	Min.	Max.	SD	N	*M*	Min.	Max.	SD
CARS total	52	32.13	21.5	42.5	5.96	22	27.30	19.5	36	4.12
SRS/P- social awareness T-score_T1	52	67.96	45	90	9.92	22	61.59	45	82	9.96
SRS/P- social cognition T-score_T1	51	69.18	45	88	8.44	22	64.82	53	81	9.49
SRS/P-social communication T-score_T1	50	67.34	43	90	9.33	22	61.09	45	76	9.65
SRS/P- social motivation T-score_T1	51	60.76	42	84	9.25	22	58.82	39	75	11.21
C-TRF raw total	52	51.46	6	106	23.04	20	39.75	3	105	23
PLS4 raw total	54	65.35	19	129	30.32	22	74	14	108	30.32
Mullen Visual Reception raw score	54	34.26	7	84	12.03	22	38.86	20	50	8.67
Age (in months)	54	47.83	36	48	8.52	22	51.36	39	60	6.11

Description of LEAP model and classrooms. Dr. Phil Strain established the LEAP model in 1981. The prevailing theoretical/conceptual foundation for the model is applied behavior analysis. The LEAP model is comprised of several components that may or may not be found in BAU classrooms (Strain & Bovey, 2011; Strain, & Hoyson, 2000). First, the pedagogical techniques used in LEAP are based on *Creative Curriculum* (Dodge, Colker, & Heroman, 2002). Second, teachers develop individualized learning programs for children with ASD, with the goal of promoting generalization of children's skills across environments. Third, the use of ongoing data collection is relied on by teachers to inform practice during everyday activities and routines. Fourth, typically developing children make-up a majority of students in the classroom relative to children with ASD (at least 2:1) and participate in peer-mediated methods aimed at improving the social interaction skills of children with ASD. Co-teaching is often a common form of instruction in these classrooms. Lastly, parents receive training to implement learning strategies in the home in order to align home-school environments for better child outcomes.

In addition to the criteria outlined above for the inclusion of LEAP teachers, their classrooms also were screened prior to study enrollment to ensure teachers were implementing LEAP with an acceptable level of fidelity. Classrooms were first screened in the spring semester prior to their study start in the fall. In the spring, classrooms had to achieve a mean score of 3.5 on the LEAP fidelity measure (scale of $1 - 5$, with 5 being representative of a higher level of implementation) as well as 3.0 on the Professional Development in Autism tool (*PDA,* 2002; with a scale of 1 - 5), which was designed to measure general quality of classrooms serving children with autism. If classrooms met

these criteria then they were invited to the booster LEAP training in the summer that a trained LEAP provider conducted. Once enrolled in the study, fidelity data were collected in LEAP classrooms four times across the school year. Finally, all LEAP classrooms operate on a half-day schedule, thus the duration of classroom instructional time for students is typically 2 – 3 hours per day.

Description of BAU model and classrooms. The term BAU refers to classrooms in which teachers do not adhere to one theoretical/conceptual framework to guide their instructional practices (e.g., applied behavior analysis), rather teachers in these classrooms use a variety of intervention approaches from multiple models. This eclectic model is the one typically used with children with ASD in the public schools (Stahmer, Collings, & Palinkas, 2005). To be enrolled in the larger study, BAU classrooms also were screened in the spring semester; however, these classrooms had to have a mean score of 4.0 on the PDA fidelity measure as no summer booster training was offered to teachers in these classrooms. BAU classrooms by their nature were diverse and ones included in the larger study used self-contained and inclusive models to serve preschoolers with ASD. The instructional time for BAU classrooms was, on average, between 2 and 3 hours (i.e., $M = 2.91$) and ranged from 2 to 3 hours to greater than 5 hours.

Procedure

This section will provide an overview of the type of analysis, coding software and coding scheme for the current study. Pilot data were coded and analyzed in order to make informed decisions about study procedures and is described below.

Ecobehavioral analysis. Ecobehavioral analysis grew out of applied behavior analysis (Greenwood, & Carta, 1987) and aligns with Bronfenbrenner's notion that ecological features within the microsystem can either constrain or enhance development (Greenwood, Carta,& Atwater, 1991). A unique feature of the ecobehavioral approach is that the interaction between the student's behavior, environmental features (e.g., activity area) as well as the behaviors of others (i.e., peers, adults) toward a focal child can be captured in real-time classroom observations, which can then be used to test hypotheses about these relationships (Greenwood, Carta, & Dawson, 2000). The primary benefit of this approach is that it provides early childhood educators, researchers and policy-makers with needed information about creating an optimal learning environment for all children (Odom, Favazza, Brown, & Horn, 2000).

Description of videotaping procedures and coding software. For the larger study, participating adults and children were videotaped during 30-minutes of center time with data collected at two time points across the school year, at least 6 months apart. Thus, two videos were collected for each consented child per classroom. The context of free play was broadly defined and individualized to each classroom; in general, it meant that research staff attempted to videotape children during center time when they were most allowed to self-select their choice of activity areas, and attempted to avoid videotaping children during instructional time. Further, adults in the classroom were not provided instruction about whether to participate or interact with children during the videotaping. In fact, as mentioned earlier, the term "adult talk" versus "teacher talk" is being used because multiple adults in the classroom (e.g., teaching assistant, related service providers) and not just the teacher could have been interacting with the child

during videotaping. The behavioral coding software, PROCODER, with its ability to capture the event and interval data needed for an ecobehavioral analysis was used to code videos (Tapp, & Walden, 2000). PROCODER was set-up to divide the roughly 30-minute videos into 10-second intervals, typically resulting in 179 intervals per observation.

Coding scheme. Decisions about the type of classrooms to examine and coding scheme in the current study were based on pilot data. With the use of PROCODER software, a total of ten videos (6= LEAP and 4=TEACCH) were coded using partial interval sampling. The coding scheme was comprised of categories and codes from Kontos' (1999) Teacher Talk scheme and the Code for Active Student Participation and Engagement (*CASPER- III*; Tsao, Odom, & Brown, 2008), a popular ecobehavioral tool for the inclusive preschool setting (e.g., Odom et al., 2000; Reszka, 2010). As mentioned earlier, based on the results of the pilot study, it was decided that TEACCH classrooms would not be included in the current study because of the low frequencies of adult talk around supporting peer relations (i.e., only four instances of supporting peer relations were identified across four, roughly 30 minute TEACCH videos). This was particularly problematic because this code has been linked to children's displays of social behavior and is one of the central purposes of this study. Thus, it was decided that only LEAP and BAU inclusive classrooms would be included to maximize the likelihood of capturing teachers using adult talk to support and promote peer interaction.

For the actual study, each video was coded for adult talk, children's immediate social behavior following adult talk and the activity area in the classroom where the adult verbalizations occurred. Adult talk codes were derived from Kontos' (1999) coding

scheme, whereas activity area and child social behavior codes were based on CASPER-III (Tsao et al., 2008) (See Appendix A for the manual). Kontos' coding scheme was deemed to be appropriate for this study because it was designed to capture the types of adult talk in the preschool setting that have been associated with children's social competence. Her classification includes questions and statements that fall under the following categories: (a) supporting peer relations; (b) supporting object play; (c) positive social contacts; (d) behavior management; (e) practical/personal assistance; (f) talking to adults; and (g) teacher reads to child (see Table 3.3 for original definitions and examples). For the current study, several notable modifications have been made to Kontos' (1999) coding method as well as the classification. First, partial interval sampling was used to code adult talk for each10-second interval, whereas Kontos relied on a scan-sampling method, and codes were made to be hierarchical and mutually exclusive, an adjustment which was needed for data analysis purposes. The hierarchy for this study is as follows (arranged from most to least important type of adult talk): supporting peer relations, positive social contacts, supporting object play, personal/practical assistance and behavior management. Since this investigation is primary concerned with the relationships between children with ASD and classroom adults and their peers, the hierarchy was organized to ensure these types of talk were prioritized in coding. Second, if an adult utterance began in one interval, continued into the second interval or beyond (e.g., the adult slowly counting 1 to 10) the highest form of adult talk was coded in each of the intervals. Third, the "talking to adults" and "teacher reads to child" categories have been removed based on the low frequencies identified in the pilot data. Fourth, the original operational definitions have been modified and new

examples and non-examples were added to the coding manual in order to better capture adult talk directed at children with ASD in the classroom. Coders also were instructed to be conservative in coding, that is, if they were debating between two codes to select the "lower" level code as a default. Lastly, in Kontos' coding scheme, praise or encouragement was solely located in the positive social contacts category; however, these types of statements and questions are now a component of each adult talk category. For example, if an adult told a student, "you did a great job putting the train track together" it would have been coded as positive social contacts based on her original classification, whereas in this adapted version it falls under supporting object play because the statement focuses on the child's appropriate engagement with objects.

According to the CASPER-III coding manual, activity area is determined by where the student is located during a 10 second interval and includes the following categories: transition, manipulatives, large motor, storytime/books, art, pretend/socio-dramatic play, large blocks, sensory, dance/music/recitation, food/snack, self-care/self-help, pre-academics, computer and circle/large group time. However, for this study, activity areas that were related to each other conceptually were combined for data analysis purposes: (a) "large blocks/manipulatives" refers to large blocks and manipulative activities; (b) story/books, computer and pre-academics were combined to form "pre-academic activities;" (c) "sensory-motor" included sensory, art and large motor activities. Circle-time and pretend/socio-dramatic play were not merged into any other category. Food/snack and self-care/self-help were not included in the analysis because children spent little time in these areas (i.e., less than 2%). Transition was not an area of interest for this study and therefore was excluded as well. Momentary time

sampling is typically used with CASPER-III to code for activity area; however, since

partial interval sampling was relied on for this study, the activity area where the child

spent the majority of the time during the 10-second interval was coded (see Powell et al.,

2008 for an example of this approach).

Table 3.3 *Kontos (1999) Teacher Verbalization Coding Scheme*

Category	Definition
Support peer relations	*Statements*: Describe, explain, give reason or information about a child's interactions (e.g., "When you said that to Mary, she probably felt upset."). *Questions*: Ask questions about a child's interactions that can be answered with a yes/no or one-word response (e.g., "Did you ask Soo Young if he would like to play?"). Ask open-ended quesions about a child's interactions (e.g., "How do you think Lori felt when you said that?").
Support object play	*Statements*: Describe, explain, give reason or information about a child's object/fantasy play (e.g., "When you mix blue and yellow paint, you get green."), or repeat statements about objects/fantasy play (e.g., *Child*: "This toy is fun." *Teacher*: "This toy *is* fun.") *Questions*: Yes/no or closed-ended questions about a child's object/ fantasy play (e.g., "Did you make that all by yourself?"). Can also include offering a child a choice (e.g., "Would you like to play at the water table or the sand table?"). Open-ended questions about object/fantasy play (e.g., "What is this a picture of?"). *Participate in fantasy play*: Teacher participates actively in child's fantasy play by taking on a role.
Positive social contacts	Teacher praises or encourages the child. Sometimes this involves peer relations ("I like the way you shared your toy with Trent.") or object play ("You did a good job counting those dinosaurs."). Also includes teachers socializing with a child (e.g., "What did you do last night?" or "I like those new shoes you are wearing.").
Behavior management	Teacher explicitly states rules (e.g., "Elise, use your walking feet."), redirects a child without explanation (e.g., "Tory, go over to the sand table."), or tells a child what to do when misbehaving (e.g., "Kyle, you need to share your marker with Derrick."). Also includes statements or questions about taking care of materials (e.g., "Put the caps back on the markers, Jana.").
Practical/personal assistance	Teacher helps child obtain materials needed for an activity, assists with self-help (e.g., clothing, toileting), or performs first-aid (ice pack, bandaids). Also includes statements or questions directed at helping a child store or clean up projects (after the activity is done) or helping a child choose an activity.
Talking to adults	Teachers talks to parents, other teachers, aides, or any adult present in the classroom.
Teacher reads to child	Teacher verbalizations are from or about a book being read to the child.
Uncodable	Brief acknowledgements or responses that cannot fit into another category (e.g., "Okay," "What?" "yeah").

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Similar to activity area, child social behavior categories were derived from

CASPER-III. These categories were chosen in order to capture children's immediate

displays of learning-related (e.g., following directions) and peer-related social skills.

Using partial interval sampling, child social behavior directed at a peer or an adult was

only coded *when it followed some form of adult talk*. This coding category also was

hierarchical in that within a given interval social behavior directed towards peers took

precedence over adults. This decision was based on the greater difficulty children with

ASD often experience interacting with peers as compared to adults. Negative social

behavior was not considered for this project because of the low occurrence of the

behavior (e.g., focal child screams at an adult).

Inter-rater reliability. All videos were coded by two primary raters (rater 1

coded 37 videos, rater 2 coded 39 videos) who were UNC graduate students in the School

of Education, and subsequently coded by a secondary rater (the author of this study) for

reliability purposes. The primary raters were, for the most part, naïve to the purposes of

this study. For instance, coders did not know whether the children were in LEAP or BAU

inclusive classrooms. Training included familiarization with the modified Kontos (1999)

adult talk classification and CASPER-III codes (Tsao et al., 2008), coding of three non-

study videos (e.g., videos of TEACCH or BAU self-contained classrooms) and ongoing

discussion. Raters had to reach at least an average of 80% agreement per code as well as

overall agreement with the author of this study across three consecutive practice videos in

order to begin coding videos used in the actual study. Kappa values were not relied on

because some of the adult talk and child social behavior codes occurred infrequently,

which led to a wide range of values (see Bakeman, McArthur, Quera, & Robinson, 1997

for a detailed discussion) and, potentially, an inaccurate reflection of actual agreement if the standard acceptable criterion was used (i.e., .70). Coders had to maintain at least a mean 80% reliability criterion for each code as well as overall agreement throughout the coding period. To ensure this took place, videos were placed in folders of five for the primary raters, and one out of every five videos (i.e., a total of 20%) was randomly selected to be coded for reliability by the author of this study. If reliability was not met then the set of videos (e.g., videos 5 through 10) had to be recoded, after re-reading the coding manual and discussion with the author of this study. Once a rater completed the re-coding of a set of videos, another video from that same set of five videos was selected and coded by the secondary coder. If the re-coding still produced significant disagreement (i.e., below 80% on any individual code or overall agreement), training videos had to be re-coded and additional discussion about discrepancies took place. Note, at no point during the coding did primary raters have to re-code training videos. (see Table 3.4 for complete reliability results)

Table 3.4 *Inter-observer Agreement for Overall Categories and Individual Codes*

	Coder 1			Coder 2		
	M	Max.	Min.	*M*	Max.	Min.
Overall Adult Talk	0.83	0.91	0.81	0.86	0.94	0.80
Supporting Peer Relations	0.97	1.00	0.92	0.97	1.00	0.92
Positive Social Contacts	0.96	0.99	0.91	0.95	1.00	0.89
Supporting Object Play	0.95	0.99	0.85	0.96	1.00	0.90
Practical/Personal Assistance	0.92	0.97	0.84	0.95	1.00	0.92
Behavioral Management	0.98	0.99	0.96	0.98	1.00	0.92
Can't Tell	0.95	1.00	0.89	0.97	1.00	0.93
No Talk	0.94	1.00	0.89	0.95	0.97	0.89
Overall Socially Competent Behavior	0.88	0.94	0.81	0.90	0.96	0.83
Social Behavior to Adult	0.92	0.99	0.88	0.93	0.96	0.87
Social Behavior to Peer	0.99	1.00	0.97	0.99	1.00	0.98
Can't Tell	0.97	0.99	0.93	0.98	0.99	0.91
No Social Behavior	0.89	0.94	0.82	0.91	0.97	0.86
Overall Activity Area	0.90	0.98	0.73	0.94	1.00	0.84
Transition	0.97	0.99	0.90	0.97	1.00	0.90
Manipulatives	0.95	1.00	0.76	0.97	1.00	0.86
Large Motor	1.00	1.00	0.99	1.00	1.00	0.98
Storytime/books	1.00	1.00	0.98	0.99	1.00	0.89
Art	0.99	1.00	0.96	1.00	1.00	0.99
Pretend Play/Socio	0.99	1.00	0.97	0.99	1.00	0.96
Large Block	0.97	1.00	0.78	0.97	1.00	0.85
Sensory	0.98	1.00	0.94	1.00	1.00	0.99
Dance	1.00	1.00	1.00	1.00	1.00	1.00
Snacks	1.00	1.00	1.00	1.00	1.00	1.00
Self-Help	1.00	1.00	0.99	1.00	1.00	0.99
Pre-Academics	0.98	1.00	0.89	1.00	1.00	0.99
Computers	0.99	1.00	0.95	1.00	1.00	0.99
Circle-time	0.99	1.00	0.94	1.00	1.00	1.00
Can't Tell	0.99	1.00	0.94	1.00	1.00	0.99

Measures

The Autism Diagnostic Observation Schedule (*ADOS*; Lord et al., 1999),

considered the gold standard diagnostic instrument, is a semi-structured assessment that

captures social interaction, communication, and play or imagination/creativity as well as

repetitive behaviors and restricted interests. Researchers administer one of four different

modules depending on the age and language abilities of the individual with ASD. The

ADOS offers two domain scores: social affect and restrictive and repetitive behavior, and

a total score. ADOS assessments were administered by research-trained and reliable

administrators to confirm the child could be included in the study based on scoring in the

ASD range of the measure.

Fidelity Demographic Form (FDF) provides information regarding the adult to

child ratio and the number of children with and without a disability in the classroom. The

FDF was developed by the research team of the larger study. Research staff completed

this form at each site 4 times per year, but for this study only data from time point 1 of

each year was used. The adult to child ratio variable from this form was calculated by

dividing total number of classroom staff by the total number of students per classroom.

The Childhood Autism Rating Scale (*CARS;* Schopler, et al., 1988) is an

instrument designed to assess children's behaviors (e.g., relating to others, fear,

nonverbal communication) in order to distinguish children with ASD (age 2 through

adulthood) from those children who have a developmental delay. This measure also

identifies children with classic autism as opposed to those with PDD-NOS. Scores range

from 15 to 60 and are based on a four-point scale. The instrument has more than

acceptable reliability (i.e., an alpha of 0.94). Judgments about diagnoses have resulted in ample agreement among clinicians ($r = .80$), a demonstration of adequate criterion validity. A raw score of 30 is the standard minimum cut-off for a diagnosis of autism spectrum disorder. Scoring is based on direct observation in clinical settings, and for this study trained and reliable observers completed the CARS during administration of the Mullen assessment (described below). Higher scores indicate more severe symptoms of autism. Total scores were used in data analysis for this study.

Caregiver-Teacher Rating Form (*C-TRF;* Achenbach, & Rescorla, 2000) is a teacher/caregiver report measure used to assess emotional and behavioral problems and consists of an internalizing and externalizing scale. The tool is appropriate for children 1.5 to 5 years old. There are 99 problem items that can be rated as 0 (not true) to 2 (very true or often true). The instrument has acceptable mean test-retest reliability ($r = 0.81$) and agreement between caregivers and teachers ($r = 0.65$). Total scores from the forms filled out by teachers were used in data analysis for this study.

The Mullen Scales of Early Learning (Mullen, 1995) is a standardized, comprehensive assessment that measures gross motor (e.g., running), fine motor (e.g., stringing beads), visual reception (e.g., sorting) and language (receptive and expressive) abilities of children from birth through 68 months. The Mullen has an internal reliability of 0.91 (Mullen, 1995), and the validity of the measure for children with ASD has been established (Akshoomoff, 2006). The calculated visual reception (VR) subscale raw score was used in this study as a proxy for the child's cognitive abilities. For the current sample, the VR subscale was highly correlated with children's total standard score ($r = .81, p = <.0001$) on the measure. In addition, because the total score is also based on

children's language ability, the VR score provides a proxy for children's nonverbal cognitive abilities.

Social Responsiveness Scale for Preschoolers (*SRS/P;* Constantino & Gruber, 2007) is a 65-item teacher/caregiver reported measure where each item is scored from 1= not true to 4= almost always true. The instrument assesses the severity of symptoms children with autism possess by providing information about his/her social impairments, social awareness, social information processing, capacity for reciprocal social communication, social anxiety/avoidance, and autistic preoccupations and traits. The SRS-P for 3 year olds and the version for children aged 4 to 18 years were utilized in this study, based on the child's age at pretest. The instruments are quite similar with the same item numbers being reversed score on each measure, and only three items having a substantive change to the phrasing of the question. For example, on the SRS-P for 3 year olds one item is "Wants to be changed when diaper or underwear are soiled or wet," whereas on the SRS the question is "Has good personal Hygiene." Test-retest reliability over 2 years has been demonstrated ($r = 0.83$) and concurrent validity is evident (e.g., mother-reported SRS and the ADI-R [a diagnostic instrument for individuals with ASD] coefficients ranging from 0.65 to 0.77). The tool is designed to be used with children aged 4 to 18 years. The calculated T-scores for the social awareness, cognition, communication and motivation subscales (teacher reported pre and post) were used to determine changes in social competence for this study (see Table 3.5 for definitions of sub-scales). These subscales were used instead of the SRS/P total score because the total score is based on an additional autistic mannerisms subscale, and for this study, the interest was children's social competence versus total severity of autistic symptoms.

Table 3.5. *Definitions of SRS subscales*

Social Awareness	Ability to pick up on social cues; items in this category represent the sensory aspects of reciprocal social behavior
Social Cognition	Ability to interpret social cues one they are picked up; this category represents the cognitive-interpretive aspects of reciprocal social behavior
Social Communication	Includes expressive social communication; this category represents the "motoric" aspects of reciprocal social behavior
Social Motivation	The extent to which a respondent is generally motivated to engage in social-interpersonal behavior; elements of social anxiety, inhibition, and empathic orientation are included among these items

The Preschool Language Scale (*PLS-4*; Zimmerman et al., 2002) is a popular

measure used to assess communication behaviors (e.g., gestures, eye contact) and

determine language delays for children from birth through 6 years, 11 months. The PLS-4

provides auditory comprehension and expressive communication subscale scores as well

as a total language score. The content validity of the measure has been demonstrated (i.e.,

parallel results with the Denver II and Fluharty-2) (Zimmerman, & Catilleja, 2005), and

there is evidence of ample test-retest reliability (90 to .97 for total language score). For

the current study, the raw total scores were used to estimate communication abilities.

Data Analysis Plan

SPSS 19 and Excel were utilized to analyze descriptives on child and classroom

variables. SAS 9.2 was used to analyze the link between the adult talk and child and

classroom measures. The first research question explored the nature of adult talk directed

at children with ASD in the preschool classroom. This question was answered using basic

descriptive statistics of the types and amounts of adult talk directed at focal children.

More specifically, frequencies and proportions were calculated for the adult talk related

to supporting peer relations, supporting object play, behavior management, positive

social contacts, personal/practical assistance as well as any uncodable verbalizations directed at focal children.

The second and third research questions addressed ecological (i.e., adult-child ratio and activity area) and child factors (i.e., autism severity, language, cognitive ability and behavior) believed to affect adult talk in the preschool classroom. To answer these questions, mixed multinomial logit models were utilized. A mixed multinomial model was needed to address the clustering of children and teachers within classrooms and because the adult talk outcome is a categorical variable. The adult talk outcome also was based on proportions and, therefore, required a logit transformation because the distribution is bounded at 0 and 1. This transformation produced a more robust distribution, allowing for model assumptions to be met (Long, 1997), and is expressed as: $P_{adult\ talk} = \log (p/(1-p))$, where $P_{adult\ talk}$= logit transformation of adult talk and p=proportions of adult talk. Following this transformation, the following models were analyzed:

RQ2: $P_{adult\ talk} = b_0 + b_1x_{adult/childratio} + b_2x_{actarea} \ldots b_7x$

RQ3: $P_{adult\ talk} = b_0 + b_1x_{severity} + b_2x_{cogn} + b_3x_{lang} + b_4x_{behavior}$

For RQ2, the model is expressed as: $P_{adult\ talk}$= logit transformation of adult talk, b_0 = intercept, $b_1x_{adult/childratio}$ = the ratio of adults to children in a classroom and $b_2x_{actarea}$ = activity area and dummy codes. For RQ3, $P_{adult\ talk}$= logit transformation of adult talk, b_0 = intercept, $b_1x_{severity}$ = autism severity, b_2x_{cogn} = cognitive ability, b_3x_{lang} = language ability and $b_4x_{behavior}$ = level of challenging behavior. Covariates for RQ2 included chronological age (x1), classroom treatment model (i.e., LEAP or BAU) (x2) and gender (x3). For RQ3, covariates were chronological age (x1), classroom treatment model (i.e.,

LEAP or BAU) (x2) child race/ethnicity and gender (x3). Centered scores were created for $b_1 x_{\text{severity}}$, $b_2 x_{\text{cogn}}$, $b_3 x_{\text{lang}}$ and $b_4 x_{\text{behavior}}$ in RQ3 using grand mean centering in order to reduce potential colinearity and to ensure the intercept is interpretable (Raudenbush, & Bryk, 2002). Model parameters were then exponentiated in order to facilitate interpretation of effect sizes.

The last research question explored the link between adult talk and immediate and subsequent displays of social competent behavior by young children with ASD. Partial correlations between the presence of immediate child social behavior following various types of adult talk were calculated, with chronological age acting as a covariate. For subsequent displays of social competent child behavior, mixed models were used to account for changes over time in SRS/P subscale scores. Without the use of a multilevel model, the clustering of responses within individuals would be ignored and result in incorrect standard errors. Separate mixed models were used for each of the four SRS/P sub-scales:

1) $\Delta_{\text{socialawar}} = b_0 + b_1 x_{\text{suppeer}} + b_2 x_{\text{possocial}} + b_3 x_{\text{supobj}} + b_4 x_{\text{prac/pers}} + b_5 x_{\text{behman}} + e_{ij} + \mu_{oj}$ where $\Delta_{\text{socialawar}}$= post-pre SRS/P social awareness, b_0= intercept, $b_1 x_{\text{suppeer}}$ = supporting peer relations, $b_2 x_{\text{possocial}}$ = positive social contacts, $b_3 x_{\text{supobj}}$ = supporting object play, $b_4 x_{\text{prac/pers}}$ = personal/practical assistance, $b_5 x_{\text{behman}}$ = behavioral management, e_{ij} = level 1 residual error (child level), and μ_{oj} = level 2 and residual error (classroom level).

2) $\Delta_{\text{socialcog}} = b_0 + b_1 x_{\text{suppeer}} + b_2 x_{\text{possocial}} + b_3 x_{\text{supobj}} + b_4 x_{\text{prac/pers}} + b_5 x_{\text{behman}} + e_{ij} + \mu_{oj}$ where $\Delta_{\text{socialawar}}$= post-pre SRS/P social cognition, b_0= intercept, $b_1 x_{\text{suppeer}}$ = supporting peer relations, $b_2 x_{\text{possocial}}$ = positive social contacts,

b_3x_{supobj} = supporting object play, $b_4x_{prac/pers}$ = personal/practical

assistance, b_5x_{behman} = behavioral management, e_{ij} = level 1 residual error

(child level), and μ_{oj} = level 2 and residual error (classroom level).

3) $\Delta_{socialcom} = b_0 + b_1x_{suppeer} + b_2x_{possocial} + b_3x_{supobj} + b_4x_{prac/pers} + b_5x_{behman} +$

$e_{ij} + \mu_{oj}$ where $\Delta_{socialawar}$ = post-pre SRS/P social communication, b_0=

intercept, $b_1x_{suppeer}$ = supporting peer relations, $b_2x_{possocial}$ = positive social

contacts, b_3x_{supobj} = supporting object play, $b_4x_{prac/pers}$ = personal/practical

assistance, b_5x_{behman} = behavioral management, e_{ij} = level 1 residual error

(child level), and μ_{oj} = level 2 and residual error (classroom level).

4) $\Delta_{socialmot} = b_0 + b_1x_{suppeer} + b_2x_{possocial} + b_3x_{supobj} + b_4x_{prac/pers} + b_5x_{behman} +$

$e_{ij} + \mu_{oj}$ where $\Delta_{socialawar}$ = post-pre SRS/P social motivation, b_0= intercept,

$b_1x_{suppeer}$ = supporting peer relations, $b_2x_{possocial}$ = positive social contacts,

b_3x_{supobj} = supporting object play, $b_4x_{prac/pers}$ = personal/practical

assistance, b_5x_{behman} = behavioral management, e_{ij} = level 1 residual error

(child level), and μ_{oj} = level 2 and residual error (classroom level).

Covariates for each model included chronological age (x1), White/Non-White (x2),

classroom treatment model (i.e., LEAP or BAU) (x3) and gender (x4). (see Table 3.6 for

a summary of variables and criteria for research questions 2-4)

Table 3.6. *Summary of Variables and Criteria for Research Questions 2-4*

Research Questions	Independent Variables	Covariates	Dependent Variables	Criteria
(2) How do child characteristics including autism severity, language, cognitive ability and behavior affect adult talk in classrooms serving preschoolers with ASD?	Autism severity (CARS), cognitive ability (Mullen), language (PLS-4) and behavior (C-TRF)	Chronological age (CA), race/ethnicity, gender and classroom treatment model (CTM)	Proportions of adult talk	…
(3) How are setting characteristics (i.e., adult-child ratio and activity area) related to adult talk in classrooms serving preschoolers with ASD?	Activity areas, Adult-child ratio	CA, gender and CTM	Proportions of adult talk	Activity area: majority of time spent in an activity area during a 10-second interval
(4) What is the association between adult talk and immediate and subsequent displays of social competent behavior by young children with ASD?	Proportions of adult talk	CA	CASPER III child social behavior	Child's social behavior following adult utterance
	Proportions of adult talk	CA, White/Non-White, gender and CTM	SRS/P (pre and post) sub-scales: social awareness, social cognition, social communication and social motivation	…

Chapter 4: Results

The purpose of this study was to examine the adult talk that occurs in inclusive classrooms serving preschoolers with ASD. The primary aim was to determine the types and amounts of adult talk children with ASD received in the preschool classroom as well as the relationship between adult talk and the socially competent behavior children displayed. The secondary aim was to examine setting (i.e., adult-child ratio and activity areas) and child characteristics (i.e., autism severity, language, cognitive ability and problem behavior) believed to be associated with the adult talk preschoolers with ASD are exposed to in the classroom. The results of specific research questions will make up the remainder of this section.

Research Question 1: What are the types and amounts of adult talk children with ASD receive in the preschool classroom? Descriptives were used to identify the types and amounts of adult talk children with ASD experience in the classroom within a 10-second interval. Based on frequency counts, the adult talk category that was most common was "no talk" from an adult (6,974). Statements and questions around practical/personal assistance (1,927), supporting object play (1,639) and positive social contacts (1,108) were the most frequent types of talk children with ASD experienced. Adult talk that took place less often included supporting peer relations (675), behavioral management (354) and those that could not be determined by the coders (742). Figure 4.1 provides an illustration of the proportion of each these categories.

Types of Adult Talk Experienced

Category	Value
Suppoting Peer Relations	5.03
Positive Social Contacts	8.26
Supporting Object Play	12.21
Practical/Personal Assistance	14.36
Behavioral Management	2.64
Can't Tell	5.53
No Talk	51.97
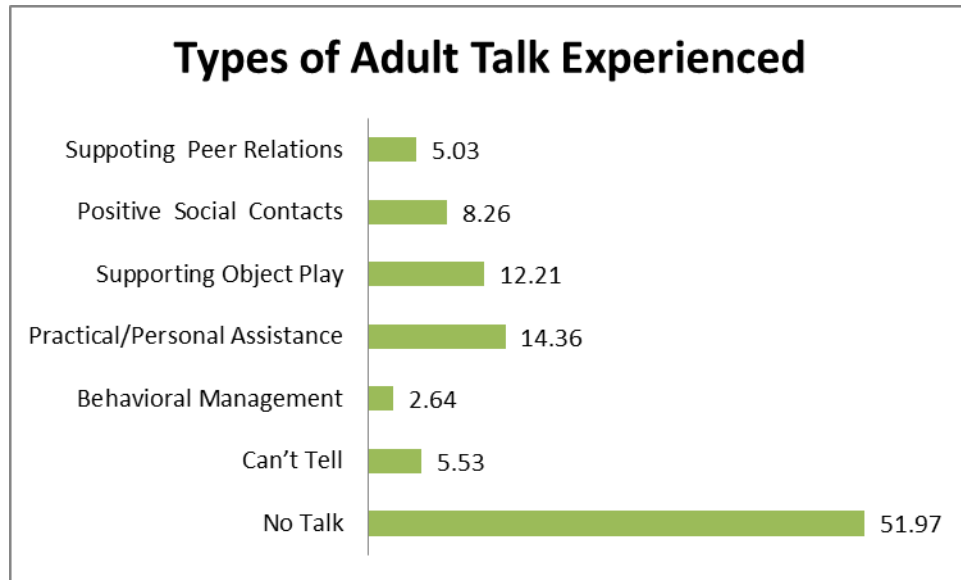
Figure 4.1. Proportions of adult talk children received

Research Question 2: How are child characteristics including autism severity, language, cognitive ability and problem behavior associated with adult talk in classrooms serving preschoolers with ASD? To answer this question a mixed multinomial logit model was used. Dummy codes were used so that each activity area could be examined while controlling for the others within the analysis model. In addition, the following measures of child characteristics were centered and single imputation was used to address the small amount of missing data for the CARS, CBCL, PLS and Mullen. The estimates for each child characteristic variable describe the likelihood of receiving a specific type of adult talk (e.g., supporting object play) relative to the reference group[7]

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[7] Although there is not a standard procedure for choosing a reference group (Chris Wiesen (statistician), personal communication, February 13, 2012), supporting peer relations was decided on as the reference group since it was a primary area of interest in this study and was a low frequency category, which aided with interpretation.

(i.e., supporting peer relations), which was needed to make comparisons between outcome variables (Twisk, 2006).

The findings show that children with lower scores on the Mullen VR (i.e., more cognitive difficulties) were more likely (β = -0.044, p = .024) to receive a positive social contact question or statement from an adult than supporting peer relations talk. However, the probability of receiving supporting peer relations talk was more likely than positive social contacts (β = 0.054, p = .005) for older children than younger ones. Children who were White had a greater chance (β = 1.892, p = .008) of receiving talk related to positive social contacts than supporting peer relations when compared to Black children. Hispanic preschoolers were more likely than White children (β = -1.022, p = .001) to receive talk related to supporting peer relations as compared to personal/practical assistance talk. Lastly, preschool girls were more likely than boys (β = 1.155, p = .033) to receive statements or questions around supporting peer relations than supporting object play. None of the other child characteristic predictors were significant (see Table 4.1 for child assessment correlations and Table 4.2 for adult talk by child characteristics results).

Table 4.1. *Child Assessment Correlations*

	CARS	SRS/P- social awareness_T1	SRS/P- social cognition_T1	SRS/P- social communication_T1	SRS/P- social motivation_T1	C-TRF	PLS4	Mullen VR
CARS	1							
SRS/P- social awareness_T1	.624[**]	1						
SRS/P- social cognition_T1	.426[**]	.746[**]	1					
SRS/P- social communication_T1	.522[**]	.795[**]	.788[**]	1				
SRS/P- social motivation_T1	.372[**]	.586[**]	.667[**]	.786[**]	1			
C-TRF	.489[**]	.502[**]	.532[**]	.573[**]	.445[**]	1		
PLS4	-.591[**]	-.552[**]	-.445[**]	-.478[**]	-.330[**]	-.320[**]	1	
Mullen VR	-.595[**]	-.675[**]	-.570[**]	-.614[**]	-.476[**]	-.397[**]	.765[**]	1

$p < .01$**, $p < .05$*

Table 4.2 *Adult Talk by Child Characteristics*

	Behavioral Management		Positive Social Contacts		Personal/practical Assistance		Supporting Object Play	
	β (Std Err)	*P*	β (Std Err)	*P*	β (Std Err)	*P*	β (Std Err)	*P*
Intercept	-1.265 (0.301)	<.0001***	0.463 (0.185)	.013*	1.276 (0.24)	<.0001***	0.291 (0.286)	.311
CARS	0.044 (0.036)	.221	0.039 (0.022)	.081	0.012 (0.029)	.676	0.019 (0.034)	.572
CBCL	0 (0.009)	.996	-0.007 (0.005)	.177	-0.013 (0.007)	.066	-0.009 (0.008)	.290
PLS	-0.002 (0.009)	.781	-0.004 (0.005)	.400	-0.003 (0.007)	.646	-0.014 (0.008)	.083
Mullen VR	-0.049 (0.031)	.116	-0.044 (0.02)	.024*	-0.042 (0.026)	.104	-0.054 (0.03)	.070
Chronological Age	0.003 (0.03)	.912	0.054 (0.019)	.005**	0.032 (0.025)	.204	0.05 (0.028)	.079
Race-ethnicity: caregiver= Asian	1.149 (0.907)	.206	-0.6 (0.626)	.338	-0.218 (0.79)	.782	-0.026 (0.91)	.978
Race-ethnicity: caregiver= Black	1.637 (1.092)	.134	1.892 (0.715)	.008**	1.565 (0.859)	.069	0.897 (1.1)	.415
Race-ethnicity: caregiver= Hispanic	-0.036 (0.365)	.921	-0.244 (0.226)	.280	-1.022 (0.296)	.001**	0.362 (0.338)	.285
Race-ethnicity: caregiver= Multi-racial	3.66 (3.004)	.223	2.668 (2.815)	.343	4.029 (2.908)	.166	3.408 (2.994)	.255
Gender: Female	0.684 (0.575)	.234	0.555 (0.372)	.137	0.422 (0.481)	.380	1.155 (0.543)	.033*
Classroom Type: BAU	0.403 (0.437)	.356	0.307 (0.266)	.249	0.222 (0.352)	.529	0.083 (0.407)	.838

(p < .05*, p< .01**, p< .0001***) Note: reference groups include supporting peer relations (adult talk), race/ethnicity (white), gender (male) and classroom type (LEAP).

In order to further explore the relationship between adult talk and child functioning the same analysis model was conducted but now included a median split for child variables. The median split allowed differences to surface in the amount of adult talk children received if they had scores below the median on individual measures. This analysis also used a mixed multinomial logit model and the child characteristic predictors (i.e., CARS, CBCL, PLS and Mullen VR) were centered. Based on data from the sample, the follow medians were used in this model analysis: CARS (29.5), CBCL (50.55), PLS (71) and Mullen VR (34). The median split estimates describe the likelihood of receiving a specific type of adult talk (e.g., supporting object play) relative to the reference group (i.e., supporting peer relations). As seen in Table 4.3, children were more likely to receive talk centered on supporting peer relations than behavioral management talk ($\beta = -0.988$, $p = .017$) and supporting object play ($\beta = -0.949$, $p = .017$) if they had less severe autism (i.e., CARS score below the median). For children with more severe cognitive impairments (i.e., a Mullen score below the median), positive social contacts ($\beta = 0.683$, $p = .030$) and personal/practical assistance talk ($\beta = 0.961$, $p = .021$) were more likely than supporting peer relations as compared to children with less cognitive impairments (i.e., a Mullen score above the median). Significant covariates remained largely unchanged, with the exception of boys receiving more positive social contacts than girls ($\beta = 0.781$, $p = .028$). This change in significance, however, is likely the result of girls having extreme values on one or more of the different child measures, since the median split was not applied to the gender variable.

Table 4.3 *Adult Talk by Child Characteristics with a Median Split*

	Behavioral Management		Positive Social Contacts		Personal/practical Assistance		Supporting Object Play	
	β (Std Err)	*P*	β (Std Err)	*P*	β (Std Err)	*P*	β (Std Err)	*P*
Intercept	-1.48 (0.508)	.004	-0.036 (0.316)	.910	0.699 (0.417)	.095	-0.475 (0.497)	.340
CARS (median split)	-0.988 (0.413)	.017*	-0.445 (0.263)	.090	-0.054 (0.346)	.876	-0.949 (0.397)	.017*
CBCL (median split)	0.157 (0.39)	.688	0.392 (0.242)	.106	0.417 (0.317)	.189	0.68 (0.378)	.072
PLS (median split)	0.327 (0.467)	.484	0.283 (0.296)	.339	-0.213 (0.393)	.588	0.833 (0.443)	.060
Mullen VR (median split)	0.799 (0.494)	.106	0.683 (0.315)	.030*	0.961 (0.414)	.021*	0.857 (0.466)	.066
Chronological Age	0.002 (0.026)	.940	0.04 (0.017)	.019*	0.022 (0.022)	.317	0.041 (0.025)	.103
Race-ethnicity: caregiver= Asian	0.826 (0.893)	.355	-0.505 (0.623)	.418	-0.134 (0.792)	.866	-0.229 (0.905)	.800
Race-ethnicity: caregiver= Black	1.671 (1.048)	.111	1.72 (0.697)	.014*	1.414 (0.835)	.091	0.055 (1.118)	.961
Race-ethnicity: caregiver= Hispanic	-0.118 (0.366)	.748	-0.235 (0.228)	.304	-0.962 (0.301)	.001**	0.292 (0.343)	.394
Race-ethnicity: caregiver= Multi-racial	3.973 (2.996)	.185	3.195 (2.841)	.261	4.428 (2.926)	.130	4 (3.002)	.183
Gender: Female	0.771 (0.525)	.143	0.781 (0.355)	.028*	0.688 (0.456)	.132	1.266 (0.512)	.014*
Classroom Type: BAU	0.613 (0.419)	.143	0.264 (0.265)	.319	0.054 (0.349)	.877	0.33 (0.402)	.413

(p < .05*, p< .01**) Note: reference groups include supporting peer relations (adult talk), race/ethnicity (white), gender (male) and classroom type (LEAP).

Research Question 3: How are setting characteristics (i.e., adult-child ratio and activity area) related to adult talk in classrooms serving preschoolers with ASD? A mixed multinomial logit model was used to determine the differences in the amounts of different types of talk occurring in individual activity areas. For this analysis, an adult-child ratio variable was created by dividing the number of adults by the number of children per classroom and was included in the model. This model also included a number of covariates: age, classroom treatment type (i.e., BAU or LEAP) and gender. Race-ethnicity was not included in this analysis because the variable was highly correlated with specific activity areas. Again, the estimates for each activity area and the adult-child ratio variable describe the likelihood of receiving a specific type of adult talk (e.g., supporting object play) relative to the reference group (i.e., supporting peer relations).

The activity area where children spent the most time was large blocks/manipulatives (4,914) and the activity area where they spent the least amount of time was circle-time (643). (See figure 4.2 for a display of proportions of overall adult talk occurring in specific activity areas).
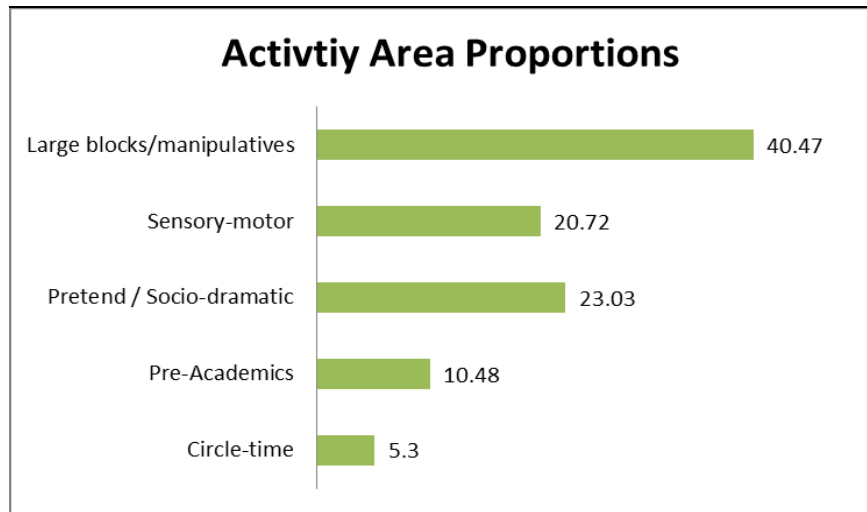
Figure 4.2. Time children spent in individual activity areas

As seen in Table 4.4, when children with ASD were in large blocks/manipulatives, they were less likely to hear behavioral management talk (β = -0.858, p = .001) than supporting peer relations, but more likely to hear positive social contacts (β = 0.446, p = .006), personal/practical assistance (β = 0.988, p = <.0001) and supporting object play (β = 1.194, p = <.0001) than supporting peer relations. In pre-academics, preschoolers were more likely to receive behavioral management (β = 0.817, p = .017), positive social contacts (β = 0.633, p = .005) and personal/practical assistance (β = 1.05, p = <.0001) than supporting peer relations from adults. However, they were more likely to hear supporting peer relations (β = -0.885, p = .0003) than supporting object play in this activity area. Supporting peer relations was less common (β = 0.479, p = .008) than personal/practical assistance in the sensory-motor area, but more common (β = -0.677, p = .0004) than supporting object play. In pretend/socio-dramatic activity area, children were more likely to hear supporting peer relations (β = -0.858, p = .001) than personal/practical assistance. Lastly, children were less likely to receive behavioral

management (β = -0.833, p = .007) and personal/practical assistance talk (β = -1.348, p =

<.0001) than supporting peer relations during circle-time.

Table 4.4 *Results for Adult Talk by Activity Area*

	Behavioral Management		Positive Social Contacts		Personal/practical Assistance		Supporting Object Play	
	β (Std Err)	*P*	β (Std Err)	*P*	β (Std Err)	*P*	β (Std Err)	*P*
Large block/manipulatives	-0.858 (0.248)	.001**	0.446 (0.16)	.006*	0.988 (0.202)	<.0001***	1.194 (0.188)	<.0001***
Pre-academics	0.817 (0.343)	.017*	0.633 (0.225)	.005*	1.05 (0.225)	<.0001***	-0.885 (0.244)	.0003**
Sensory-motor	-0.425 (0.265)	.109	0.042 (0.193)	.827	0.479 (0.181)	.008*	-0.677 (0.19)	.0004**
Pretend/Socio-dramatic Play	-0.205 (0.257)	.426	0.14 (0.193)	.467	-1.364 (0.205)	<.0001***	0.038 (0.182)	.836
Circle-time	-0.883 (0.327)	.007*	-0.224 (0.228)	.327	-1.348 (0.222)	<.0001***	-13.09 (28.623)	.648
Adult-Child ratio	-0.07 (0.135)	.602	0.013 (0.082)	.878	-0.029 (0.119)	.809	-0.013 (0.11)	.903
Chronological Age	-0.039 (0.026)	.138	0.01 (0.016)	.528	0.008 (0.023)	.741	-0.021 (0.022)	.345
Gender: Female	-0.538 (0.299)	.072	-0.521 (0.191)	.006*	-0.438 (0.268)	.102	-0.898 (0.246)	.0003**
Classroom Type: BAU	-0.188 (0.255)	.462	0.003 (0.156)	.986	-0.174 (0.224)	.437	-0.213 (0.209)	.308

($p < .05*$, $p < .01**$, $p < .001***$) Note: reference groups include supporting peer relations (adult talk), gender (male) and classroom type (LEAP).

Research Question 4: What is the association between adult talk and concurrent and longitudinal displays of social competent behavior by young children with ASD? Figure 4.3 presents the proportions of socially competent behavior displayed by children in this study. The descriptives reveal that preschoolers with ASD directed more of their social behavior to adults (1,752) than their peers (190). That said, positive social behavior following adult talk was absent for the most part (11,029).
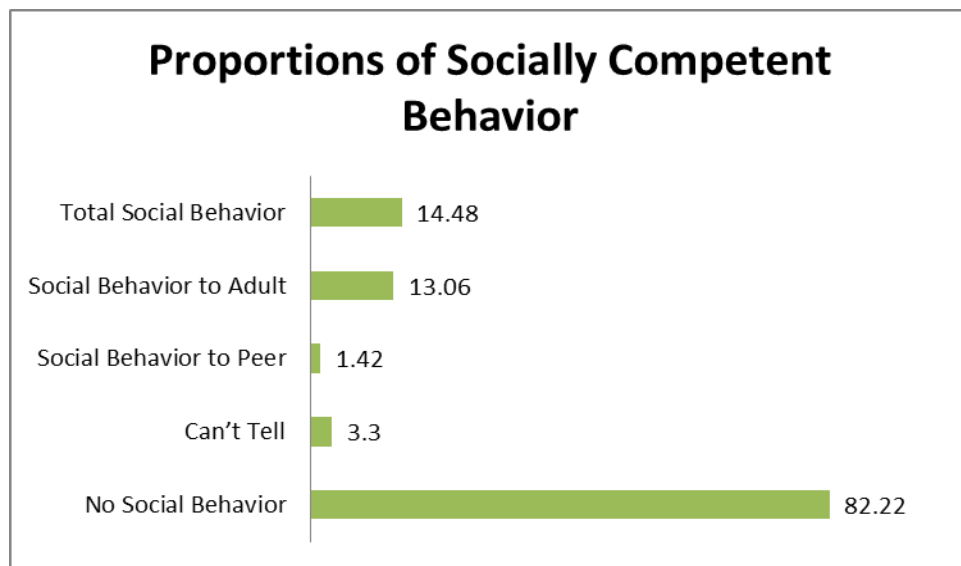
Figure 4.3. Children's socially competent behavior following some form of adult talk

Pearson partial correlations, with chronological age as the covariate, were used to examine immediate socially competent behavior (i.e., the observed occurrence of child social behavior following adult talk), and mixed models were used to investigate changes in social behaviors over time, as measured through teacher report. There were significant correlations (*r*) between the supporting peer relations adult talk category and children's total socially competent behavior ($r = 0.298$, $p < 0.01$). Additional correlational analysis

revealed when adults used supporting peer relations talk, the child's subsequent positive

social behavior was primarily directed to peers rather than adults ($r = 0.715$, $p < .0001$).

In comparison, the association between positive social contacts and total socially

competent behavior was significant ($r = 0.408$, $p < .01$) and appeared to be primarily

directed at adults ($r = 0.427$, $p < .01$). Lastly, supporting object play was positively

associated with total socially competent behavior ($r = 0.258$, $p < .05$) and social behavior

directed at adults ($r = 0.287$, $p < .05$) (See Table 4.4 for complete results).

Table 4.5 *Adult Talk and Socially Competent Behavior Correlations*

	Total Socially Competent Behavior	P	Socially Competent Behavior to adults	P	Socially Competent Behavior to Peers	P
Supporting Peer Relations	0.298	.009**	0.175	.134	0.715	<.0001***
Positive Social Contacts	0.408	.0003**	0.427	.0001**	0.107	.363
Supporting Object Play	0.258	.025*	0.287	.013*	-0.0122	.917
Personal/Practical Assistance	0.093	.426	0.126	.28	-0.110	.347
Behavioral Management	0.035	.765	0.062	.597	-0.109	.353
CA	0.212	.067	0.225	.051	0.033	.774

($p < .05$*, $p < .01$**, $p < .0001$***)

In order to examine the longitudinal relationship between adult talk and children's socially competent behavior, individual mixed models were utilized. A mixed model was necessary in order to correctly model the non-independence of repeated measures within persons. Classroom type, race, gender, and age are main effects, although not of substantive interest to this research question, are presented in Table 4.5 along with a reduced version of the output for the sake of clarity. Race (i.e., White/Non-white) was used instead of the race-ethnicity variable because the small number of students considered multi-racial resulted in inaccurate estimates. The remaining variables describe the different aspects of social competence (i.e., social awareness, social cognition, social communication and social motivation) displayed by the child and have been interacted with time. The estimates for each SRS or SRS-P sub-scale by time variable describe the expected change in the outcome in relation to each type of adult talk. Note, higher scores on the SRS/P are associated with increased symptom severity, thus, lower scores over time reflect improvement.

The findings reveal that children who received more statements or questions around <u>positive social contacts</u> at Time 1 (i.e., pretest) were seen by teachers as having more improvements in social cognition (β = -14.872, p = .001) and social motivation (β = -12.483, p = .098) over the course of one school year. Preschoolers who received higher amounts of <u>supporting object play</u> talk were rated by teachers as improving over time on the following SRS/P subscales: social awareness (β = -11.702, p = .003), social cognition (β = -10.28, p = .0004), social communication (β = -9.528, p = .002) and social motivation (β = -8.883, p = .007). In contrast, higher amounts of <u>behavioral management</u> adult talk directed to the child at Time 1 were associated with less social awareness (β =

24.963, *p* = .011) and social cognition (β = 17.06, *p* = .014) as perceived by teachers over time. Regarding the age covariate, teachers viewed children's social awareness as improving with age (β = -0.29, *p* = .049). The amount of supporting peer relations and personal/practical assistance talk did not impact children's socially competent behavior over time, at least as measured using teacher report. (Graphs for the significant adult talk predictors and social competence outcomes can be found on pages 77 and 78).

Table 4.6. *Socially Competent Behavior Over Time by Adult Talk*

	SRSP- social Awareness		SRSP- social Cognition		SRSP- social communication		SRSP- social Motivation	
	β (Std Err)	*P*	β (Std Err)	*P*	β (Std Err)	*P*	β (Std Err)	*P*
Supporting Peer Relations	2.601 (7.014)	.712	-7.873 (4.93)	.115	-10.394 (5.236)	.051	-9.63 (5.731)	.098
Positive Social Contacts	-7.708 (6.159)	.215	-14.872 (4.326)	.001**	-6.988 (4.572)	.131	-12.483 (5.029)	.016*
Supporting Object Play	-11.702 (3.851)	.003**	-10.28 (2.726)	.000**	-9.528 (2.909)	.002**	-8.883 (3.17)	.007**
Personal/Practical Assistance	2.761 (3.216)	.394	4.246 (2.234)	.062	4.544 (2.37)	.060	4.598 (2.597)	.081
Behavioral Management	24.963 (9.592)	.011*	17.06 (6.757)	.014*	11.81 (7.267)	.109	7.94 (7.856)	.316
Chronological Age	-0.29 (0.145)	.049*	-0.207 (0.13)	.117	-0.109 (0.136)	.428	-0.056 (0.145)	.701
Gender	-1.526 (1.71)	.376	-1.208 (1.54)	.436	-2.964 (1.607)	.070	-1.417 (1.718)	.413
Non-white	-0.495 (1.196)	.680	-1.524 (1.075)	.161	-1.653 (1.122)	.146	-1.818 (1.199)	.134
Classroom treatment type	-1.049 (1.296)	.421	-1.634 (1.164)	.165	-1.636 (1.215)	.183	-0.731 (1.298)	.575

(p < .05*, (p< .01**) Note: reference groups include male (gender), race (white) and classroom type (LEAP).
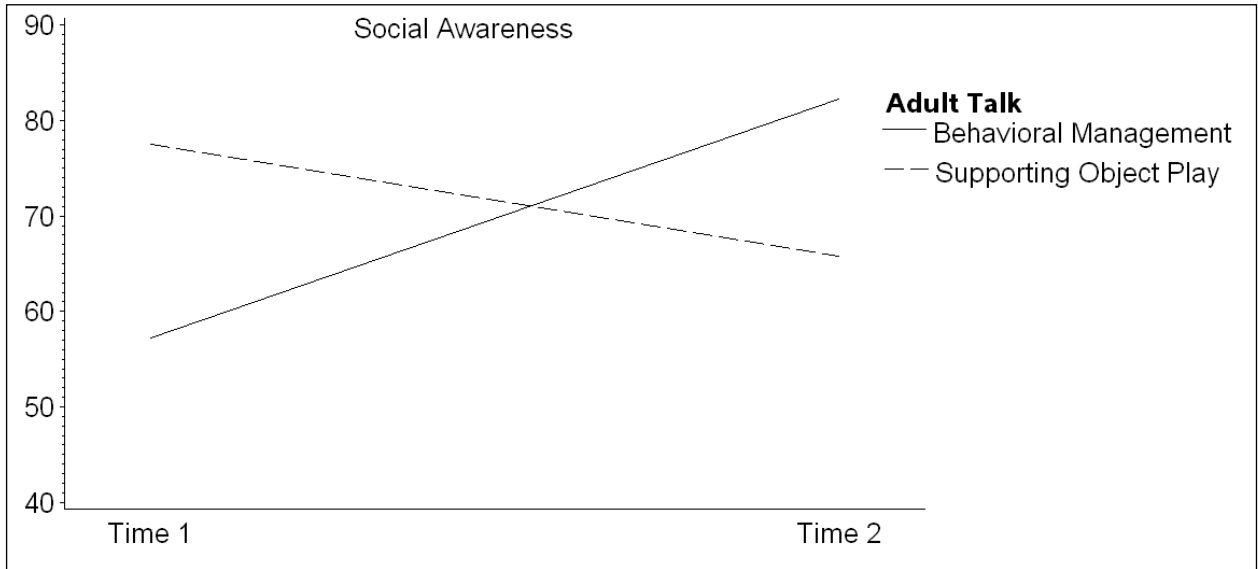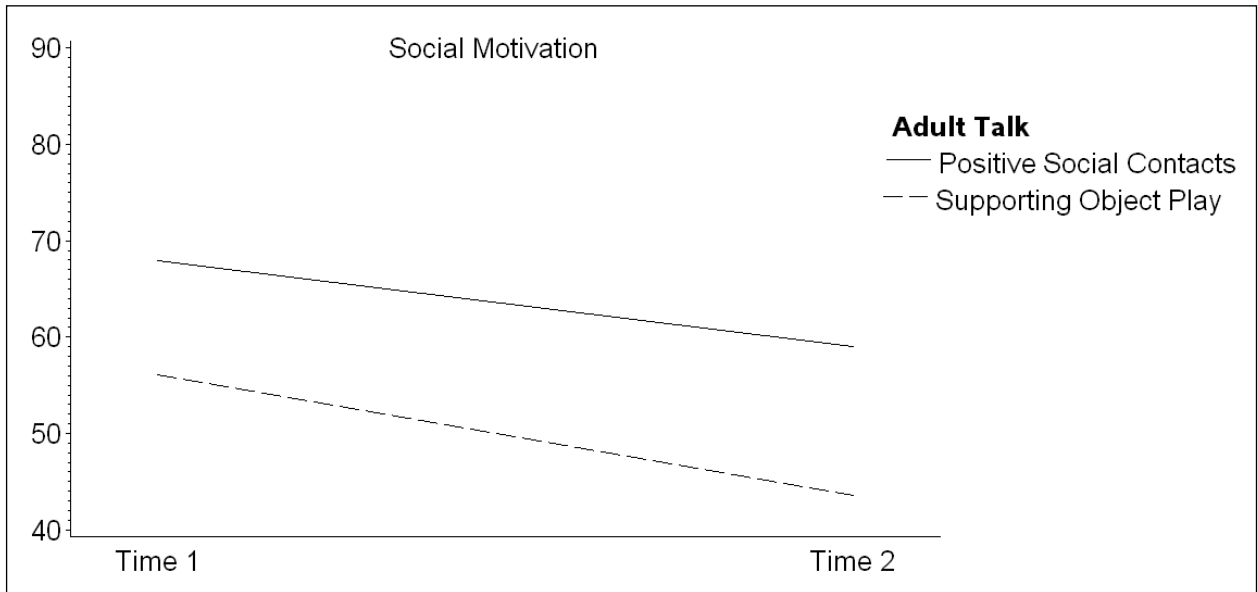
Figure 4.4. Social awareness by adult talk

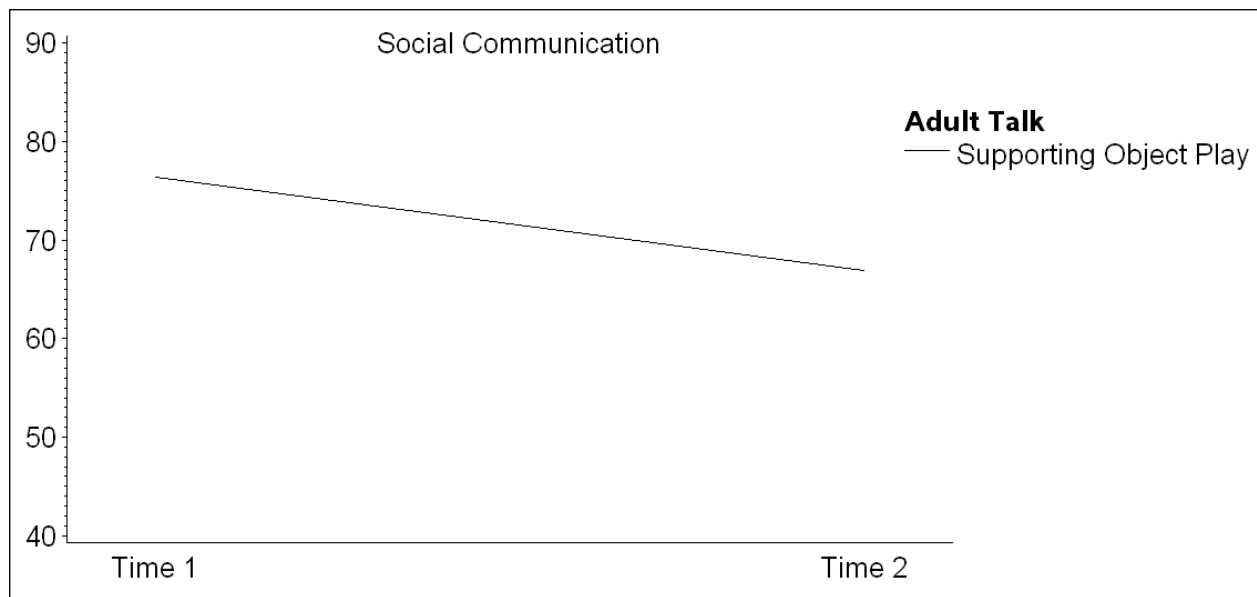*Figure 4.5.* Social motivation by adult talk
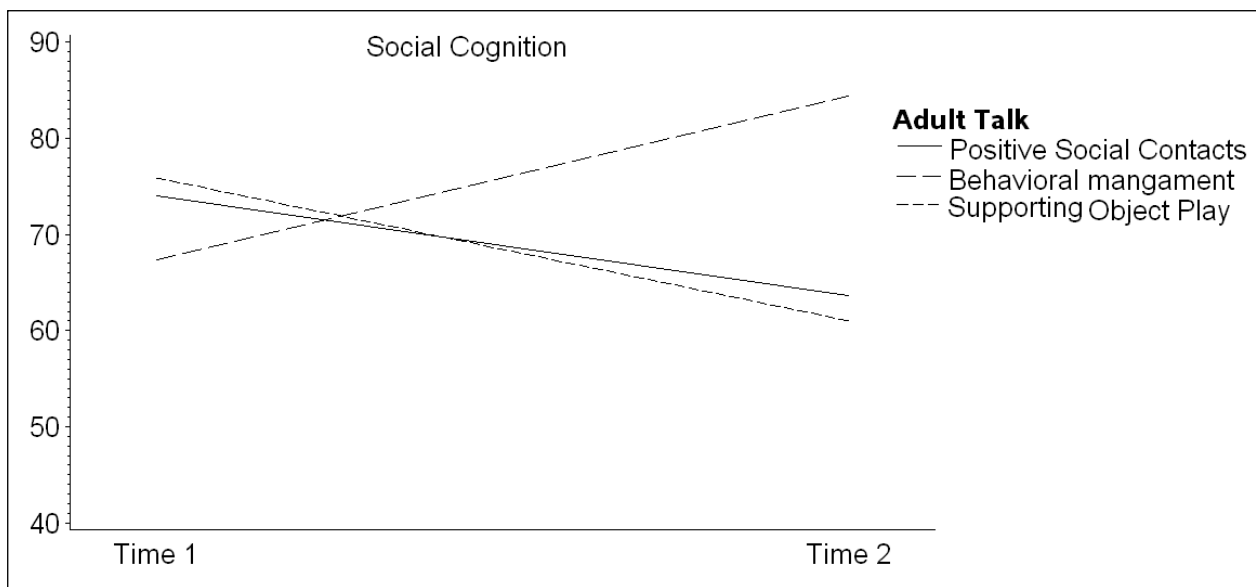
Figure 4.6. Social communication by adult

Figure 4.7. Social cognition by adult talk

Chapter 5: Discussion

The first portion of this chapter will briefly discuss the study's findings within Bronfenbrenner's bio-ecological model. Next, interpretations of the current findings as compared to previous research will be described. Lastly, the limitations as well as implications for practice and future research will be discussed.

Overview of Findings

Support for the notion that features of children's primary environments and the interactions within them affect children's development is the crux of Bronfenbrenner's bio-ecological model. In the case of the early childhood classroom, children's development is fueled by the consistency, frequency and complexity of interactions they have with others and the physical environment (i.e., proximal processes) (Bronfenbrenner, 2005). The current study supports his view that certain setting (e.g., activity area) and child characteristics (e.g., cognitive ability) may indeed impact the proximal processes taking place between classroom adults and preschoolers with ASD. This knowledge is meaningful since it could aid policy makers and school administrators in making realistic decisions about how to design or refine existing inclusive early childhood classrooms to support the social competence of children with ASD.

Types and amounts of adult talk. The results of this study demonstrate that the more frequent types of adult talk were "no talk" and personal/practical assistance, with "no talk" (51.97%) being the most commonly occurring. The amount of "no talk" in this

study appears to align with the percentage of no adult behavior preschoolers with disabilities received in Brown and colleagues' (1999) study (i.e., 58%). That said, the fact that children were not receiving talk from adults for large proportions of time in these studies may not be that surprising because, as Kontos points out, children typically out number adults in the classroom. Taking this into account, the average amount of time adults in the current study spent providing children with *some form* of talk (48.03%) appears to be quite substantial. Following 'no talk,' personal/practical assistance (e.g., Do you need help getting the puzzle off the shelf?) verbalizations were the most frequent (14.36%) form of talk children experienced, a finding which resembles the proportion of adult support Brown et al. (1999) reported. This finding was somewhat expected as it is likely that young children with ASD may require more assistance from adults in order to navigate the preschool classroom.

The amount of positive social contacts children with ASD received was lower than figures reported from studies involving typically developing children. Specifically, the amount of positive social contacts (e.g., What did you do at your Dad's house this weekend?) preschoolers in this study were exposed to was lower (8.26%) than the figure reported in Kontos' (1999) study (16%). The lower value could be a result of changes to Kontos' original positive social contacts code. Another possibility is that adults are indeed providing children with ASD less talk aimed at building positive adult-student relationships (e.g., questions about home life, asking a child to come play to cars and trucks). It is conceivable that adults may view relationships with students with ASD as difficult to cultivate because of the symptoms of this disorder. Further, the lack of bi-

directional social interaction between adults and children may have resulted in this type of talk being used less frequently.

In this study, adult talk centered on supporting peer relations was more frequent than percentages reported with typically developing children and children with other types of disabilities (e.g., speech and/or cognitive delays), but not as common as supporting object play. For example, File (1994) found adult support for social play among children with and without disabilities occurred infrequently (2%) and Kontos (1999) reported the amount of supporting peer relations talk typically developing children were exposed to also was low (2%). In comparison, statements and questions that supported peer relations (e.g., See if Jenny wants to play dolls with you) in this study took place somewhat more often (5.03%). The amount of supporting object play is in congruence with File's study where she found that talk which supported cognitive play (e.g., helping a child to engage with objects) occurred more often (12.21%) than talk that encouraged focal children to interact with their peers. There is, however, research suggesting talk around objects can positively impact the language (e.g., Yoder, & McDuffie, 2006) and communication (e.g., Lawton, & Kasari, 2012) abilities of children with ASD and, in turn, improve the quality of social interactions they have with others. In other words, even though this type of talk is occurring more frequently than supporting peer relations, it may be indirectly improving the social difficulties children with this disorder have with peers. Nevertheless, the amount of supporting peer relations talk, although higher in this study as compared to previous research, still appears to be quite low and, therefore, of some concern since children with ASD have difficulties with initiating and maintaining positive interactions with peers (see Strain et al., 2008). It must

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be noted that the optimal amount of supporting peer relations talk for promoting positive peer relationships is unknown, so whether adults in this study are providing too much or too little of this type of talk remains an area for future research.

Interestingly, the least amount of talk provided to preschool-aged children with ASD was behavioral management (2.64%) (e.g., We don't run in the classroom). Research suggests that behavioral problems are often attributed to children with ASD (see Matson, Wilkins, & Macken, 2009); however, the findings of this study suggest that teachers are not providing children with large amounts of behavior management talk. This result may be a product of preschoolers in this study having, on average, levels of problem behavior that fell below the clinical cut-off of 60 on the CTRF measure (i.e., LEAP $M = 51.46$; BAU $M = 39.75$). Another possibility is that because behavior management verbalizations were at the bottom of the coding hierarchy, this type of adult talk may be underrepresented.

In sum, "no talk" and personal/practical assistance were types of adult talk that were most frequent. The amount of positive social contacts focal children received in this study was less than reported in Kontos' (1999) investigation with typically developing children. Conversely, talk centered on supporting peer relations took place at a higher rate than in Kontos' investigation, but was still at a fairly low level. Consistent with previous research on the talk adults provide to children with disabilities, verbalizations related to supporting object play occurred more often than supporting peer relations. Finally, behavior management talk was quite infrequent and somewhat unexpected, since displays of challenging behavior are often associated with children with ASD. Overall,

this study builds on previous research by offering new knowledge about the quality of talk children with ASD are receiving in the inclusive classroom.

Child characteristics and adult talk. The findings of this study suggest that cognitive impairment and autism severity was associated with the types of adult talk children with ASD experienced. These results are congruent with earlier studies that found a preschooler's disability status may be related to the talk they receive from adults (e.g., Hestenes et al., 2004; Kontos et al., 1998). Regarding preschoolers with ASD, Dykstra and colleagues (in press) reported that children with more cognitive impairments were exposed to fewer adult verbalizations than those with higher cognitive abilities. The results of this study demonstrated that children with more cognitive difficulties are receiving less talk related to supporting peer relations as compared to positive social contacts. When a median split was utilized, it was found that children with more cognitive difficulties (i.e., a Mullen score below the median) had a higher probability of receiving certain types of adult talk. More specifically, these students were more likely to receive statements or questions centered on positive social contacts and personal/practical assistance than supporting peer relations. The use of a median split with the measure of autism severity demonstrated that children with more severe autism (i.e., a score above the median) were more likely to be exposed to behavioral management or supporting object play talk than supporting peer relations.

On the other hand, the link between language and problem behavior and adult talk diverged from past research. For instance, Dobbs and Arnold (2004) reported typically developing children are exposed to different types of talk if they were perceived to have challenging behaviors. Girolametto and colleagues (2000b) found that children with

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language delays received more directive talk than verbalizations that modeled language. Dykstra and colleagues (in press) also reported that the language ability of children with ASD was associated with adult input. In the current study, however, language difficulties and problem behavior were not associated with the adult talk preschoolers with ASD experienced. As mentioned earlier, preschoolers in this study had relatively low levels of perceived problem behaviors, which may have resulted in undifferentiated adult talk. The divergent finding with Dykstra et al. was surprising since many of the students included in their study were part of this one, but perhaps this is related to the length of the observation. More specifically, the videos were roughly 30 minutes long used in this study, whereas the LENA recordings used in Dykstra and colleagues' study were 3 hours and, therefore, may be more accurately capturing adult verbalizations.

Previous research is mixed as to whether children's age impacts the talk they receive from adults. For instance, Wilcox-Herzog and Kontos (1998) found that teachers used more elaboratives and non-elaboratives with younger children relative to those who were older. Conversely, Girolametto et al. (2000b) found that age was not linked to the directives typically developing children received from early childhood educators. The results of the current study provide some evidence that age may indeed be related to the types of talk children with ASD experience. Specifically, older children were more likely to be exposed to statements or questions related to supporting peer relations than younger children. Contrary to this finding, Buysse, Davis, Goldman, & Skinner (2003) reported that teachers in early childhood inclusive classrooms used more strategies with younger children to support positive relations than older preschoolers. The divergent results may be a product of older children in this sample having fewer autistic symptoms ($r = .26$, p =

.024), and therefore, potentially being seen as more capable of positively interacting with peers.

Children's race-ethnicity was a factor that affected the types of adult talk they experienced. Vygotsky's socio-cultural theory suggests that parents pass on cultural values to their children through language. Providing some evidence for this notion, in a review of the literature, Hanson and SooHoo (2008) posited that parents may emphasize more collective/interdependent (e.g., caring for siblings) vs. individualistic/independent (e.g., children being able to dressing themselves) talk depending on their cultural background. In this study, relative to White children, Hispanic preschoolers were more likely to hear talk related to supporting peer relations than personal/practical assistance. A possible explanation for this finding may be related to the number of Hispanic preschoolers (n = 17) who were matched with a teacher of Hispanic background in the sample. In other words, Hispanic teachers may place increased value on positive cooperation among peers as compared to pre-academic activities, for example, (i.e., personal/practical assistance) than European American teachers. Thus, the results of this study suggest classroom adults, similar to parents, may use language to pass on cultural values.

Child gender also was associated with certain types of adult talk. Specifically, the results of this study indicated girls were more likely than boys to be exposed to supporting peer relations talk relative to supporting object play. There is research suggesting teachers may perceive girls as being more socially competent than boys (see Odom et al., 2008), and perceptions of social competence can influence how teachers interact with children (Brophy-Herb et al., 2007). Thus, adults in this study may view

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girls as having more peer-related social skills and, therefore, feel more comfortable providing them with this type of talk than with boys.

In sum, these results qualify existing research on the link between adult input directed at children with ASD by accounting for specific types of adult talk. This study found that a preschooler's degree of cognitive difficulties and autism severity impacted the types of talk they experienced. These findings demonstrate that language and problem behaviors do not seem to impact adult talk toward children with ASD in the same way that has been found with young children who do not have this disorder. Lastly, the results of this study demonstrated that age, race/ethnicity and gender also affected the types of adult talk directed at children with ASD. For instance, Hispanic adults in classrooms were more likely to provide children with talk centered on supporting peer relations than personal/practical assistance, which could be related to their collective values.

Setting characteristics and adult talk. Previous research suggests that the types of talk adults provide to children, both with and without disabilities, are affected by the activity area they are located or engaged in (Brown et al., 1999; Girolametto et al, 2000a; Kontos, 1999). Similarly, the results of this study indicated children with ASD were more or less likely to hear certain types of talk depending on the activity area. For instance, when children were located in circle-time, the activity area in which they spent the least amount of time, they were more likely to hear supporting peer relations talk than verbalizations centered on behavioral management and personal/practical assistance. Alternatively, when children were in pretend/socio-dramatic play and large blocks/manipulatives, they were in general, less likely to hear supporting peer relations compared to other types of talk. Boyd and colleagues (2008) reported that preschoolers

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with ASD were more likely to engage in peer interactions in small groups when the adult was disengaged. Perhaps classroom adults participating in this study also have noticed that providing children with ASD with talk centered on supporting peer relations in relatively small group areas (e.g., large block/manipulatives) can interfere with peer interactions. Alternatively, large group areas (e.g., circle-time) may be seen by classroom adults as a more suitable, less direct approach to supporting peer relations. In other words, group arrangement may be a factor affecting the types of verbalizations children with ASD receive from adults.

Adult-child ratio and classroom treatment type (i.e., being a LEAP vs. BAU inclusive classroom) did not affect the types of talk children with ASD experienced. Studies have found adult-child ratio can impact interactions between teachers and children in mainstream classrooms (Cassidy and Buell, 1996; Hauser-Cram et al., 1993). In inclusive classrooms, Hestenes and colleagues (2008) and File and Kontos (1993) reported that high adult-child ratios did indeed result in higher quality interactions between classroom adults and children. However, some researchers have found that adult-child ratio does not impact the interactions between teachers and typically developing children (Mashburn et al., 2008; Pianta et al., 2005). However, the findings of the current study should be interpreted with caution because they may be a product of the classrooms having rather high adult-child ratios (i.e., on average, 4.6 students per adult). Lastly, children with ASD received similar amounts of specific types of talk in LEAP and BAU classrooms, an unexpected finding since a central aim of LEAP classrooms is to support peer relations and this may or may not be the case in BAU classrooms. The absence of group differences may, however, be a product of the adult talk data being

captured at the beginning of the school year and teachers not yet fully implementing

LEAP curriculum/strategies by that point.

In sum, classroom adults may be taking a more indirect route when it comes to

verbally supporting positive interactions between preschoolers with ASD and their peers

by providing them with this type of talk during pre-planned circle-time activities as

opposed to less structured activities, such as large blocks/manipulatives. Previous

research on the impact of adult-child ratio is inconclusive. The results of this study were

aligned with studies that found adult-child ratio was not a factor affecting interactions

between students and teachers. This finding, however, may be related to the lack of adult-

child ratio variability. Lastly, the adult talk children with ASD received in LEAP and

BAU classrooms did not differ. This result suggests that high quality inclusive

classrooms that do not adhere to specific principles may provide children with similar

amounts of specific types of adult talk, but this finding also could be related to the time of

year the observations took place.

Adult talk and social competence. Research suggests that young children's level

of social competence is linked to positive relationships with peers and adults as well as

academic success in the classroom (Katz, & McCellan, 1997; McClelland and Morrison,

2003; Missall, & Hojnoski, 2008). The adult talk young children are exposed to is one

factor that may contribute to children's development of social competence (Gallagher et

al., 2007; Powell et al., 2008; Sontag, 1997; Stanulis, & Manning, 2002). With

difficulties in social competence being a core deficit among children with ASD, it is

essential that early intervention efforts are focused on ameliorating these impairments

because it may result in reductions in health and educational expenditures as well as in

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symptom improvement across the lifespan (Lord, & Bishop, 2010). This study sought to determine the types of talk classroom adults provide to children with ASD with the hope of translating this knowledge into interventions/classroom strategies that can be used during common, naturally occurring preschool activities and routines.

Previous research suggests the adult talk children are exposed to impacts their concurrent displays of socially competent behavior. For instance, Mahoney and Wheedan (1999) and File (1994) found that more teacher responsiveness was positively associated with children's displays of social competence (e.g., social initiations). With regard to learning related skills, Powell et al. (2008) reported that increased on-task behaviors were associated with more adult praise among typically developing children. Further, there are ample interventions studies (e.g., Frea, Craig-Unkefer, Odom, & Johnson, 1999; Kohler, Greteman, Raschke, & Highman, 2007; Nabors, McGrady, Rozenzweig, & Srivorakiat, 2007) demonstrating the types of talk adults provide to children with disabilities affects their socially competent behavior. The results of this study align with previous research in that children's immediate displays of socially competent behavior followed certain types of talk. Specifically, increased amounts of supporting peer relations directed at children were associated with increased displays of socially competent behavior toward peers. In addition, greater amounts of positive social contacts and supporting object play talk were associated with children directing more appropriate social behavior to adults. The strength of the association between supporting peer relations talk and children's positive social behavior toward peers ($r = 0.72$, respectively) suggests this type of verbalization may be useful for encouraging interactions between children with ASD and their peers during center time activities. Further, providing preschoolers with this

disorder with increased amounts of positive social contacts and supporting object play appear to be promising strategies for encouraging engagement with classroom adults. Taken together, these findings provide new information on the association between adult talk and the proximal displays of positive social behavior by children with ASD in the natural environment.

Previous studies have explored how adult behaviors affect the social engagement of children with ASD with classroom adults and peers (Reszka, 2010); and the link between adult engagement vs. disengagement and these children's positive social interactions with peers (Boyd et al., 2008). To this author's knowledge, studies have not examined the link between the amounts of various types of adult talk directed to preschoolers with ASD in the natural environment and changes in social competence over time. The results of this study indicated that certain amounts of specific types of adult talk were predictive of changes in children's social competence over the course of one school year.

Preschoolers who received more behavioral management had less social awareness (e.g., reacts to people as if they are objects) and social cognition (e.g., takes things too literally) at time 1 compared to time 2. This finding suggests when adults rely largely on behavioral management talk (e.g., reminding a student of classroom rules) that indicators of these children's social competence worsen over the school year. Fortunately, this was the most infrequent type of talk classroom adults directed to children with ASD; nevertheless, this particular type of adult talk appears to have a substantial impact on teacher's perceptions of children's social development.

Conversely, larger amounts of positive social contacts and supporting object play were associated with improvements on several indicators of children's social competence. Specifically, teachers rated children who received more talk centered on positive social contacts as having more improvements in social cognition and social motivation. With regard to supporting object play, when students with ASD received greater amounts of this type of talk at Time 1, teachers perceived them as having improvements in social awareness, social cognition, social motivation (e.g., seeks out social interactions with peers or adults) and social communication (e.g., ability to relate to others). Thus, supporting object play talk had the most impact on teachers' perceptions of positive changes in children's social competence. This finding is supported by previous research which has found that supporting object play verbalizations can indeed positively impact the social behaviors of children with disabilities (Kim, Elbaum, Hughes, Sloan, & Sridhar, 2003; Sainato, Jung, Salmon, & Axe, 2008). There are several possibilities that could offer some explanation for this finding. For instance, adults may talk more about objects children with ASD are interested in, which could result in children actually displaying more socially competent behavior, or at the very least children's appropriate engagement with objects may lead to teachers to perceive these preschoolers as being more socially competent. Another possibility is that talk centered on supporting object play is allowing children to develop the play skills needed to interact more appropriately with peers and objects over time. It is not clear why supporting peer relations did not result in positive changes in teacher's perceptions of children's social competence, although it could be a product of the measure being teacher report and possibility capturing socially competent behavior towards teachers more so than peers.

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That said, these findings are quite compelling in that they potentially provide a minimally burdensome instructional approach (i.e., increasing specific types of adult talk) classroom adults could use to foster the positive social behavior of children with ASD in the natural environment, which could lead to improvements in their relationships with peers and teachers.

In sum, the findings from this study are in congruence with previous research that has demonstrated specific types of adult talk impact the social behavior of children with disabilities. This study, however, adds to past research by providing knowledge on what types of adult talk (i.e., positive social contacts, supporting peer relations and object play) affect these children's concurrent displays of socially competent behavior in the natural classroom setting. The results of this study also suggest that behavioral management talk may negatively affect children's social competence. Conversely, if children receive higher amounts of supporting object play and positive social contacts they show gains in socially competent behavior, as reported by teachers, over the course of the school year. These findings lend some support to Bronfenbrenner's assertion that the type and frequency of proximal processes between adults and children impact social development. These results also have a number of practical implications, which will be discussed in more detail soon.

Limitations

This study has several limitations that must be noted. The first set of limitations relate to the data used for analysis. For example, the data comes from a larger quasi-experimental study; therefore, casual links are not possible, since randomization was not utilized. The videotaping of children with ASD took place during center time only, so

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whether similar types and amounts of adult talk are present at other times of the preschool day (e.g., outdoor play) is unknown. The data used comes from one time point, with the exception of SRS/P scores from time 2. The decision to use pre-test vs. post-test data was done in order to minimize possible effects of children's exposure to the two types of classrooms (i.e., LEAP and BAU) included in the study. In addition, only high quality classrooms were included in this study, thus, it is uncertain whether these findings generalize to low quality inclusive preschool classrooms. Further, this study only used time 1 adult talk data to predict changes in children's social competence at time 2 (i.e., the SRS/P). Therefore, an inference was made that adult talk at time 1 would remain constant across the school year, which may have not been the case. Further, teacher perception of child behavior likely influenced how the teacher assessed that child's social competence over the course of the school year. Thus, objective or parent rated measures of children's social competence are needed to substantiate these findings. However, for the current sample, the parent-completed version of the SRS/P was not used because it was so poorly correlated with both teacher measures as well as direct assessments of children's social behaviors. Obviously, context/setting has an impact on adults' perceptions of children's social competence (see Kanne, Abbacchi, & Constantino [2009] for a discussion on divergent parent and teacher SRS reports).

There are also limitations associated with the coding scheme used in this study. For instance, the adult talk and child social behavior coding schemes were hierarchical, which may have resulted in some forms of children's socially competent behavior and certain types of adult talk being missed. For example, if a focal child received verbalizations related to supporting object play and behavior management in the same 10-

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second interval, then only the higher level of talk (i.e., supporting object play) would have been captured. Further, coders were also instructed to code conservatively if they were uncertain of the type of adult talk directed toward the focal child, which may have resulted in underestimates of some types of talk. Nevertheless, the adult talk and child social behavior hierarchies were necessary for partial interval sampling. This type of sampling likely resulted in more behaviors being captured than if momentary-time sampling was used, since some behaviors were low frequency and short in duration (see Meany-Daboul, Roscoe, Bourret, & Ahearn, 2007; Yoder, & Symons, 2010).

Regarding the data analysis, an adult talk reference category was necessary for the models utilized, and supporting peer relations was chosen since it was of primary interest in this study. Unfortunately, this did not allow for comparisons to be made between other types of talk and child and setting characteristics. For instance, whether children with more cognitive difficulties were more likely to receive supporting object play or positive social contact was not examined. In addition, an examination of the types of adult talk children received took place within rather than across activity areas. A second reference group would have been required to explore adult talk across activity areas and would have resulted in findings that were quite difficult to interpret.

Implications for Future Research

Research is needed on the longitudinal relationship between adult talk and the social behavior of children with ASD since the study sample used only included pre-test data. Further, intervention studies where teachers are trained to boost the amount of specific types of adult talk to children with ASD (e.g., talk focused on object play), based on the outcomes of this study, are needed to see if there are indeed differential effects for

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children in an intervention vs. control group. Studies that use the existing coding system to examine whether adult talk to children varies by disability type (e.g., ASD vs. Down syndrome) also could provide a better understanding of the relationship between adult talk and disability. Future investigations should incorporate characteristics of early childhood practitioners (e.g., stress level) as well as other setting features (e.g., group composition) that have been shown to affect adult talk but that were not able to be included in the current study. Lastly, as previously mentioned, studies using direct observation are needed to determine whether adult talk in the early childhood classroom is similar to adult talk found in the home, and whether any improvements in children's social competence are found across both settings.

Implications for Practice

The primary aim of this study was to determine the types and amounts of adult talk children with ASD received in inclusive preschool classrooms as well as the relationship between adult talk and the socially competent behavior children displayed. The secondary aim was to examine setting (i.e., adult-child ratio, activity area) and child characteristics (i.e., autism severity, language, cognitive ability and problem behavior) associated with the adult talk preschoolers with ASD experienced.

This study's findings have several practical implications. This research provides knowledge that could be used by researchers to create and refine existing interventions that seek to improve the positive social behavior displayed by children with ASD and, possibly, children with other types of disabilities (e.g., emotional or behavioral disorders) who have difficulties with social interaction. Further, these refined or newly developed interventions could facilitate the generalization of these children's positive social

behavior because adults may continue to employ them in other classrooms areas (e.g., snack time). This study identifies the amount of specific types of talk children with ASD experience, knowledge which could be used to ensure children with this disorder are exposed to the adult talk needed to ameliorate social impairments and potentially improvements in overall core symptoms (e.g., communication difficulties). The amelioration of autistic symptoms may improve the relationships children with ASD have with their peers and teachers, which may impact success in school and other settings. The results of this study could be used by teachers and allied health service providers to foster home-school partnerships that may lead to children with ASD receiving a higher dose of specific types of talk (e.g., supporting object play) linked to socially competent behavior. Further, when classroom adults provide parents with information about the benefits of providing young children with ASD with certain types of adult talk, it could result in parents using these strategies during play-dates and/or interactions with siblings, which could lead to additional improvements in these children's social competence. Lastly, this study provides additional knowledge on the effect of certain types of adult talk that could be used to build professional development tools and incorporated into university early childhood and allied health courses. With this information, current and future practitioners may be better able to create preschool language environments that foster the social competence of children with ASD, which could result in reductions in special educational expenditures and a more harmonious classroom climate

APPENDIX A: Adult Talk and Subsequent Child Social Behavior Manual

DIRECT OBSERVATION OF ADULT TALK DIRECTED AT CHILDREN WITH AUTISM
SPECTRUM DISORDER AND THEIR RESULTING SOCIAL BEHAVIORS

Note: This coding manual is designed to train behavioral coders and is for use with
PROCODER

Table of Contents

I. Project Overview

A. Adult Talk and the Social Competence of Children with ASD

Autism spectrum disorders (ASD) are characterized by deficits in communication and social interaction, in addition to the presence of restricted and repetitive behaviors. Communication difficulties may include a delay or lack of development of spoken language and gestures as well as difficulty initiating or maintaining conversation and echolalia. Social impairments may be displayed by a lack of spontaneous sharing with others, a lack of social reciprocity and difficulties relating to others. Restricted and repetitive behaviors may be exhibited in the form of repetitive use of objects (e.g., flipping eyelids on dolls), circumscribed interests, a strict adherence to routines and/or repetitive motor mannerisms (e.g., hand flapping).

For children with ASD attending preschool, these impairments will likely prevent them from exhibiting the social competence needed for success in the classroom. Social competence is comprised of learning-related and peer-related skills valued by adults in the classroom. Peer-related skills are those a student needs to accomplish their interpersonal goals, such as initiation and maintenance of interactions. Examples of these skills include entering a peer group, gaining access to a toy and suggesting play ideas. Learning-related social skills are needed for academic performance, but may not be necessary for positive relations between peers. Examples of learning-related social skills include listening to and following directions, organizing work materials and staying on task.

The type and amount of verbalizations adults direct at individual children in the preschool classroom is often referred to as adult talk. Adult talk is thought to both present and limit opportunities for children's development of social competence. For example, a child may have an increased number of interactions with his or her classmates if verbally prompted by an adult. In other cases, adult talk may limit interactions with peers and promote more engagement with adults. Further, the type and amount of adult talk directed at children may depend on environmental factors, such as the activity area where the verbalizations occur (e.g., art area vs. large block area). To date, the adult talk directed toward children with ASD, the activity areas that may be related to it and the social behavior children display following adult talk has received little attention by researchers. To address these unknowns, I have developed a direct observational coding scheme, which will be described in some detail beginning in section IV.

II. Behavioral Coding

Two trained observers will code several types of adult talk (e.g., supporting peer relations, positive social contacts) in the preschool classroom during free play as well as social behaviors (e.g., hugging a peer) children display after an adult verbalization using standardized operational definitions for these behavior categories. I will act as a third observer for a minimum of 20% of the observation sessions to ensure inter-rater agreement. Each observation session will be roughly 30-minutes and divided into 10-second intervals, which will typically result in a 179 10-second intervals. In addition, I will randomly select 1 out of every 5 videos to code for reliability. If reliability is not present then that set of videos (e.g., videos 5 through 10) and training tapes will need to be recoded. Note, coders must reach at least an 80% consensus agreement per coding category as well as overall agreement for each coding category for three consecutive videos before coding a non-practice/reliability video. The coding of adult talk and any positive child social behavior that follows, although slow-going and tedious at times, will provide early childhood educators, researchers and policy-makers with needed information about creating an optimal environment for fostering the social competence of children with ASD.

III. Coding Procedures

1. Read over the behavioral definitions/examples each time you being a coding session.

2. Take a 10-minute break after coding a full video.

3. Use headphones when coding videos.

4. Code consecutively for no more than 1 ½ hrs.

5. You will start coding at the beginning of the session (00:10.00).

6. Listen for the focal child's name at the beginning of each video.

7. Manipulate media and coding screens so that the interval time is visible.

8. Record all behaviors present during each session as described in this manual.

9. You are allowed to watch a given video twice. Pause and rewind as much as needed when coding a given video.

10. The 1st letter of each code is a short-cut and is recommended over the pull-down menu. Note, some codes begin w/ the same letter, so you'll need to press a given letter multiple times.

A.   To Create a Code File

1. Connect USB cord from T-L 2 hard-drive to the laptop

2. Copy media file from T-L 2 hard-drive to the desktop

    a.   Media files are located in the folder titled, "Adult Talk Videos"

3. Click on Digital PROCODER short-cut

4. Click on File

    a.   Place cursor on "Open"

    b.   Click on "Open a Code File"

    c.   Open "Adult Talk.cod"

        i.   Sometimes you have to click on the "Desktop" icon on the left side of the screen to see this file

5.   Go back to the "Procoder for Digital Video" screen

    a.   Click on file

    b.   Place cursor on "Open"

    c.   Click on "Open a Media File"

        i.   Locate file on the pop-up screen, click on it and open it

6. Go back to "Procoder for Digital Video" screen

    a.   Place the cursor on "New"

    b.   Click on Observation data file

    c.   Name the file with ID#, date and your initials and then press "save"

7. Once file is saved, a new screen should open

  a. Here you will input your ID#, date and your initials in the appropriate boxes

  b. Place the cursor at the bottom of the screen and pull down it down so that you can see two "Use current" boxes

    i. Click "Use" current for the Media and Code File

  c. Click on data (top left-hand corner of half screen)

    i. Click on "adjust data grid for current codes"

    ii. Click on "add rows" and type-in 179 and then press the "OK" box

8. Press Data next to the "File Info" to begin

  a. Adjust margins to so that all categories are visible

B. During a Coding Session

1. Click on 1st cell and then press replay. Continue this process until all intervals are coded

2. To code, press the corresponding computer key(s) or use the cursor to click on the pull down menu and then press the desired code

3. Use the "comments" sheet for any anomalies, questions, and/or concerns (see Appendix 1)

C. To End a Coding Session

1. Ensure that all cell are fill-in (i.e., there should be no blank cells in a given file)

2. Delete any unused rows when you are finished

3. Be sure to click "disk" to save at the end of each coding session

4. Move video to the recycling bin when a coding is complete

5. Transfer completed code file to the "Coded Adult Talk" file on the desktop and T-L 2 hard-drive

D. PROCODER Reminders:

a. If you happen to erase the cell time (e.g., 00:10.10) as you move from one 10-s to the next, simply re-type the same time in cell (00:10.10).

b. Try to finish the current video and save it onto the hard-drive, since laptop memory is quite limited.

c. Be sure videos and code files are not being left on the laptop we you finish with a coding session.

d. Watch for tips from the cameraperson about the interactions between the focal child and others as well as location of the focal child (i.e., activity area).

IV. Operational Definitions

A. Adult Talk Codes[8]

This project will use a coding scheme designed to capture the adult talk in the preschool setting and the resulting social behaviors of children with ASD. This classification includes questions and statements directed at the focal child that fall under the following hierarchical and mutually exclusive[9] categories: (1) supporting peer relations; (2) positive social contacts (3) supporting object play; (4) practical/personal assistance; (5) behavior management; (6) can't tell; and (7) no talk. These statements and questions can be directed solely at the focal child or in the form of group talk (i.e., verbalizations directed at a group of children that includes the focal child). It's important to focus on the *primary purpose* of the adult's talk. If it appears the purpose of the adult's talk is to facilitate the child's appropriate play with an object, then code supporting object play; however, if it appears the primary purpose of the adult's talk is to promote peer to peer interaction then code supporting peer relations. That said, for each 10-s interval the highest level of adult talk should be coded. If an adult utterance begins in one interval, continues into the second interval or beyond (e.g., slowly counting 1 to 10) code the highest form of adult talk in each interval and child social behavior in the interval where the talk ends, if it occurs. You should be conservative in coding in that if you're debating between 2 codes to select the "lower" level code as a default (e.g., if there is an instance of adult talk that could be considered both

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[8] Adult talk codes are derived from the coding scheme developed by Kontos (1999).

[9] Hierarchical meaning that supporting peer relations is the highest level of adult talk that can be coded, whereas no talk is the lowest. Mutually exclusive means that only one type of adult talk can be coded per 10-s interval.

supporting peer relations and behavioral management – go with behavioral management). The following are examples and non-examples of the adult talk codes:

Supporting Peer Relations (S): Statements: Adult describes, explains, encourages, gives a reason or information about a child's interactions with another child (e.g., "When you said that to Mary, she probably felt upset."). Attempts by the adult to familiarize the focal child with peers (e.g., "which friend is absent today?") or the actions of peers (e.g., Jason and Kim are holding hands as they bounce on the trampoline,") as the focal child watches them. **Questions:** Asks questions about a child's interactions that can be answered with a yes/no or one-word response (e.g., "Did you ask Tim if he would like to play?"). Asks open-ended questions about a child's interactions (e.g., "How do you think Lori felt when you said that?"). While two children are pushing a car back-and-forth, the car goes astray and the adult says, "Jenny, ask Jon if he's going to get it."

Non-examples: If adult tells the focal child and two other children, "Let's each grab a funnel to play with, friends," *supporting object play* should be coded because the statement is primarily concerned with the funnel. If the focal child asks an adult, "What center is Jennie going to?" and the adult points to pretend play, without any verbalization, *no talk* should be coded.

Positive Social Contacts (P): Statements: Adult uses statements to praise or encourage the child or a group the child is part of to interact with the focal adult or another adult in order to support positive adult-student relations in the classroom (e.g., "Want to come keep me company while I put out snack?;" "thank you for playing"). These statements also relate to acknowledging children's feelings (e.g., "It sounds like the monsters in the story scared you") or showing concern for a student's well-being (e.g., "Jim, are you not hungry today?"). Greeting a child should be coded as positive social contacts. Singing, finger plays, rhymes and story-telling are generally considered positive social contacts; however, if the adult is explicitly singing to encourage the child to engage in an activity such as clean-up or to wash his/her hands, for example, then *practical/personal assistance* should be coded. Also, when an adult repeats or expands a child's utterance, code positive social contacts. **Questions:** Adult socializing with a child (e.g., "What did you do last night?," "Where did you get those new shoes?" or "How are you"). These are questions that consider the child's perspective, such as offering a child a choice.

Non-examples: If an adult says, "Here's the big blue block," when building a tower with the focal student, although he/she is encouraging an interaction, the talk revolves around *supporting object play* and should, therefore, be coded as *supporting object play*. If the child asks, "What letter is this?" and the adult says "let's sing our ABC's to

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figure it out" then *practical/personal assistance* should be coded rather than positive social contacts, since the purpose of the singing is to help the child identify letters. Adult to focal child: "He loves his purple circle." In this instance, you should code down to *supporting object play* rather than positive social contacts. Although the statement has a feelings component, it doesn't encourage an interaction w/ the adult and appears to be more about the object. "You did a great job counting the cars," should be coded practical/personal assistance, even though it is positive statement coming from the adult – the talk is about counting, an academic activity. If a child says, "That's a T.V." and the adult says "Yes, that is a T.V," *Can't Tell* should be coded, since the talk does not fall under any of the primarily codes of interest for this study.

Support Object Play (SS): Statements: Adult praises, encourages, describes, explains, gives reason or information about a child's object/fantasy play (e.g., "This fire helmet can turn you into a firefighter"). **Questions:** Yes/no or closed-ended questions about a child's object play (e.g., "Are you going to make a train out of play-dough today?"). Open-ended questions about play (e.g., "What did you make with the blocks?").

Non-examples: If an adult and focal child are rolling a toy car back-and-forth, and the adult says, "Ready, set, go" to the child, *positive social contacts* should be coded, since the aim of the request is to encourage relations between the adult and focal child.

Practical/Personal Assistance (PP): Statements: Adult provides reminders / encouragement / praise about self-help (e.g., clothing, toileting). Praise, encouragement, and information related to academic and pre-academic activities (e.g., counting, matching, copying letters, art) should be coded *practical/personal assistance*. These statements also include those aimed at helping a child store or clean-up projects after the activity is done (e.g., The blocks go on the second shelf). **Questions:** Adult helps child obtain materials needed for an activity (e.g., "Do you have the pizza cutter for our pizza party?"; "Okay, guys let's grab some markers for the leaf project ") or helps the focal child transition to a different center (e.g., "What center is after large blocks?" when she is finishing up with art. If a child is engaged in a computer program about shapes and numbers and the adult is asking questions about it (e.g., "What shape is at the bottom of the screen?").

Non-examples: If adult says, "You don't get to go to art until you clean up the puzzles" *behavioral management* should be coded, since this statement is about following a classroom rule. Asking a focal child to hand another student dishes for a pretend meal should be coded as *supporting peer relations*; although, the statement contains aspects

related supporting object play-- the purpose of the adult talk is primarily to promote interactions between the focal child and his/her peers.

Behavior Management (B): Statements: These are statements where the child displays an undesirable behavior and an adult commands/requests/implies a different one be used. Examples include the adult explicitly stating a classroom rule believing the child is about to break a rule (e.g., "Elise, use your walking feet," as the child leaves pretend play for art), redirecting a child who is not engaged toward an activity without explanation (e.g., "Tory, stop looking at the computer area, we are building a tower with blocks right now."), or telling a child what to do when he's misbehaving (e.g., "Tim, we don't take toys from Becky"). Other examples include: the adult tells the child it's clean-up time and the child runs away and the adult repeats that it's clean-up time; and the child is told by the adult it's time to go to art and starts to go towards the blocks and adult says "no, we're going to art." If the adult praises or encourages desirable classroom behaviors (e.g., "I like the way you walked to the art area") behavioral management should be coded. Encouraging the child to respect classroom materials also falls under this category. **Questions:** Adult asks focal child about classroom rules and routines (e.g., "Why aren't you sitting on rug during circle time?).

Non-examples: If the adult says, "Julie, paint the all leaves" while the focal child is painting, the talk should be coded as *supporting object play*, since the focal child is engaged in the activity and has not broken a classroom rule. If after the adult tells Tim not to take toy, she goes on to say "I think apologizing to Becky for taking her toy would make her happy," *supporting peer relations* should be coded, since its purpose is to mend strained peer relations.

Can't Tell (C): Acknowledgements or responses that do not fit into one of the above mentioned categories (e.g., "Okay," "What?" "Yeah"). You're unable to tell if a verbalization is directed the focal child or you are not able to hear what the adult is saying (e.g., high levels of static). If the adult and child are outside of camera range and you are not able to determine if interactions between them are taking place (e.g., the adult and child enter the bathroom) – code *can't tell*. Keep in mind, this code should be used sparingly.

No Talk (N): No adult talk directed to the focal child occurs during the 10-s interval. If an adult is assigning children to different activity areas during circle-time, no talk should be coded unless the verbalization is directed at the target child.

Children's Social Behavior Codes[10]

For each 10-s interval, social behavior toward adults, peers or no social behavior will be coded. Social behavior can only be coded if some form of adult talk precedes it. Children's social behavior codes, like the adult talk codes, are hierarchical and mutually exclusive: (1) social behavior toward peers; (2) social behavior toward adults; (3) can't tell; and (4) no social behavior. For this project, the highest level of children's social behavior is (1) social behavior toward peers and the lowest is (4) no social behavior. If a child's social behavior takes place between two 10-s intervals, the behavior should be code in the where the behavior is initiated. Negative social behavior is not being considered for this project (e.g., focal child screams at an adult). The following provides definitions and examples of children's social behaviors coded for this project:

Social Behavior Toward Adult (S): Motor/gestural or vocal/verbal actions that the child directs to an adult during the 10-s interval that follow some form of adult talk. These are actions made to an adult and should have a communicative intent. Examples of social behavior directed to an adult include talking to adult, greeting (waving good-bye to a teacher); sharing (giving an object); touching (giving a hug, kiss, pat on the arm); calling the adult's name; or any other socially directed behavior. If an adult asks a question and the focal child provides an answer or raises his/her hand, positive child social behavior is coded. If the focal child takes an object from the adult, child social behavior is also coded, as long as the adult does not help the child take the object. Sitting in an adult's lap is coded as positive social behavior. Adult requests or directives that are clearly carried out by the child without physical assistance from the adult should be coded as *social behavior toward adult* (e.g., Adult: "put your raincoat on so we can go outside"; Child: puts on raincoat). More specifically, for a child's non-verbal compliant behavior to be coded as child social behavior toward an adult, you need to be able to answer 'yes' to ALL the following w/in a 10-s interval:

(1) The adult directive/request was related to an act the child was not currently participating in (i.e., it must be novel).

(2) The adult did not provide physical assistance. It is acceptable if the adult provides more than one verbal request to the child or models the action s/he wants the child to engage in.

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[10] Social codes, definitions and examples are derived from the CASPER coding system (Tsao et al., 2008).

(3) The child responded appropriately to the adult request/directive. (If the child's response is in-between intervals, watch that next interval to see if the child responded appropriately.)

Example 1: The child has been told by the adult, "we are going to use a sponge to paint leaves on a sheet of paper." Child social behavior toward the adult should be coded if: (a) the child is painting a leaf and the adult asks the child, "Can you paint a mountain?" and the child does so (although there is some carry-over in the request (i.e., child is **painting** leaves and then is asked to **paint** a mountain), it would still be considered novel, since no adult assistance was provided and the child complies); (b) the child is painting and the adult tells him to put down his sponge and he does so without any physical assistance from the adult (this is an adult directive is related to something different the child was participating in and the child follows through correctly).

Non-example 1: Social behavior toward an adult should not be coded, if while painting leaves on the right hand side paper the adult: (a) says "paint some leaves on the left side of the paper" (the child is currently painting leaves and the adult is not asking him to do something novel); tells him to "paint all the leaves" (the child is currently participating in painting leaves); (b) grabs the child's hand to help him paint on the page (child social behavior toward adult can't be coded if adult provides physical assistance); (c) the adult says "do you want to keep painting?" and the child continues to paint (this is not a novel request).

Other Non-Examples: If a child repeats an adult's utterance, code *no social behavior* (e.g., adult says, "That's a green leaf" and the child immediately says "Green leaf,") (responses that may be echolalic are not considered social behavior). An adult reaching for a child's hand to transition to a new center, should be coded *no social behavior*, since the adult is initiating the social behavior rather than the focal child. Adult requests that result in the focal child whining, crying, hitting, or screaming should be coded as *no social behavior*, since these are considered to be negative social behaviors toward an adult.

Social Behavior Toward a Peer (SS): Motor/gestural or vocal/verbal actions that the child directs to a peer during the 10-s interval that follow some form of adult talk. These are actions made to another peer and should have a communicative intent. Examples of social behavior directed to a peer include talking to peer, greeting (waving good-bye to a peer); sharing (giving an object); touching (giving a hug, kiss, pat on the arm); calling the peer's name; or any other socially directed behavior. If the focal child takes an object from the peer, child social behavior is also coded.

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Non-examples: If adult takes a focal child's hand and taps another child on the shoulder, social behavior toward peers should not be coded, since it's not clear whether the focal child is the one initiating the social behavior. If the adult tells the focal child to ask another student for a toy and the focal child rips the toy from his/her peer's hands, *no social behavior* should be coded, since negative social behavior is not of interest and the child did not follow through with the adult's request.

Can't Tell (C): *Can't tell* is coded when it is unclear whether a socially directed behavior was emitted (e.g., the focal child's mouth is moving, but static prevents you from determining whether she is directing an utterance at a peer or adult). If the adult and child are outside of camera range and you are not able to determine if interactions between them are taking place – code can't tell. This code should be used sparingly.

No Social Behaviors (N): Coded when the focal child is not directing any motor/gestural or vocal/verbal behavior to an adult/peer. Example include: the teacher and the focal child are wiping the table during clean-up together without talking; the focal child is sitting at a table with peers and teachers but not interacting with anyone

B. Activity Area Codes[11]

Activity area codes represent information about the location (permanent or temporary) of the focal child within the physical ecology of an early childhood setting. Activity area is determined by where the student is located during an interval and includes the following codes: Transition, Manipulative, Large Motor, Storytime/Books, Art, Pretend/Sociodramtic, Large Blocks, Sensory, Dance/Music/Recitation, Food/Snack, Self Care/Self Help, Preacademics, Computer and Circle/Large Group time. For this study, the activity area where the child spends the most time during the 10-s interval will be coded. For instance, if the child spends 3-s in art and 5-s in pretend play, code the 10-s interval as pretend play. Activity area is determined by the prominent materials within a given area. If an area does not have an overarching theme (i.e., significant amounts of materials related to two or more activity codes), then the area should be determined by what the child spends the most time doing. For instance, if the focal child is at a table in the middle the classroom and there are art supplies (e.g., paints, markers) and cars and trucks covering the table and the child is painting for a majority of time, then the activity area should be labeled Art **A**. Once an activity area is decided on, the coder should use that same code for as long as the focal child remains in that location. If the child leaves this center area and returns to this area at another time during the

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[11] Activity area codes, definitions and examples come from the CASPER coding system (Tsao et al., 2008).

recording and the area is not clearly defined based on the prominent materials, code the area based on what the and spends more time doing; keep in mind, this may result in an activity area receiving a different code than the one previously decided on.

Transition (T): Coded when the focal child spends more time per 10-s interval moving from one activity area to another or outside an activity and is clearly waiting to enter. For example, when a child is waiting for another to leave block area so that he can enter -- transition should be coded. In addition, an area where activity area cards are posted is considered to be **T**.

Manipulative Play (M): Manipulative play is coded when the focal child is located in an activity area that focuses on the small motor movements of the hand, fingers, wrists, and hand-eye coordination. Manipulative play activities include playing with play-dough, putting together puzzles, stacking rings stringing beads, sewing, placing pegs in a pegboard and fitting Tinkertoys. Manipulative play activities also includes pushing and pulling small toys buttons on toys and playing with cars and trucks. If while playing with play-dough in a manipulative play activity area, a child or adult arranges a pretend play activity (e.g., passes out plates and candles to pretend making a birthday cake)the coder should consider this time as pretend play **P**. Legos and play at the lego table are also coded **M** (manipulative play).

Large Motor (L): Large Motor is coded when the focal child is located in an activity area with large motor equipment (e.g., bikes, wagon, swings, slides, see-saws, monkey bars, obstacle course) or in an activity in which large motor behavior is being exhibited (e.g., children can or are running, jumping, climbing). Large motor is typically coded as the activity context during outdoor play activities unless adults, peers or the focal child initiates a more specific activity such as Sensory **SS** by scooping in the sandbox. Examples of large motor activities include: swinging, climbing, running, hopping, skipping, chasing another child, riding tricycles, walking, being pulled in a wagon and being pushed in a wheelchair. Large motor activities typically occur in the gym or during outdoor play, but may also occur in classrooms and other settings. Examples of other indoor large motor activities include: playing on or using an obstacle course, sliding down a slide, rolling or climbing on large wedges, pushing large rolling equipment, climbing in or out of plastic crates, rough and tumble play, and pillow fights. In addition, large motor activities should be coded when a teacher (or physical therapist) has clearly set up a structured large motor activity (e.g., working on walking, teaching stair climbing).

Storytime/Books (S): Storytime/books is coded when the focal child is located in an activity area that has materials for reading, listening and telling a story. Storytime/books materials often involve books, puppets, flannel board, or other media materials (e.g., story records, story videotapes). Storytime/books should be coded if the focal child is located in an activity areas arranged for reading books and listening to stories. In addition, the focal child may be located in a group activity in which reading, telling or listening to a story is occurring. Playing instruments with a book or singing along with book or flannel board is also coded as **S**. If the focal child is watching a video or movie, the activity is coded as storytime.

Art (A): Art is coded when the focal child is located in activity areas for painting, drawing, coloring, writing, or sculpting to create an art product. In these areas, children typically may use materials such as crayons, paints, markers, brushes, finger-paints, coloring, pipe cleaners, clothes pins, glue, plaster, cut out shapes, tape, scissors and stamps.

Pretend/Sociodramatic Play (P): Pretend/sociodramatic play is coded when the focal child is located in areas with materials that are typically used in a symbolic manner (e.g., dress up clothes, kitchen utensils, dollhouse) or that support activities with other children that contain make-believe roles or themes (e.g., fireperson hat, doctor's kit). Examples include: dressing-up clothes, cooking in kitchen area, washing babies, pretending to have a birthday party and going to the grocery store. Symbolic play may occur in other activities also, but this code should only be used if the activity materials were specifically designed to support pretend play.

Large Blocks (LL): Large blocks is coded when the focal child is located in activity areas with large building or construction materials. Large blocks is differentiated from manipulative play in that the play materials are *typically larger and used on the floor rather the table.*

Sensory (SS): Sensory is coded when the focal child is located in activity areas where children might use and play with materials designed to elicit a specific sensation (e.g., touching, feeling, scooping, pouring, burying). Examples of these activities include sensory tables or sand boxes filled with materials such as water, sand, rice, beans, birdseed and noodles. In addition, an activity area or activity of blowing bubbles should be coded as sensory. If touching, petting or playing with a real animal (e.g., rabbit, kittens, puppy) is the focus of the general activity, the activity area is coded as **SS.**

Dance/Music/Recitation (D): Dance/music/recitation is coded when the focal child is located in activity areas that contains instruments (e.g., bells, drums, flutes) for making music or general activities that include singing, dancing, listening to music, clapping and moving to music, doing finger-plays and reciting poems. Examples of this activity include children sitting with the entire group singing "EENSY-WEENSY SPIDER," reciting the poem "FIVE LITTLE PUMKINS," several children doing the actions to a rhythmic aerobics record or a child listening to music on the headphones. Dance/music/recitation is coded when instrument play is led by a teacher during a group music time or when the focal child selects and uses a musical instrument from a shelf of many different type of toys (e.g., trucks, books, blocks).

Snacks/Meals/Food (SSS): Snacks/meals/food is coded when the focal child is located in an activity area that is being used for the preparation and the eating of real food. Snacks/meals/food is coded when children are involved in activities that include setting the table, passing out food, cooking and preparing food stuffs (e.g., measuring ingredients, slicing foods, pouring liquids, stirring ingredients). Pretending to set the table or prepare or eat food is considered **P.**

Self-Care/Self-Help (SSSS): Self-care/self-help is coded when the focal child is located in an activity area for self-care (e.g., bathroom) or is engaged in self-care activities which children practice skills to meet their general personal needs (e.g., toileting, washing hands, dressing, brushing teeth, putting on eye glasses, undressing, and combing hair). Self-care activities are also coded when they are the focus of direct instruction (e.g., the child is learning to pull up his pants in a toileting program) or when they are a functional part of the classroom events (e.g., the child is putting on her coat before going outside).

Pre-academics (PP): Pre-academics is coded when the focal child is located in an activity with the explicit objective of practicing or teaching skills related to traditional pre-academic and academic information (e.g., matching or naming colors, shapes, and common objects, reading, writing, copying letters, reciting the alphabet, naming letters, counting, identifying numbers). Designated science and writing centers are considered pre-academic activity areas.

Computer Activities (C): Computer activities is coded when the focal child is located in an activity area or activity in which computers are use irrespective of how the computers are used (i.e., for instruction, viewing or fun).

Circle/Large Group Time (CC): Circle/large group time is coded when the focal child is located in an activity areas that involves sitting in a group in which the adult is discussing

or presenting information. The children may be sitting in chairs or on the floor. The adult may be discussing various topics including: the weather, holidays, who is present or absent, and past or future events. When children are involved in 'recall,' circle-time should be coded as the activity area.

Can't Tell (CCC): Can't tell is coded when the above listed activity areas do not apply or seem to fit the situation <u>or</u> if two or more of the definitions stated above seem to fit equally as well. If a focal child is placed in 'Time Out', the activity is coded as **CCC**. If the child goes to an area designed as a 'Quiet Time AREA,' the activity is coded **CCC**. This does not include the focal child lying down in the middle of the classroom or lying down while in another activity is being conducted (e.g., story-time/books, transition).

C. Observer Key Codes

Adult Talk		Child Social Behaviors		Activity Area	
Supporting Peer Relations	S	Social Behavior Toward Adults	S	Transition	T
Supporting Object Play	SS	Social Behavior Toward Peers	SS	Manipulative Play	M
Behavioral Management	B	No Social Behavior	N	Large Motor	L
Positive Social Contacts	P	Can't Tell	C	Storytime/Books	S
Personal/Practical Assistance	PP			Art	A
Can't Tell	C			Pretend/Socio-dramatic Play	P
				Large Blocks	LL
				Sensory	SS
				Dance/Music/Recitation	D
				Snacks/Meals/Food	SSS
				Self-Care/Self-Help	SSSS
				Pre-academics	PP
				Computers	C
				Circle time/Large Group Time	CC
				Can't Tell	CCC

Appendix 1

Date	Video ID # (last 8 digits)	Interval	Anomalies, questions, and/or concerns (e.g., children who are slow responders)

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