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Child and classroom characteristics associated with the adult language provided to preschoolers with autism spectrum disorder☆

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ABSTRACT

The aim of this study was to examine associations between the automated Language ENvironment Analysis (LENA) system adult word count (AWC) variable and characteristics of classrooms (e.g., teacher burnout) and preschoolers with autism spectrum disorder (ASD) (e.g., autism severity). The AWC samples from 67 preschoolers with ASD were collected during typical morning classroom routines (e.g., center time). Results indicated that AWC was positively associated with children's cognitive ability and negatively associated teacher burnout and adult to student with ASD ratio. Lower adult to children with ASD ratio (i.e., fewer adults relative to students with ASD) resulted in preschoolers receiving less adult language. Additional factors thought to be related to child and classroom characteristics affecting the adult language directed at children with ASD are discussed.

1. Introduction

A rich, supportive language environment is associated with gains in the social and communication competencies typically developing children need for success in the preschool classroom and beyond (Burchinal et al., 2008; Mashburn et al., 2008). Adult language (or "output") is a fundamental component of the language environment and appears to be an underlying factor enabling the acquisition of these skills. These tenets, recognizing the importance of both the environment and the role of adult responsiveness to child communication, are key components of the transactional theory of language development. Transactional theory emphasizes the bidirectional nature of communication development, with the responsiveness of adults to children and their reciprocal interactions playing a vital role in development (Kublin, Wetherby, Crais, & Prizant, 1989). For example, the amount of teacher verbalizations children are exposed to in early childhood settings is positively associated with their sociability (Phillips, McCartney, & Scarr, 1987). Teachers' use of conversational control questions (e.g., Wh-questions) has been reported to produce more diverse and complex language among young children (Girolametto, Hoaken, van Lieshout, & Weitzman, 2000). Adult language is therefore likely to be

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even more beneficial for preschoolers with autism spectrum disorder (ASD), since it may play a role in ameliorating social-communication impairments (Warren & Yoder, 2004).

While adult language may be crucial for symptom improvement, there is some research to suggest that it varies greatly in preschool programs serving children with ASD. For example, Dykstra et al. (2012) reported that the number of adult words children with ASD are exposed to in preschool classrooms ($n = 15$) over a 3 h period ranged from 1771–10,898 ($M = 4886$). Although differences in program intensity, strategies, and methods likely affect this variability, knowledge is scant about child and classroom characteristics that may contribute to differences in the adult language children with ASD experience. With growth in the number of children with ASD entering the preschool classroom (Data Accountability Center, 2011), a better understanding of these factors will be important for early intervention efforts, as these factors may impact the reciprocal transactions, and ultimately may have effects on development in communication and other developmental areas.

There is evidence that certain child characteristics affect the adult language young children experience. Warren et al. (2010) used the Language ENvironment Analysis (LENA), a newly developed automated recording device, to examine the natural language environment of the home for children with ASD in comparison to a normative sample of typically developing children. Their results indicated that, on average, typically developing children had more vocalizations (647) and conversational turns (146) with adults per day than children with ASD. Further, the caregiver report measures of children's ASD symptomatology were associated with the amount of words caregivers directed to children. In other words, children with fewer autistic symptoms received more language from adults. Interestingly, the caregiver report measures were more robustly correlated with the number of words children with ASD received than objective measures of their abilities, suggesting that perceptions of ability may uniquely contribute to the amount of language children with ASD receive from adults. Adding to these findings, Dykstra et al. (2012), also using the LENA, found that the severity of children's autistic symptoms influenced the adult–child interactions in the preschool classroom. Specifically, these authors found that children with ASD who had greater cognitive impairments produced fewer vocalizations in the classroom, and children with this disorder who had lower language and cognitive abilities experienced fewer words from adults. Thus, irrespective of the setting (i.e., home or classroom), it is reasonable to hypothesize that children with ASD who produce fewer vocalizations may in turn elicit fewer words from adults, which may affect their ability to take advantage of learning opportunities in these social contexts.

In addition to child characteristics, there is reason to believe that unique features of the classroom (i.e., adult stress level and adult to child ratio) may affect the adult language children experience. First, there is evidence that difficult parent–child interactions are related to stress level, which in turn, can affect children's language development (Magill-Evans & Harrison, 2001). For example, Noel, Peterson, and Jesso (2008) found that higher levels of parent stress were associated with lower receptive and expressive language abilities among disadvantaged children. These authors speculated that their results stemmed from the lower quality of the parent–child interactions. Pertaining to preschool classrooms, research suggests that teachers of students with ASD may experience high levels of stress (Hastings & Brown, 2002; Lecavalier, Leone, & Witz, 2006; Wisniewski & Gargiulo, 1997). Similar then to highly stressed parents, classroom adults may have diminished verbal interactions with children with ASD, which may affect the development of children's language skills. The ratio of adults to children within the classroom is another factor that may impact the amount of time adults have to verbally interact with individual children. Hestenes, Cassidy, Shim, and Hegde (2008) examined teacher-student interactions in both inclusive and non-inclusive classrooms and found that high adult to child ratios were associated with increased teacher responsiveness. Alternatively, low adult to child ratios have been found to be associated with teachers' use of more restrictive language (e.g., go to blocks, put on your shoes) with children (Cassidy & Buell, 1996; Hauser-Cram, Bronson, & Upshur, 1993), which could lead to fewer conversational turns between adults and children, particularly those with limited communication skills such as children with ASD. Thus, stress level and adult–child ratio appear to be related to adult–child interactions and are, therefore, likely to be particularly influential in classrooms containing children with ASD because of the challenges this disorder presents to teachers.

Although previous studies provide useful information about child and classroom characteristics that affect the adult language young children experience, several limitations are apparent. First, there is a dearth of knowledge about the relationship between child characteristics and the resulting adult language children with ASD experience in the classroom. Second, research on the link between the adult output received by children with ASD and features of the classroom (e.g., ratio of adults to children with ASD) is needed. To begin to address these deficits in the literature, the overall aim of this study was to examine the association between the LENA variable of adult word count (AWC) and characteristics of classrooms and preschoolers with ASD. The specific research questions were: (1) how does the number of adult words directed at children with ASD vary by severity of children's symptoms; and (2) what is the association between certain characteristics of classrooms (i.e., teacher burnout, adult to child ratio and adult–student with ASD ratio) and AWC.

2. Methods

2.1. Participants

Sixty-seven children, ages 3–5, who were part of a larger study examining preschool programs for young children with ASD were included in this study. All participating children were served in self-contained classrooms in a Southeastern school district in the United States. Of the 67 participants, 79% were male ($n = 54$) and 7% ($n = 5$) were Asian, 17% Black ($n = 12$), and