Predictors of decoding for children with autism spectrum disorder in comparison to their peers

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ABSTRACT

Background: Although researchers have identified strong associations between emergent literacy in early childhood and later conventional reading skills for typically developing (TD) children, it is unclear whether these associations extend to children with autism spectrum disorder (ASD).
Method: We analyzed the degree to which three emergent-literacy skills (i.e., alphabet knowledge, print-concept knowledge, and phonological awareness) of 35 children ages three- to five-years-old with ASD predicted decoding and the degree to which associations differed from a comparison group of 73 TD children. We hypothesized that all emergent-literacy skills would predict later decoding for both groups of children and that autism status would moderate the association between print-concept knowledge and decoding.
Results: We found that phonological awareness was a statistically significant predictor of later decoding for children with ASD, but we did not find any evidence that ASD status moderated the relationships between emergent-literacy skills and decoding.
Conclusions: Based on these findings, early educators should consider emergent-literacy skills to be important learning targets for young children with ASD, just as they are for children without disabilities. Furthermore, phonological awareness might be even more important for young children with ASD than for children without disabilities.
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Emergent literacy is a developmental process that starts before children begin formal reading instruction and includes several skills that have been shown to be important precursors to later reading development for typically developing (TD) children (Catts, Fey, Zhang, & Tomblin, 1999; Hammill, 2004; National Early Literacy Panel [NELP], 2008; Scarborough, 1998). These skills include oral language, print knowledge, and phonological awareness. Although there is substantial evidence that shows emergent-literacy skills are important predictors of formal reading (e.g., word reading, comprehension) for TD children, less is known about the emergent-literacy skills that may predict formal reading for children with autism spectrum disorders (ASD). Therefore, the current study aims to examine the emergent-literacy skills that predict decoding for children with ASD in comparison to their TD peers.

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1. Patterns of literacy for children with ASD

One common reading profile for children with ASD is a discrepancy between typically developing decoding ability and deficient comprehension skills (Nation, Cocksey, Taylor, & Bishop, 2010; Wei, Christiano, Jennifer, Wagner, & Spiker, 2015). Although many children with ASD fit this profile, children with ASD are a heterogeneous group evidencing deficits in a range of literacy areas including: (a) decoding words (Nation, Clarke, Wright, & Williams, 2006; Wei et al., 2015), (b) reading fluency (Kamps, Barbetta, Leonard, & Delquadri, 1994), and (c) comprehending text (Nation et al., 2010; Ricketts, Jones, Happé, & Charman, 2013). Furthermore, even children that fit into the common reading profile exhibit high levels of variability, with some children performing either uniformly low or high on measures of decoding and comprehension (Nation et al., 2010; Wei et al., 2015).

2. Emergent literacy and TD children

The research base on emergent literacy and TD children has been thoroughly established. For TD children, emergent-literacy skills in early childhood have been shown to predict children's later reading abilities (NELP, 2008; Scarborough, 1998). Three specific emergent-literacy skills that have been identified as strong predictors of later reading success are oral language, print knowledge, and phonological awareness. Oral language refers to children's abilities with receptive and expressive language and has been shown to be highly correlated with children's later reading ability (Catts et al., 1999; Roth, Speece, & Cooper, 2002). Print knowledge, or children's understanding of the meaning and use of print, is comprised of two separate skills (i.e., alphabet knowledge and print-concept knowledge) and is one of the most powerful predictors of how well a child will read in early elementary school (Hammill, 2004; Piasta, Justice, Mcginty, & Kaderavek, 2012; Schatschneider, Fletcher, Francis, Carlson, & Foorman, 2004). Phonological awareness—children's understanding of the sounds that comprise words—has also been shown to be a predictor of TD children's word reading skills (Kirby, Parrila, & Pfeiffer, 2003; Swanson, Trainin, Necoechea, & Hammill, 2003). The best emergent-literacy predictors of later reading for TD children are alphabet knowledge ($r = 0.50$) and phonological awareness ($r = 0.40$), whereas print-concept knowledge ($r = 0.34$) and oral language ($r = 0.33$) are moderate predictors of later reading (NELP, 2008).

3. Early literacy and children with ASD

Unfortunately, much less is known how emergent literacy relates to later reading skills for children with ASD. The current research literature on the emergent literacy of children with ASD includes only five published research studies (Davidson & Ellis Weismer, 2014; Dynia, Brock, Logan, Justice, & Kaderavek, 2016; Dynia, Lawton, Logan, & Justice, 2014; Lanter, Freeman, & Dove, 2013; Lanter, Watson, Erickson, & Freeman, 2012), one unpublished doctoral dissertation (Rosenberg, 2008), and one review of the literature (Westerveld, Trembath, Shellshear, & Paynter, 2016). Taken together, these studies support several conclusions. First, children with ASD tend to have comparable alphabet knowledge in comparison to their TD peers but children with ASD lag behind their peers in print-concept knowledge, vocabulary, and phonological awareness (Dynia et al., 2014; Lanter et al., 2013). Second, although there seems to be a common profile of emergent literacy for children with ASD, subsets of children with ASD show varying patterns of low performance or high performance across emergent-literacy skills (Davidson and Ellis Weismer, 2014; Lanter et al., 2013). Third, children with ASD have similar rates of growth as their peers in alphabet knowledge and print-concept knowledge (Dynia et al., 2016). Finally, children with ASD's performance on measures of emergent literacy seem to be related to deficits related to ASD, such as language (Dynia et al., 2014; Lanter et al., 2012), cognition (Davidson and Ellis Weismer, 2014; Rosenberg, 2008), and social skills (Davidson and Ellis Weismer, 2014; Lanter et al., 2013). Taken together, these studies offer insight into the development of emergent literacy for children with ASD; however, it remains unclear how emergent-literacy skills relate to later phonetic decoding ability for children with ASD.

4. Current study

Given the lack of research measuring the impact of emergent-literacy skills on conventional reading skills for children with ASD, it is unclear how emergent-literacy skills relate to conventional reading skills (i.e., decoding) for this population. From existing cross-sectional studies, it seems that this development may be quite different than for TD children. Understanding the links between emergent literacy and decoding for children with ASD could inform early literacy interventions for this population. Therefore, the present study addresses two research questions: (a) whether and to what extent children's preschool emergent-literacy skills predict decoding for children with ASD and (b) whether and to what extent autism status moderates the association between children's preschool emergent-literacy skills and decoding. Based on the extant literature, we hypothesize that alphabet knowledge, print-concept knowledge, and phonological awareness will be related to children with ASD's decoding and that autism status will moderate the association between print-concept knowledge decoding with the association between print-concept knowledge and decoding being stronger for children with ASD (Dynia et al., 2016). The directionality of this hypothesis is based on previous findings that print-concept knowledge and decoding profiles differ for children with ASD compared to TD children; we hypothesized that these pronounced differences might predict later reading deficits.