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The relationship between cognitive development and conduct problems in young children with autism spectrum disorder



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ABSTRACT

Individuals with ASD often demonstrate elevated rates of challenging behaviors, such as tantrums, aggression, and property destruction. The current study examined the relationship between cognitive abilities and conduct problem behaviors in 263 children aged 18 to 39 months. Cognitive development was measured utilizing the cognitive developmental quotient (DQ) on the *Battelle Developmental Inventory, Second Edition (BDI-2)*. Participants were separated into two groups: (1) low cognitive DQ group (cognitive DQ less than or equal to 70), and (2) typical cognitive DQ group (cognitive DQ greater than 70). Conduct problems were assessed using the Tantrum/Conduct Behavior subscale of the *Baby and Infant Screen for Children with aUtism Traits, Part 2 (BISCUIT-Part 2)*. Higher rates of overall conduct problem behaviors were observed in young children with ASD and typical cognitive development relative to children with low cognitive development. Comparisons of specific conduct behaviors indicated cognitive ability may be associated with particular presentations of conduct problems. Implications are discussed.

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1. Introduction

Autism Spectrum Disorder (ASD) is characterized by social and communication deficits and the presence of repetitive behaviors and restricted interests (Matson, 2007; Matson, Carlisle, & Bamburg, 1998; Matson & Dempsey, 2008; Matson, González, & Wilkins, 2008; Volkmar, Lord, Bailey, Schultz, & Klin, 2004). Additionally, many common comorbid conditions such as psychopathology, feeding problems, and other adaptive skill deficits accompany this condition (Matson, Dempsey, & Fodstad, 2009; Matson & Kuhn, 2001; Matson, Rivet, Fodstad, Dempsey, & Boisjoli, 2009; Matson et al., 1999; Matson & Smiroldo, 1997; Paclawskyj, Matson, Bamburg, & Baglio, 1997). One of the most common and concerning comorbid problems exhibited by individuals with ASD are challenging behaviors (CB; Jang, Dixon, Tarbox, & Granpeesheh, 2011; Matson, Mahan, Hess, Fodstad, & Neal, 2010; Matson, Wilkins, & Macken, 2008). CB typically displayed by this population include self-injurious behavior (SIB), stereotypies, and externalizing behaviors like temper outbursts, aggression toward others, and destruction of property (Horner, Carr, Strain, Todd, & Reed, 2002; Matson, Mahan, Hess, & Fodstad, 2010; Matson & Rivet, 2008; McTiernan, Leader, Healy, & Mannion, 2011; Symons, Sperry, Dropik, & Bodfish, 2005). Treatment technologies are available, but identifying the problem and understanding its nature is critical (Matson & Boisjoli, 2007; Matson et al., 2005;

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Matson & Wilkins, 2008; Singh, Matson, Cooper, Dixon, & Sturmey, 2005). This is made even more important since psychotropic medications are often prescribed and can result in serious side effects (Advokat, Mayville, & Matson, 2000; Mahan et al., 2010; Matson, Rivet, & Fodstad, 2008a; Matson, Rivet, & Fodstad, 2008b).

Research on CB in ASD is beginning to emerge but little is known to date about the characteristics of these behaviors in very young children (Fodstad, Rojahn, & Matson, 2012). Toddlers with ASD have been found to engage in more and more severe CB than at-risk peers without ASD. Further, researchers have demonstrated that severity of aggressive and destructive behaviors in young children with ASD increases with age (Fodstad et al., 2012). In a study by Sipes, Matson, Horovitz, and Shoemaker (2011) using the same measure as the present study (i.e., *BISCUIT-Part 2*), the authors found that tantrum/conduct symptoms were more prevalent among individuals with ASD than their atypically developing counterparts. The focus of the present study was on tantrum (i.e., temper outburst) and conduct behavior. The Tantrum/Conduct Behavior subscale on the measure utilized, the *Baby and Infant Screen for Children with Autism Traits, Part 2 (BISCUIT-Part 2; Matson, Boisjoli, & Wilkins, 2007)*, includes items related to over-reactivity (e.g., easily becomes upset, easily becomes angry, irritable mood), temper outbursts, property destruction, intrusiveness (e.g., interrupts, intrudes upon the activities of others), and other related CB.

Many individuals with ASD exhibit the aforementioned examples of CB, which are symptoms that characterize two disorders that frequently co-occur with ASD: oppositional defiant disorder (ODD) and conduct disorder (CD). Rates of ASD and these disorders have been estimated as high as 37.2% for ODD and 9.6% for CD (de Bruin, Ferdinand, Meester, de Nijs & Verheij, 2007; Simonoff, Pickles, Charman, Chandler, & Baird, 2008). Additionally, individuals with ASD who fail to meet diagnostic criteria for ODD may still demonstrate behaviors consistent with the disorder (Gadow, DeVincent, & Drabick, 2008). For instance, Mayes and Calhoun (2011) found that the *Checklist for Autism Spectrum Disorder (CASD; Mayes & Calhoun, 1999; Mayes et al., 2009)* item “overreactivity, meltdowns, and/or aggression” was endorsed in 89–92% of their participants with ASD. Further, Mayes et al. (2012) found that children with ASD had significantly higher endorsement of explosive, oppositional, and aggressive scores than their counterparts with attention-deficit/hyperactivity disorder, inattentive type (ADHD-I), anxiety, brain injury, and typical development.

The study of CB among this population is important because researchers have found that CB are correlated with disruption of educational opportunities (Machalicek, O'Reilly, Beretvas, Sigafos, & Lancioni, 2007) and therapeutic intervention (Stigler & McDougle, 2008), reduced opportunity for normal activities (Matson & Nebel-Schwalm, 2007), greater parental stress (Herring, Gray, Taffe, Tonge, Sweeney, & Einfeld, 2006; Lecavalier, Leone, & Wiltz, 2006), and other negative outcomes. As such, factors that may influence the development, frequency, and/or severity of CB among individuals with ASD are crucial to investigate.

One such variable worth examining is cognitive development, as differences in ASD severity have been found between individuals with high functioning ASD (HFA) and low functioning ASD (LFA), distinctions made based upon particular IQ or developmental quotient (DQ) cut-offs (Matson, Mahan, Hess, & Fodstad, 2010; Szatmari, White, & Merikangas, 2007). In particular, researchers have overwhelmingly found an inverse relationship between ASD severity and cognitive development (Matson & Shoemaker, 2009). That is, as IQ decreases, ASD symptom severity increases. Mayes and Calhoun (2011), for example, found that IQ was more significantly related to ASD symptom severity than any other factor, including age, examined in their analysis. Similarly, levels of intellectual disability can also affect levels of psychopathology and CB (Matson, Smiroldo, Hamilton, & Baglio, 1997).

Based on this inverse relationship, one might expect a similar pattern between severity of related problems, such as CB, and IQ. At present, research on this topic is inconclusive. There is some evidence for different behavior profiles among individuals with ASD of varying cognitive development. For instance, Estes, Dawson, Sterling, and Munson (2007) found higher levels of hyperactivity, irritability, and attention problems among their lower functioning group. Further, Adler and colleagues (2014) found that comorbid ID was a risk factor for developing drug-refractory aggression, SIB, and severe tantrums among individuals with ASD. However, other research suggests few to no differences between groups based on IQ. Mayes and Calhoun (2011) found similar symptom profiles between HFA and LFA groups, including similar endorsement of the *CASD* item “overreactivity, meltdowns, and/or aggression” (Mayes & Calhoun, 2011). Relatedly, Mayes et al. (2012) found that behavior problem scores on the *Pediatric Behavior Scale (PBS; Lindgren & Koepl, 1987)*, of which these authors included the explosive items (explosive, irritable or angry, over-reactive, temper outbursts, and moody), oppositional items (defiant, argues, uncooperative, and disobedient), and aggression items (mean, threatens, fights, physically aggressive, destructive, lies, steals, and SIB), did not differ between their HFA and LFA groups.

Further research is needed on the relationship between this subset of CB and cognitive development among individuals with ASD, including among different age ranges. As noted previously, little is known about the characteristics of CB in very young children with ASD. The study of this topic is very important because of the emphasis on early intervention (Matson & LoVullo, 2009). The authors of the present study aimed to further this area of research by investigating whether cognitive development was related to differences in a particular subtype of CB, specifically tantrum behavior and/or conduct problems, among infants and toddlers with ASD. Based on existent research demonstrating an exacerbation of ASD and comorbid symptomatology with greater intellectual deficits (Matson, Hamilton, et al., 1997; Matson & Shoemaker, 2009; Matson, Smiroldo, et al., 1997), it is hypothesized that young children with ASD and greater cognitive impairment will evince greater CB.

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