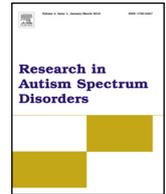




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# Research in Autism Spectrum Disorders

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## The relationship between race and comorbid symptoms in infants and toddlers with autism spectrum disorder

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### ABSTRACT

Researchers have indicated that persons with autism spectrum disorder (ASD) population evince higher rates of comorbid symptoms. While the relationship between comorbid symptoms and factors such as autism symptom severity, IQ level, age, communication abilities, and degree of social impairment were previously examined, there has been limited research on the effect of race in this area. The current study examined the potential role of race in comorbid symptoms in toddlers with ASD and atypically developing toddlers without a diagnosis of ASD using *The Baby and Infant Screen for Children with aUtism Traits – Part 2 (BISCUIT-Part 2)*. Based on the current findings, African-American toddlers evinced higher rates of comorbid symptoms than Caucasian toddlers and toddlers of other races. In addition, toddlers with ASD evinced higher rates of comorbid symptoms than atypically developing toddlers without a diagnosis of ASD. Implications regarding these findings are discussed.

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Autism Spectrum Disorder (ASD) is among the most common and the most researched pediatric disorders (Matson & Boisjoli, 2008; Matson, Gonzalez, Wilkins, & Rivet, 2008). This may in part be due to ASD prevalence rates, which have significantly increased in recent years; it is now estimated that one in 88 children in the United States are diagnosed with the disorder (Center for Disease Control [CDC], 2012; Matson & Kozlowski, 2011). Typical diagnosis of ASD occurs at 3–4 years of age; however, onset of symptoms occurs prior to 30 months of age (Lund & Jensen, 1989; Matson, Wilkins, & González, 2008). The core deficits of ASD involve qualitative impairments in social communication as well as the presence of repetitive behaviors and restricted interests (Fodstad, Matson, Hess, & Neal, 2009; Matson & Boisjoli, 2007; Matson, Dempsey, LoVullo, & Wilkins, 2008; Matson, Kozlowski, Hattier, Horovitz, & Sipes, 2012; Matson & Wilkins, 2009; Williams, Matson, Jang, Beighely, & Rieske, 2013).

In addition to associated symptoms such as cognitive impairment, deficits in adaptive functioning, feeding and sleep difficulties, and challenging behaviors (Jang, Dixon, Tarbox, & Granpeesheh, 2011; Kozlowski, Matson, Belva & Rieske, 2012; Turygin, Matson, Adams & Belva, 2013; Yerys, Wallace, Sokoloff, Shook, James, & Kenworthy, 2009), individuals with ASD are also frequently affected by at least one comorbid psychiatric disorder (Bruin, Ferdinand, Meester, de Nijs & Verheij, 2007; Morgan, Roy, & Chance, 2003; Simonoff, Pickles, Charman, Chandler, & Baird, 2008). In fact, researchers have found that individuals with ASD experience significantly more comorbid psychopathology and other impairments than peers with intellectual disabilities (Brereton, Tonge & Einfeld, 2006; Smith & Matson, 2010a, 2010b, 2010c). For example, Simonoff et al. (2008) estimated that 70% of children with ASD had at least one comorbid disorder and 41% had two or more. Common co-occurring diagnoses are learning disorders, anxiety disorders, attention deficit hyperactivity disorder (ADHD), depression,

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and oppositional defiant disorder (ODD; Morgan et al., 2003; Simonoff et al., 2008; White, Oswald, Ollendick, & Scahill, 2009).

The rate of anxiety disorders in the ASD population far exceeds the rate in the general population (Davis et al., 2010; de Bruin, Ferdinand, Meester, de Nijs, & Verheij, 2007; Mayes, Calhoun, Murray, Ahuja & Smith, 2011; White et al., 2009). Comorbidity estimates for anxiety in children with ASD have been found to be between 11% and 84% (de Bruin et al., 2007; White et al., 2009). More specifically, researchers have found that individuals with ASD experience significantly more specific phobia, obsessions and compulsions, motor and vocal tics, and social anxiety than both typically and atypically developing peers (White et al., 2009). While most individuals with ASD evince some level of anxiety, the nature of the symptoms has been found to vary according to functioning level; individuals with high-functioning ASD are more likely to exhibit social worries while lower functioning children experience more obsessive-compulsive and avoidant symptoms (White et al., 2009). Other factors affecting anxiety rates in individuals with ASD include IQ and communication skills (Davis et al., 2012; Weisbrot, Gadow, DeVincent, & Pomeroy, 2005).

Although previous diagnostic criteria have forbid the dual diagnosis of ASD and ADHD, the two conditions often co-occur (Leyfer et al., 2006; Tureck, Matson, May, & Turygin, 2013; Yerys et al., 2009). Leyfer et al. (2006) found that 55% of individuals of ASD experience elevated symptoms of inattention and excessive hyperactivity. Additionally, 31% of individuals with ASD meet diagnostic criteria for ADHD. When ADHD co-occurs with ASD, symptoms of ASD are exacerbated; children with ASD and ADHD exhibit greater impairment in socialization, working memory, and adaptive skill compared to children with ASD alone (Matson, Hess, Neal, Mahan & Fodstad, 2010; Yerys et al., 2009). Individuals with comorbid ASD and ADHD also experience higher rates of internalizing and externalizing behaviors, tantrum behaviors, stereotypies, aggression, and destruction (Goldin, Tureck, Matson, Cervantes, & Jang, 2013; Matson, Mahan, Fodstad, Worley, Neal, & Sipes, 2011; Tureck et al., 2013).

In addition, researchers have found that the rate of ODD is significantly greater in the autism population than in children with various other clinical diagnoses and typically developing children (Mayes et al., 2012). Researchers have estimated that ODD occurs in 37.2% of children with ASD (de Bruin et al., 2007). While the prevalence of ODD appears to decrease with age in the general population, individuals with comorbid ASD and ODD have been found to experience more permanent symptoms related to ODD (Mattila et al., 2010). Language ability is a significant factor affecting the rate of comorbid ODD diagnoses in individuals with ASD; verbal children were found to meet diagnostic criteria for ODD significantly more frequently than nonverbal children with ASD (Witwer & Lecavalier, 2010).

While researchers have found high rates of such co-occurring disorders like anxiety, ADHD, and ODD, clinicians struggle to identify these comorbidities (Simonoff et al., 2008; Volkmar & Cohen, 1991). Because many of the symptoms of co-occurring conditions overlap with the symptoms of ASD, they may be overshadowed. In addition, communication difficulties and intellectual disabilities common in individuals with ASD can make clinical interview challenging (Simonoff et al., 2008; Volkmar & Cohen, 1991).

Factors such as autism symptom severity, IQ level, age, communication abilities, and degree of social impairment have been correlated with various comorbid disorders in individuals with ASD (Davis et al., 2012; Mayes et al., 2011a,b; White et al., 2009). One area that has received little research attention is race and ethnicity. Therefore, the purpose of the current study was to explore the effect of race on the rate of comorbid symptoms in infants and toddlers with ASD. The comorbid conditions examined include tantrum/conduct behavior, inattention/impulsivity, avoidance behavior, anxiety/repetitive behavior, and eating/sleep problems.

## 1. Methods

### 1.1. Participants

Study participants were 2197 infants and toddlers between the ages of 12 months to 39 months ( $M = 25.89$ ,  $SD = 4.82$ ). The total sample consisted of 69.8% males and 30.2% females, of which 53.4% were Caucasian ( $n = 1174$ ), 38.2% were African American ( $n = 840$ ), and 8.3% were categorized as other ethnicity ( $n = 183$ ) including Hispanic, Asian, and multiracial. This sample was obtained via EarlySteps, Louisiana's state-funded early intervention program, which provides services to infants and toddlers under the Individuals with Disabilities Education Act, Part C. Participants were divided into two groups: ASD group who met diagnostic criteria for an ASD ( $n = 346$ ) and non-ASD group who were atypically developing but did not meet criteria for an ASD ( $n = 1851$ ). ASD diagnoses were made by a licensed psychologist with over 30 years of experience. Diagnoses were based on scores from a variety of measures including the *Modified Checklist for Autism in Toddlers (M-CHAT)*, the *Battelle Developmental Inventory, Second Edition (BDI-2)*, and the *DSM-V* criteria (Newborg, 2005; Robins, Fein, Barton, & Green, 2001) and clinical judgment. The atypically developing group had been labeled with a variety of disorders (e.g., global developmental delay, cerebral palsy, Down syndrome, premature birth, seizure disorder, hydrocephalus). Complete demographic information can be found in Table 1.

### 1.2. Measures

*The Baby and Infant Screen for Children with aUtism Traits – Part 2 (BISCUIT-Part 2)* is a subscale of a more comprehensive assessment measure of ASD symptoms and challenging behaviors. The *BISCUIT-Part 2* is administered by a trained provider

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