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Restricted and repetitive behaviors and psychiatric symptoms in youth with autism spectrum disorders

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ABSTRACT

Children with autism spectrum disorders (ASD) are at high risk for co-occurring psychiatric disorders. Previous research has suggested that restricted and repetitive behaviors (RRB) are associated with symptoms of co-occurring psychiatric disorders in individuals with ASD, but this relationship is not well understood. The current study investigated the relationship between RRB and co-occurring psychiatric symptoms, including depressive, anxiety, attention-deficit hyperactivity disorder (ADHD) and oppositional defiant disorder (ODD) symptoms, while considering the role of level of functioning. Participants were 72 parents of youth diagnosed with an ASD (ages 5–17). They completed the Social Communication Questionnaire (SCQ), the Repetitive Behavior Scale-Revised (RBS-R), an abridged version of the Child Symptom Inventory-4 (CSI-4) and the Conceptual domain of the Adaptive Behavior Assessment System, 2nd Edition (ABAS-II). Results indicated that RRB do predict psychopathology. Ritualistic and sameness behavior is predictive of anxiety, depression and ODD while stereotypy is predictive of ADHD. Restricted interests were a negative predictor of depression. Level of functioning moderated the relationship between self-injurious behavior (SIB) and both anxiety and depressive symptoms as well as the relationship between ritualistic and sameness behavior and depressive symptoms. Understanding the relationship between RRB and psychiatric symptoms could help clarify the presentation of ASD phenotypes as well as etiological variables.

1. Introduction

Autism spectrum disorders (ASD) are a group of neurodevelopmental disorders characterized by deficits in social and communication skills as well as the presence of restricted and repetitive behaviors (RRB). In contrast with the domains of social and communication skills, RRB have only recently begun to be systematically studied (Bishop, Richler, & Lord, 2006; Carcani-Rathwell, Rabe-Hasketh, & Santosh, 2006; Mirenda et al., 2010). RRB can cause significant challenges for both the individual with ASD and his or her family. RRB can additionally interfere with learning and socialization by decreasing the likelihood of positive interactions with peers (Nadig, Lee, Singh, Bosshart, & Ozonoff, 2010). Parents of individuals with ASD say that RRB are one of the most challenging aspects of ASD due to their significant interference with daily life (South, Ozonoff, & McMahon, 2005).

In the 4th edition of the *Diagnostic and Statistical Manual* (*DSM-IV-TR*; American Psychiatric Association (APA), 2000), RRB are defined by the presence of at least one of the following: (a) encompassing preoccupation with one or more stereotyped

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and restricted patterns of interests (“restricted interests”), (b) apparently inflexible adherence to specific nonfunctional routines or rituals (“ritualistic behavior” and “compulsive behavior”), (c) stereotyped and repetitive motor mannerisms (“stereotypic behavior”) and (d) persistent preoccupation with parts of objects. The proposal for the 5th edition of the *DSM* (*DSM-5*) indicates that RRB will remain a core feature of ASD, adding repetitive speech and sensory reactions to this domain (APA, 2012).

Individuals with ASD are more likely to be diagnosed with intellectual disability (ID) than the general population. In a review of 32 epidemiological studies, Fombonne (2003) concluded that 30 percent of individuals with autism have no intellectual impairment, 30 percent have mild to moderate ID and 40 percent have severe to profound ID. Level of functioning and chronological age impact the presentation of RRB in individuals with ASD. Lower-level RRB, including stereotypy, repetitive manipulation of objects and repetitive self-injurious behavior (SIB), are more common in younger individuals or individuals with lower intellectual functioning. Higher-level RRB, including object attachments, repetitive language and restricted interests, are more common in older individuals or individuals with higher intellectual functioning (Bishop et al., 2006; Carcani-Rathwell et al., 2006).

Individuals with ASD are at high risk of co-occurring psychiatric disorders including anxiety and mood disorders, attention-deficit hyperactivity disorder (ADHD) and oppositional defiant disorder (ODD). These psychiatric disorders that occur in individuals with ASD are phenotypically similar to disorders defined in the *DSM-IV-TR* (e.g., de Bruin, Ferdinand, Meester, de Nijs, & Verhejj, 2007; Gadow, DeVincent, & Schneider, 2008b; Leyfer et al., 2006). Research using semi-structured interviews such as the *Kiddie Schedule for Affective Disorders and Schizophrenia* (KSADS) suggests that 70 to 80 percent of children with ASD meet diagnostic criteria for one or more co-occurring disorders and 40 to 50 percent meet criteria for two or more. Anxiety disorders (40–55%), ADHD (30–45%), ODD (10–30%) and mood disorders (5–15%) are the most common co-occurring disorders (e.g., de Bruin et al., 2007; Gjevik, Eldevick, Fjæran-Granum, & Sponheim, 2011; Leyfer et al., 2006; Mattila et al., 2010; Simonoff et al., 2008). Level of functioning is related to these co-occurring disorders in individuals with ASD. Higher functioning individuals are more likely to have anxiety and mood problems whereas lower functioning individuals are more likely to have symptoms of ADHD (Estes, Dawson, Sterling, & Munson, 2007; Gadow et al., 2008b). Psychopathology in individuals with ASD also has a large impact; for example, these symptoms are associated with increased caregiver stress (Lecavalier, Leone, & Wiltz, 2006).

Few studies have investigated the relationship between RRB and co-occurring psychiatric symptoms in individuals with ASD. All types of RRB, including stereotypic behavior, restricted interests, ritualistic behavior, compulsive behavior and SIB, are associated with parent-reported severity of anxiety, depression, ADHD, irritability and aggression (Lam, 2004) as well as parent-reported internalizing, externalizing and total problem scores on the *Child Behavior Checklist* (CBCL; Mirenda et al., 2010). Overall RRB are associated with parent reported hyperactivity as well as obsessions and compulsions (Lecavalier, Aman et al., 2006). However, most studies do not consider the impact of level of functioning, which is known to be associated with both RRB presentation as well as co-occurring psychiatric symptoms. In a small-scale study, Gabriels, Cuccaro, Hill, Ivers, & Goldson (2005) found that RRB are associated with irritability, hyperactivity and sleep problems. After controlling for nonverbal IQ, only hyperactivity remained significantly correlated with RRB.

The current study investigated the relationship of RRB and co-occurring psychiatric symptoms while controlling for level of functioning as indicated by parental report of conceptual adaptive behavior. A better understanding of the relationship between RRB and psychiatric symptoms has implications for genetic and neurobiological research as it could lead to refinement of ASD phenotypes and a better understanding of the pathogenesis of RRB. Additionally, understanding how co-occurring psychiatric symptoms impact the presentation of RRB (and vice versa) has implications for treatments and interventions designed to reduce the frequency and/or severity of RRB.

It was hypothesized that frequency and severity of RRB would positively correlate with specific psychiatric symptom domains. Specifically, it was predicted that anxiety symptoms would correlate most strongly with compulsive and ritualistic behaviors and that this relationship would be strongest for higher functioning individuals. Based on previous research, depressive symptoms were expected to correlate most strongly with repetitive SIB. Lastly, it was hypothesized that ADHD symptoms would correlate strongly with stereotypic behavior and that this relationship would be strongest for lower functioning individuals.

2. Methods

2.1. Participants

Participants were parents of children age 5 to 17 diagnosed with ASD. Participants were primarily recruited through school districts and autism schools in Central Ohio and additionally through programs and clinics in Central Ohio, national parent associations and an autism school in Providence, RI. Eligibility was based on parent reported ASD diagnosis, receipt of special education services and a score of 11 or higher on the *Social Communication Questionnaire* (SCQ; Rutter, Bailey, & Lord, 2003). No other exclusionary criteria were applied. Parents who elected to participate in the study completed all study materials online or returned paper copies by mail.

A total of 89 parents completed and returned study materials; however, 11 children did not meet eligibility criteria on the SCQ, five parents did not return all study materials and one child was too young, leaving 72 participants for data analysis. Parent-reported demographic information, including relationship of the informant to the child and the child's age, gender