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Do communication and social interaction skills differ across youth diagnosed with autism spectrum disorder, attention-deficit/hyperactivity disorder, or dual diagnosis?

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ABSTRACT

Given the well-documented symptom overlap between autism spectrum disorder (ASD) and attention deficit/hyperactivity disorder (ADHD), careful evaluation of potential differentiation and overlap is critical for accurate diagnostic decisions. Although research has considered the use of symptom checklists and parent/teacher report questionnaires for symptom differentiation, standardized observational methods, typically utilized in the context of ASD evaluation, have received less attention. The present study examined the continuum of communication and social interaction impairment for youth diagnosed with ASD and ADHD, as indexed by the Autism Diagnostic Observation Schedule (ADOS). Participants were 209 youth ages 3–18 years with ASD, ADHD, dual diagnosis (ASD + ADHD) or no diagnosis. Differences across diagnostic groups were observed for mean communication and social interaction total scores on the ADOS, with the highest scores (i.e., greater impairment) observed for the ASD group and lowest scores for the ADHD and no diagnosis groups. Results provide the first evidence for use of the ADOS for distinguishing youth who have ADHD alone versus ASD alone or co-occurring ASD + ADHD. Findings are discussed in light of implications for clinical practice and future research.

1. Introduction

At first glance, core symptom profiles of autism spectrum disorder (ASD) and attention deficit/hyperactivity disorder (ADHD) appear clearly distinctive for diagnostic purposes, but in reality the picture is often more complex. In fact, multiple studies have documented the co-occurrence of ASD and ADHD, as well as overlapping genetic and neurobiological commonalities (for reviews see Matson, Rieske, & Williams, 2013; Reiersen & Todd, 2008). This consensus has resulted in a change of diagnostic convention to allow co-occurring diagnoses of ASD and ADHD in The Diagnostic and Statistical Manual of Mental Disorders (5th ed., DSM-5, American Psychiatric Association, 2013). However, diagnostic evaluation of differential and co-occurring conditions still poses a significant challenge for clinicians and researchers. Currently, it is unclear to what extent standardized diagnostic measures can effectively capture differentiation in these symptom profiles in order to facilitate valid clinical diagnoses. The current study examines a primary domain of symptom overlap across ASD and

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ADHD – communication and social interaction impairment – using a standardized assessment measure, the Autism Diagnostic Observation Schedule (ADOS, Lord et al., 2000) as a means of identifying differentiation in diagnostic classification for children with ASD, ADHD or co-occurring ASD + ADHD. Characterizing the continuum of communication/social interaction profiles among individuals with ASD, ADHD and ASD + ADHD is not only relevant from a diagnostic and treatment perspective, but also critical for etiological research. Reliable differences in ADOS symptom profiles associated with ASD, ADHD and ASD + ADHD would offer a valuable means of systematically examining pathways toward ASD and ADHD.

1.1. ASD and ADHD commonalities

Core characteristics of ASD include impairments in social communication and social interaction and the presence of restricted, repetitive patterns of behavior, interests or activities, while ADHD is characterized by core symptoms of inattention, hyperactivity and impulsivity (American Psychiatric Association, 2013). Prevalence rates are estimated at 5% for ADHD and 1% for ASD (American Psychiatric Association, 2013). A co-occurring diagnosis is given when core symptoms of one disorder do not adequately account for the clinically significant symptom elevations of the other.

Noteworthy for diagnostic consideration, many children with ASD (22–83% depending on clinical or community samples) present with symptoms of attention deficits and hyperactivity, similar to those observed in children with an ADHD-only diagnosis (Frazier et al., 2001; Gadow, Devincent, Pomeroy, & Azizian, 2005; Goldstein & Schwebach, 2004; Hattori et al., 2006; Lee & Ousley, 2006; Rommelse, Geurts, Franke, Buitelaar, & Hartman, 2011; Sinzig, Walter, & Doepfner, 2009). Likewise, 20–65% of children with ADHD also display symptoms of ASD that are clinically significant, including deficits in social communication, peer relationship difficulties, lack of social and emotional reciprocity, difficulty adapting to change, and restricted and repetitive behavior (Clark, Feehan, Tinline, & Vostanis, 1999; Grzadzinski et al., 2011; Hartley & Sikora, 2009; Hattori et al., 2006; Koyama, Tachimori, Osada, & Kurita, 2006; Santosh & Mijovic, 2004).

In addition to behavioral links, ASD and ADHD are both considered highly heritable and display a moderate degree of shared genetic and familial overlap across the lifespan (for a review see Matson et al., 2013). For example, family and twin research has yielded evidence for shared genetic factors, both among individuals with a diagnosis as well as among individuals within the general population with subclinical features (Lichtenstein, Carlstrom, Rastam, Gillberg, & Anckarsater, 2010). Theoretical perspectives on the phenotypic and neuropsychological overlap between ASD and ADHD highlight the role of executive functioning deficits. It has been suggested that damage or dysfunction to the frontostriatal regions (frontal lobes, basal ganglia and a range of associated neurotransmitters), which are the slowest developing regions within the central nervous system, underlie neurodevelopmental disorders such as ASD and ADHD (Bradshaw, 2001). Overall, research to date indicates that while ASD and ADHD appear distinctive in their "pure" form, the existence of common behavioral, cognitive, and neurobiological features provides important opportunities to examine shared origins. This creates an imperative for measurement studies aimed at identifying reliable tools to aid in diagnosis when presented with a referral for differential or co-occurring diagnosis of ASD and ADHD.

1.2. Diagnostic considerations

The symptom overlap between ASD and ADHD can present a diagnostic puzzle for clinicians, and oftentimes a diagnosis of ASD may be delayed or initially misdiagnosed as ADHD (Hartley & Sikora, 2009). Furthermore, diagnosis may be even more challenging when ASD and ADHD are co-occurring (Gargaro, Rinehart, Bradshaw, Tonge, & Sheppard, 2011), which is especially concerning given their high rate of co-occurrence, as discussed above.

One critical point for decision making about differential or co-occurring diagnosis is consideration of the degree of social communication and social interaction deficits. While identifying behaviors associated with inattention and hyperactivity/impulsivity or restricted repetitive behaviors are central to diagnostic decision making about ADHD and ASD, these behaviors are often distinguishable via clinical interview, assessment and observation (for a review of neuropsychological testing in ASD, see Corbett, Carmean, & Fein, 2009). While the clinician may be tasked with identifying the degree of severity in each of these domains (i.e., whether symptoms of inattention/hyperactivity clinically impairing; whether restricted/repetitive behaviors are clinically significant), the presence of significant impairment in either category of symptoms points to a clear diagnostic category. Comparatively, social communication and interaction impairments can be more challenging to objectively categorize in the context of an evaluation, as these behaviors can derive from core impairments associated with either ASD or ADHD. Within the DSM-5, the following guidance for differential diagnosis of the social communication and interaction impairment is offered: "the social dysfunction and peer rejection seen in individuals with ADHD must be distinguished from the social disengagement, isolation, and indifference to focal and tonal communication cues seen in individuals with ASD" (American Psychiatric Association, 2013, p. 64).

In practice, children with ASD and ADHD often both present with difficulties in conversational skills and recognizing social cues, not listening to others, initiating conversations at inappropriate times, interrupting/intruding on others, high rates of off-task behaviors, and disruptive or rule-violating behavior. The challenge then is to identify standardized tools for characterizing social communication and interaction profiles. A variety of screening and parent-report tools are available for this purpose, designed either to capture ASD type social communication and interaction impairments (e.g., Social Communication Questionnaire, Rutter, Bailey & Lord, 2003; Children's Communication Checklist, Bishop, 2006, Social