DUAL EXCEPTIONALITY

Giftedness and ADHD: Identification, Misdiagnosis, and Dual Diagnosis

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Many gifted characteristics overlap the symptoms of attention deficit–hyperactivity disorder (ADHD). The potential for the misdiagnosis of giftedness as ADHD exists, but so does the potential for a dual diagnosis of giftedness and ADHD. A decade after the misdiagnosis of giftedness as ADHD was first investigated we examine lessons learned regarding misdiagnosis, dual diagnosis, and the identification of giftedness and ADHD. The current study reviewed empirical studies of the misdiagnosis, identification, and dual diagnosis of giftedness and ADHD published in peer-reviewed domestic and international academic journals between 2000 and 2014. We explored the literature for diagnostic trends and challenges, theories of misdiagnosis, and empirical findings on dual diagnosis. We discuss differences between misdiagnosis and dual diagnosis and conclude with a description of limitations found within reviewed studies and suggestions for future research.

Keywords: ADHD, dual diagnosis, giftedness, misdiagnosis, twice-exceptional

In 2004, Hartnett, Nelson, and Rinn published one of the first empirical studies to illustrate the potential misdiagnosis of giftedness as attention deficit–hyperactivity disorder (ADHD). Hartnett et al. (2004) argued that gifted students may be referred to physicians and psychologists for ADHD-like behaviors that are also characteristic of giftedness. Such referrals are frequent, yet a presumed 25–50% of gifted children diagnosed with ADHD fail to meet the diagnostic criteria to make a diagnosis of ADHD (Webb et al., 2006). The Hartnett et al. study coincided with a book on the same topic, Misdiagnosis and Dual Diagnoses of Gifted Children and Adults: ADHD, Bipolar, OCD, Asperger's, Depression, and Other Disorders (Webb et al., 2005), and was followed by a special section on misdiagnosis in an issue of the Roeper Review (Ambrose, 2006).

Further, in 2012, an international nonprofit organization, Social Emotional Needs of the Gifted, embarked on an international campaign to alert pediatricians about issues regarding the misdiagnosis of ADHD among gifted children.

In the decade leading up to 2010, the number of visits to a physician that resulted in an ADHD diagnosis among all ability levels increased 66% from 6.2 million to 10.4 million visits (Garfield et al., 2012), leading us to believe that the potential for misdiagnosis of giftedness as ADHD still exists, but so does the potential for a dual diagnosis of giftedness and ADHD. At this point, a decade after Hartnett et al. (2004) published their initial research, what have we learned about misdiagnosis, dual diagnosis, and the identification of giftedness and ADHD? We selected empirical studies on the misdiagnosis, identification, and dual diagnosis of giftedness and ADHD published in peer-reviewed domestic and international academic journals between 2000 and 2014. We explore this literature for diagnostic trends, challenges, theories of misdiagnosis, and empirical findings on dual diagnosis. Next we discuss differences between misdiagnosis and dual diagnosis. We conclude with a description of limitations found within reviewed studies and suggestions for future research.

TRENDS IN ADHD DIAGNOSES

ADHD is a chronic and pervasive childhood disorder characterized by developmentally inappropriate activity levels,
low tolerance for frustration, impulsivity, poor organization of behavior, distractibility, and an inability to sustain attention and concentration (American Psychiatric Association, 2013). There are three types of ADHD: predominantly inattentive presentation, predominantly hyperactive–impulsive presentation, and combined presentation. ADHD is among the most common childhood disorders and occurs in 2–16% of the population, depending on the diagnostic criteria used (Biederman, 2005; Cormier, 2008; Faraone, Sergeant, Gillberg, & Biederman, 2003).

In May 2013, the American Psychiatric Association released the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), the reference used by mental health professionals to make diagnoses such as ADHD. The American Psychiatric Association made important changes in the DSM-5 from the previous version (DSM-IV-TR; American Psychiatric Association, 2000) in the diagnostic criteria for ADHD:

- the age criterion for symptom onset was raised from age 6 to age 12;
- several symptoms must now be evident in multiple settings but are no longer required to cause impairment in multiple settings;
- descriptions were updated to include examples of adult ADHD symptoms;
- and persons age 17 or older need five symptoms instead of the six required for younger children.

Notably absent in the DSM-5 is the mention of giftedness. The DSM-IV-TR states, “Inattention in the classroom may also occur when children with high intelligence are placed in academically understimulating environments” (American Psychiatric Association, 2000, p. 91). This statement was omitted from the DSM-5, but it is not clear why the omission was approved by the American Psychiatric Association.

In examining trends in ADHD diagnoses, there are two camps of researchers and practitioners. One camp maintains that the U.S. national rate of ADHD diagnosis in children exceeds the disorder’s true prevalence (e.g., Frances, 2013; Stroufe, 2012; Watson, Arcona, Antonuccio, & Healy, 2014). This stance also is supported by a number of researchers outside of the United States (e.g., Bruchmüller & Schneider, 2012; Edwards, 2012). The other camp of researchers and practitioners, on the other hand, holds that the overdiagnosis of ADHD is a public and media perception and that insufficient evidence exists to conclude that ADHD is systematically overdiagnosed (e.g., Sciutto & Eisenberg, 2007).

MISDIAGNOSIS AND DIFFICULTIES IN MAKING THE ADHD DIAGNOSIS

The comorbidity, or presence of one or more additional disorders, of ADHD is common, such that as many as 75% of children with ADHD also meet the criteria for another psychiatric diagnosis (Barkley, 2006). In children, disorders comorbid with ADHD include oppositional defiant disorder, conduct disorder, mood disorders, anxiety disorders, and learning disabilities, among others (Biederman, 2005; Milberger, Biederman, Faraone, Murphy, & Tsuang, 1995; Pliszka, 1998). Several studies reported similar comorbidity patterns in gifted and nongifted individuals with ADHD (Antshel et al., 2007, 2008; Cordeiro et al., 2011; Katusic et al., 2011). What is more, the misdiagnosis of ADHD as other psychiatric disorders and issues also occurs. Researchers have explored the possibility of an ADHD misdiagnosis regarding a variety of disorders and conditions, including obsessive–compulsive disorder (Abramovitch, Dar, Mittelman, & Schweiger, 2013), bipolar disorder (Chilakamarri, Filkowski, & Ghaemi, 2011), scotopic sensitivity/Meares-Irlen syndrome (Loew & Watson, 2013), lead poisoning (Turner, Dilks, Mayeaux, & Marceaux, 2005), vision impairment (Granet, 2014), mania (Biederman & Jellinek, 1998), and pervasive developmental disorder (Perry, 1998).

In addition to the many overlapping symptoms between ADHD and other psychiatric disorders and issues (e.g., difficulty sustaining attention, noncompliance), other factors complicate the diagnosis of ADHD. For example, the relative age of children influences whether they are diagnosed and treated with ADHD, such that the youngest children in a classroom are significantly more likely to be diagnosed with ADHD and prescribed medication than their peers in the same grade level (Morrow et al., 2012). Younger children in any given elementary school grade level may appear immature compared to their older peers, sometimes prompting a referral for an ADHD evaluation. Researchers have also indicated that the sex of the child plays a role in diagnostic decisions, such that boys are more likely to be diagnosed with ADHD than girls (Bruchmüller, Margraf, & Schneider, 2012). Girls with ADHD tend to exhibit lower levels of externalizing and disruptive behavior and higher levels of internalizing symptoms and inattentiveness. These symptoms are less likely to be disruptive in a classroom setting and so are more likely to be overlooked (Gaub & Carlson, 1997; Gershon, 2002). Ethnicity also matters. The diagnostic validity of DSM-IV disorders varies across racial and ethnic groups (Green et al., 2012). Despite equal likelihood to display behaviors characteristic of ADHD in the classroom, pre-kindergarten children who are Black or raised in non-English-speaking households are much less likely to be diagnosed with ADHD than otherwise similar White children (Morgan, Hillemeier, Farkas, & Maczuga, 2014). Similarly, ethnic minority children in kindergarten through eighth grade are much less likely to receive an ADHD diagnosis than otherwise identical White children (Morgan, Staff, Hillemeier, Farkas, & Maczuga, 2013): the odds of diagnosis for African Americans, Latinos, and other ethnicities were 69, 50, and 46% lower than for Whites. Differences...
were similar for boys and girls across ethnicities. Possible explanations include language barriers, unfavorable parental attitudes toward mental health services, or a lack of cultural sensitivity on the part of clinicians. Finally, because of variations in diagnostic decision making and assessment instruments, ADHD may be diagnosed more often than it would be if the DSM criteria were properly utilized and/or if reliable and valid assessment instruments were utilized (Posserud et al., 2014). Studies of assessment and diagnostic decision making show that psychologists and physicians often make a diagnosis of ADHD without a comprehensive assessment (Handler & DuPaul, 2005; Wasserman et al., 1999). The potential for misdiagnosis, then, is definitely plausible.

Hartnett et al. (2004) conducted the first empirical study to illustrate the potential misdiagnosis of ADHD and giftedness. Hartnett et al. theorized that a number of issues common to gifted children would complicate the ADHD misdiagnosis because of an overlap in symptoms or behaviors characteristic of giftedness and those characteristic of ADHD, including high activity levels, difficulty paying attention, and impulsivity. Among the gifted, these behaviors can be explained by asynchronous development (Silverman, 1997), boredom in the classroom (Gallagher, Harradine, & Coleman, 1997; Webb & Latimer, 1993), or overexcitabilities (Dabrowski, 1964; Mendaglio, 2008), among other explanations. Hartnett et al. (2004) examined whether graduate students enrolled in a master’s-level school counseling program had tendencies to interpret identical behaviors that were characteristic both of ADHD and of a gifted child (e.g., daydreaming, impulsivity) in such a fashion that a focus on pathology (i.e., ADHD) was more prevalent. The participants in the study each read an identical vignette describing a hypothetical child with overlapping characteristics of ADHD and giftedness:

Sam is 7 years old and a second grader. He has been referred to you for assessment by his teacher. He has a high activity level and appears more restless than other children his age. Sam has difficulty restraining his desire to talk in the classroom and interrupts you frequently. You have repeatedly tried to change Sam’s behavior, but Sam questions authority and he has a difficult time accepting rules and regulations. Sam’s homework is frequently messy because he appears careless or inattentive to details. Sam has a poor attention span, especially when he is bored. Sam’s home environment appears to be normal. (Hartnett et al., 2004, p. 75)

Hartnett et al. (2004) found that participants were more likely to provide a diagnosis of ADHD, even when the suggestion of giftedness as an alternative diagnosis was presented. The researchers concluded that graduate students in this school counseling graduate program may not be receiving training regarding the similarities and differences between children who are gifted and those who have ADHD, which could result in a misdiagnosis.

Rinn and Nelson (2008) replicated the Hartnett et al. (2004) study using a sample of preservice teachers. Because teachers are often the first to identify students who may be eligible for gifted programming, and because physicians often request information from children’s teachers regarding characteristics of ADHD in the classroom (Tripp, Schaugency, & Clarke, 2006), Rinn and Nelson (2008) concluded that the ability of preservice teachers to distinguish between giftedness and ADHD is an important skill to have prior to becoming an inservice teacher. In their study, Rinn and Nelson (2008) again found that preservice teachers were more likely to provide a diagnosis of ADHD, even when the suggestion of giftedness as an alternative diagnosis was presented.

Rinn and Reynolds (2012) further explored the relationship between characteristics of giftedness, overexcitabilities, and ADHD among a sample of 116 gifted adolescents. In examining self-report measures of ADHD and overexcitabilities among a sample of gifted adolescents who did not have a diagnosis of ADHD, Rinn and Reynolds (2012) found significant correlations between the psychomotor overexcitability scores, the sensual overexcitability scores, and the imaginative overexcitability scores and various subscales of the Conners’ ADHD/DSM-IV Scales—Adolescent (Conners, 2001). The findings illuminate a potential relationship between the characteristics of overexcitabilities and the symptoms of ADHD. The researchers concluded that “the potential exists for gifted individuals to be incorrectly labeled with a diagnosis of ADHD” because of a “lack of awareness of the characteristics of giftedness, specifically expressions of overexcitabilities, and a predisposition to view these behaviors as indicative of the presence of ADHD” (Rinn & Reynolds, 2012, p. 44). Goerss, Amend, Webb, Webb, and Beljan (2006), in their support of the original research of Hartnett et al. (2004), sum up the misdiagnosis issue well by saying, “What you do not know, you do not recognize” (p. 249).

DUAL DIAGNOSIS

Giftedness and ADHD coexist in some children. Until the most recent decade, individuals diagnosed with both giftedness and ADHD drew little attention in educational research and programming. Recent evidence supports the validity of dual diagnosis. Antshel et al. (2007) noted that gifted children with ADHD show a pattern of cognitive, psychiatric, and behavioral characteristics consistent with the diagnosis of ADHD documented in children of average IQ. Cordeiro et al.’s (2011) findings also validated dual diagnosis; 10 of the 15 intellectually gifted children in their clinical study met DSM-IV criteria for ADHD. Parallel patterns
of cognitive and social impairment, family history, and comorbidity in gifted children and nongifted children with ADHD also support the validity of dual diagnosis (Katusic et al., 2011).

The prevalence of ADHD in gifted populations is also consistent with ADHD in the general population. Antshel (2008) suggested that 10% of individuals with ADHD are also gifted. A similar finding from a study of gifted Korean children estimated a 9.4% rate of ADHD in the gifted population (Chae, Kim, & Noh, 2003). Jarosewich and Stocking (2002) estimated a 3.1% rate of ADHD in the gifted population, but that estimate was based on a sample of gifted students enrolled in a summer residential enrichment program and therefore may lack generality.

Interactions Between ADHD and Giftedness

Dual diagnosis of ADHD and giftedness can be frustrating to children who sense their elevated potential yet struggle to reach it. In dually diagnosed children, the individual’s strengths and disabilities interact in such a way that one of the exceptionalities obscures the other. Three scenarios describe the interaction effect. First, when ADHD masks giftedness, the child’s behavior and academic performance may appear average or below average. In this case, the child may be recognized as having ADHD but not as being gifted. In the second scenario, giftedness masks ADHD. In this scenario, the student uses strengths advantageously to compensate for impairments. These students are often recognized for their gifts but go unrecognized for their disability. A third scenario occurs when giftedness and ADHD interact reciprocally, essentially hiding one another. When this happens, the child may appear average both academically and behaviorally and is unlikely to be recognized for either exceptionality.

Few studies have addressed the first scenario (ADHD masks giftedness). Existing studies have reported socioemotional and cognitive outcomes but have not directly addressed the masking effect of ADHD on academic performance. Foley-Nicpon, Rickels, Assouline, and Richards (2012) noted that dually diagnosed children displayed lower self-esteem than did their gifted peers without ADHD. Antshel and colleagues (2008) found that dually diagnosed children were more likely to present mood, anxiety, and disruptive behavior disorders than their gifted peers without ADHD. When ADHD coexists with giftedness, ADHD may impair executive functions including working memory, processing speed, and auditory verbal memory (Brown, Reichel, & Quinlan, 2011). Executive function impairment may represent substantial difficulty in achieving a level of academic achievement consistent with the child’s intellectual ability.

The literature has given more attention to the second scenario (giftedness obscures ADHD). In this scenario, the child is at risk of failing to be referred for special education services. Zentall, Moon, Hall, and Grskovic (2001) noted that gifted children compensated for ADHD impairments but only to the point of average performance. Dually diagnosed children still experienced academic underachievement, difficulty organizing, and difficulty maintaining attention. Zentall and colleagues (2001) noted, however, that dually diagnosed children’s specific talents in academic, creative, and social areas could protect long-term outcomes when cultivated in talent development programs. Some research suggests that intellectual giftedness protects creativity when ADHD is present (Fugate, Zentall, & Gentry, 2013; Healey & Rucklidge, 2006; Zentall et al., 2001). Another study reported that giftedness insulates children from verbal memory impairment associated with ADHD (Whitaker, Bell, Houskamp, & O’Callaghan, 2015).

Notably, we found no research examining bidirectional interactions between ADHD and giftedness. Closer examination of these interaction scenarios is a precondition to designing effective educational policies and services for dually diagnosed students. Because interactions between giftedness and ADHD are insufficiently understood, gifted students with ADHD typically receive treatment and support for ADHD relatively late in their academic careers (Brown, 2014). Another problem arises when the child’s gifted status raises parent and teacher expectations to levels unreasonable for a dually diagnosed student (Zentall et al., 2001). Emotions may represent an additional interaction: students who fail to meet parent and teacher expectations are likely to experience negative emotions. Brown (2014) argued that emotion mediates the ability of gifted individuals with ADHD to compensate for cognitive weaknesses with strengths.

Dual Diagnosis Profile

We explored the current empirical literature for patterns of characteristics that discriminate gifted individuals with coexisting ADHD from their gifted peers without ADHD. We identified and summarized cognitive, social, emotional, functional, family historical, and neurobiological patterns unique to dual diagnosis.

Cognitive Function

Antshel (2008) summarized previous findings that indicate that by having ADHD, gifted children are less likely to perform in the gifted range on the Wechsler Intelligence Scale for Children (Wechsler, 1991). The Wechsler Full-Scale IQ Test includes processing speed and working memory measures that may depress scores in children with ADHD (Raiford, Weiss, Rolfsus, & Coalson, 2005). As reported by Chae et al. (2003), gifted children with ADHD scored lower on the Korean Educational Development Institute–Wechsler Intelligence Scale for Children (Park, Yoon, Park, Park, & Kwun, 1987). Coding subtest, a measure of visual–motor speed and fine
motor coordination. Chae et al.’s (2003) findings suggest that gifted children with ADHD have difficulty performing psychomotor speed tasks despite their cognitive strengths. Chae et al. noted that gifted children with and without ADHD performed similarly on measures of working memory, whereas Antshel et al. (2007) reported that gifted children with ADHD scored significantly lower than their gifted counterparts without ADHD. Both findings may have been affected by limitations. Because Chae et al. used an IQ of at least 130 as the gifted inclusion criterion, the sample included highly gifted children ($M = 138.4$, $SD = 7.18$). Highly gifted children are more likely to be misdiagnosed with ADHD as a result of their elevated intellectual drive, higher capacity for hyperfocus, and greater susceptibility to boredom (Antshel, 2008). Antshel et al. (2007) used an outcome variable (Block Design score) as a sampling criterion and consequently increased the risk of failure to detect significant group differences. Both findings should be considered preliminary.

Executive function can be defined as a set of control mechanisms that prioritize, consolidate, and modulate other cognitive functions. Examples of executive function skills include planning and organizing, sustaining and shifting attention, sustaining effort and alertness, managing emotions, and using working memory (Brown, Reichel, & Quinlan, 2009). Executive function impairments have been observed in gifted children with ADHD. For example, ADHD-related executive function impairments inhibit a gifted child’s ability to self-manage emotions and behavior. Executive function impairment increases the risk of long-term educational and occupational failure (Brown et al., 2011). Brown et al. (2011) cited evidence suggesting executive function and IQ skills are only weakly correlated and noted that IQ tests inadequately assess executive function skills. Brown et al. (2009) asserted that executive functions are interdependent; moreover, clinical research suggests that environmental and emotional factors moderate the relationship between intelligence and executive functioning in individuals with ADHD. Traditional neuropsychological assessments, however, attempt to isolate the executive functions from other neurological functions and from one another (Brown et al., 2009). In essence, executive function plays an important but limited role in the profile of gifted children with ADHD.

To demonstrate that gifted children with ADHD suffer from executive function impairments, Brown et al. (2011) compared gifted youths with ADHD against published norms on eight standard measures of executive function: working memory, processing speed, verbal auditory memory, activation, focus, effort, emotion, and memory utilization. Sixty-two percent of gifted children in the study were significantly impaired on at least five of the eight executive function measures despite their cognitive strengths; overall, dually diagnosed children were substantially impaired in working memory, processing speed, and auditory verbal memory relative to their own cognitive abilities and the rate of impairment in this group was greater than in the general population. Whitaker et al. (2015) compared strategic verbal memory in gifted children with ADHD, gifted children without ADHD, and nongifted children with ADHD and found impairment in gifted children with ADHD despite their cognitive strengths. Whitaker et al. noted that when verbal memory tasks were supported with organizational cues (for example, a clustered as opposed to unclustered list of words), both gifted and nongifted children with ADHD showed similar gains in verbal memory performance. However, when the cues were removed, gifted children generalized the strategy to new tasks and maintained their performance gains, whereas nongifted children regressed to initial performance levels. In effect, giftedness may insulate children from strategic memory dysfunction associated with ADHD.

### Social and Emotional Patterns

Antshel et al. (2008) noted that social problems persisted over time in gifted youths with ADHD. According to Willard-Holt, Weber, Morrison, and Horgan (2013), self-concept problems continue into early adulthood; for instance, gifted college students declined ADHD accommodations to avoid being singled out. Early recognition and treatment of low self-esteem in gifted children with ADHD may avert social problems and improve later academic and professional outcomes (Foley-Nicpon, Rickels, Assouline, & Richards, 2012).

Zentall et al. (2001) described delayed social and emotional maturity in gifted boys with ADHD relative to their own intellectual and imaginative strengths. In a related study, Moon, Zentall, Grskovic, Hall, and Stormont (2001) noted that giftedness appeared to intensify rather than buffer social and emotional problems associated with ADHD; gifted boys with ADHD had more emotional difficulties relative to both nongifted peers with ADHD and gifted peers without ADHD. Specifically, dually diagnosed boys displayed immaturity, irresponsible behavior, and annoying behavior that contributed to social rejection in their gifted classrooms. Similarly, Chae et al. (2003) found that social skills of gifted children with ADHD were poorer than those of their gifted counterparts without the diagnosis. Dually diagnosed students observed by Cordeiro et al. (2011) all displayed significant but subclinical levels of social problems.

Foley-Nicpon et al. (2012) compared self-concept and self-esteem in gifted children with and without ADHD and found gifted children with ADHD had substantially lower self-esteem, self-concept, and overall happiness than those without ADHD. Gifted children with and without ADHD, however, were similar on self-reported intelligence, anxiety, popularity, and physical self-concept. Foley-Nicpon et al. charged that the connection between ADHD and happiness in gifted students warrants further examination.
Comorbidities
Evidence suggests that dually diagnosed children have higher rates of comorbidities than their gifted peers without ADHD. Antshel et al. (2007) reported higher rates of major depression, generalized and separation anxiety disorders, social phobia, and conduct disorder in gifted children with ADHD than without. Antshel and colleagues pointed out that high rates (greater than 50%) of conduct disorder and major depression observed in gifted children with ADHD warrant further examination to rule out comorbidities as a cause of academic underachievement. Brown et al. (2011) found significant cooccurrences of one or more psychiatric disorders including depression, obsessive–compulsive disorder, and Asperger’s syndrome in dually diagnosed children. Cordeiro et al. (2011) observed at least one additional comorbid mood, learning, or behavior disorder in eight of the 10 dually diagnosed children in their study.

Dual Diagnosis and Academic Performance
Though academic underachievement has been cited as a concern for gifted students with ADHD, only a few empirical studies have examined this problem. In a case study, Zentall et al. (2001) compared learning and motivational profiles of three groups of boys: (a) gifted boys with ADHD, (b) gifted boys without ADHD, and (c) nongifted boys with ADHD. They noted that gifted boys with ADHD were more likely to underachieve, avoid homework, and experience difficulty initiating tasks and staying on task. Cordeiro et al. (2011) used a multidisciplinary approach in their case study of 15 gifted children referred for behavior or learning difficulties. The children completed a comprehensive set of psychiatric, psychological, and pedagogical assessments including tests of intelligence, ADHD, and psychiatric disorders. Ten participants had the dual diagnosis. All 10 dually diagnosed children showed significant academic impairment, and seven of those 10 performed poorly on standardized tests of reading, writing, or math. Brown et al. (2011) reported similar reading achievement scores for gifted children with and without ADHD, but the gifted children with ADHD scored lower on a math achievement test. Gifted students with ADHD may repeat grades more often. Antshel et al. (2007) observed a 20% retention rate for gifted students with ADHD in comparison to gifted peers without ADHD. Similarly, Brown et al. (2011) found gifted children with ADHD more likely to have been retained a grade, to be placed in a special education setting, or to have received academic tutoring. Foley-Nicpon, Allmon, Sieck, and Stinson (2011) noted that gifted students with ADHD may succeed or even excel academically until demands exceed their ability to compensate with intelligence, creativity, or talent.

Creatively Gifted with ADHD
Cramond (1994) assessed creativity in children with ADHD and ADHD in highly creative children. Children with ADHD performed more than one standard deviation above the test mean on elaboration, defined as a style of creative response that involves adding substantial detail to an idea. Further, Cramond (1994) reported that 26% of the highly creative children also met the screening criteria for a diagnosis of ADHD, despite teachers’ reports of normal levels of inattention, hyperactivity, and impulsivity. Zentall et al. (2001) likewise found that gifted students with ADHD demonstrated more creative ability than gifted students without ADHD. Healey and Rucklidge (2006) compared creatively gifted children with and without ADHD and found that ADHD occurred more frequently among creatively gifted children: 40% of creatively gifted students displayed significant levels of ADHD symptomology versus 9% expected in the general population. Healey and Rucklidge (2006) noted that full-scale IQ, working memory, and executive functioning were equivalent in creative children with and without ADHD, yet creative children with ADHD were impaired in processing speed and reaction time compared to their peers without the diagnosis. Parents of creative children with ADHD rated their children higher on inattentiveness and hyperactivity, but neither parent nor teacher ratings indicated cognitive impairment. The authors concluded that what distinguishes creative children from children with ADHD may be their higher ability to process and use information they cannot selectively filter.

Fugate et al. (2013) compared creativity and working memory in gifted students equivalent in fluid intelligence, with and without ADHD. Despite poorer working memory, gifted students with ADHD were substantially more creative than gifted peers without ADHD. Forty-one percent of dually diagnosed students scored at or above the 90th percentile and more than half scored at or above the 70th percentile on the Torrance Tests of Creative Thinking (Torrance, 1966, 2006). A compelling finding was the negative relationship between working memory and creativity in both groups; poorer working memory was associated with higher creativity. Fugate and colleagues (2013) noted that their finding contradicts previous evidence of a positive association between working memory and creativity. Fugate et al. concluded that dually diagnosed students’ inability to filter peripheral cues may enhance creative performance. Notably, Fugate et al.’s evidence of a positive relationship between intelligence and creativity challenges the threshold concept, or the idea that the positive relationship between intelligence and creativity disappears above a threshold IQ of 120 (Torrance, 1962).

Stability of Dual Diagnosis
Cordeiro et al. (2011) reported consistent psychopathological attributes and functional impairments across settings in dually diagnosed children. Antshel et al. (2008) analyzed longitudinal data from cohorts of gifted youths with and without ADHD and found at the 4.5-year follow-up, 78% of youths in the ADHD cohort had maintained ADHD status.
IQ was equally stable over time in both cohorts, and gifted youth with ADHD were no more likely to lose gifted status than gifted peers without ADHD.

**Familial Patterns**

Antshel et al. (2007) compared family histories of ADHD in first-degree relatives of gifted children with and without ADHD. ADHD was more common in the families of gifted children with ADHD. Twenty-three percent of first-degree relatives of gifted children with ADHD met diagnostic criteria for ADHD compared to 5.6% of first-degree relatives of gifted children without ADHD. Similar rates have been reported in nongifted individuals with ADHD.

**Perceptions of Others**

Investigations into others’ perceptions of dually diagnosed children have reported varied findings. Edwards (2008) observed that parents of gifted children with ADHD, not their teachers, identified the children as underachieving. Chae et al. (2003) reported that 13.2% of their sample of gifted children were rated by parents and teachers as having ADHD according to a behavior checklist, yet did not meet clinical criteria for a diagnosis of ADHD. Chae et al. suggested that gifted children might be rated impulsive or inattentive by parents and teachers when they fail to focus on routine tasks. Similarly, Antshel (2008) found that parents of gifted children with ADHD rated their children higher in psychopathology and dysfunction than did parents of gifted children without the diagnosis. Brown et al. (2011) pointed out that parents are often told by educators and practitioners that ADHD does not occur in gifted children and thus may be reluctant to accept a dual diagnosis. For example, Wood (2012) noted that parents and teachers of gifted children referred for ADHD evaluation indicated only average levels of concern for inattention, hyperactivity, and executive function. Willard-Holt et al. (2013) reported gifted college students’ accounts of struggling to have their ADHD validated. The parents of one dually diagnosed student in Willard-Holt et al.’s study denied the validity of her disability. This created in the student a misconception that all adults denied her ADHD diagnosis. Another dually diagnosed student explained that she was never recognized as having ADHD as a child because she was quick to grasp concepts. These findings underscore how important it is for practitioners to understand the characteristics of ADHD and their presentation among gifted children (Reis, Baum, & Burke, 2014).

Foley-Nicpon, Assouline, and Colangelo (2013) surveyed 317 educators on their familiarity with ADHD in gifted students and found that 49% of respondents had specific familiarity, 36% had some familiarity, and 15% had either passing or no familiarity. Regarding their experience working with gifted students with ADHD, 22% of respondents indicated extensive experience, 39% indicated moderate experience, 31% indicated some experience, and 8% indicated no experience. Gifted–talented specialists were more familiar with, and experienced in, working with gifted students with ADHD than classroom teachers, special education teachers, or school psychologists. Foley-Nicpon et al.’s (2013) findings are positive but they warrant further professional development for classroom teachers, school psychologists, and others who work with gifted children.

**Neurobiological Patterns**

Kalbfleisch (2001) used electroencephalography to compare gifted and nongifted boys with ADHD on their neural efficiency to shift between tasks. Interestingly, gifted boys with ADHD were more impaired than nongifted boys with ADHD when shifting between divergent thinking tasks. Kalbfleisch contended that gifted children with ADHD need help developing compensation skills that facilitate transitions. Kalbfleisch’s findings help explain the hyperfocused behavior described anecdotally in gifted children with ADHD; because of their aptitude for higher-level thinking afforded by high ability, it might be more difficult for these children to disengage from divergent thinking tasks. Kalbfleisch concluded that the propensity of gifted boys with ADHD to maintain intense focus on tasks involving higher-level thinking is a cognitive benefit of ADHD.

**ADHD AND GIFTEDNESS: DIFFERENTIAL DIAGNOSIS**

Given the possibility for both misdiagnosis and dual diagnosis, it is important to present information relevant in making a differential diagnosis or a way to identify the presence of a disorder or condition when multiple alternatives are possible or appear possible.

Behavior checklists are often used to provide evidence for a diagnosis of ADHD, yet a number of scholars believe that relying on behavior checklists or behavioral markers is an insufficient way to identify ADHD in gifted children (Budding & Chidekel, 2012). Behavior checklists largely address the expression of behavior rather than the cause of behavior. For example, whereas nongifted children with ADHD generate kinesthetic and sensory activity when understimulated, gifted children with ADHD generate cognitive activity instead (Zentall et al., 2001). Such cognitive activity may be unobservable or subject to misinterpretation if the accompanying physical behavior is compliant; for example, a child engaged in imaginative thought may appear focused or attentive. Wood’s (2012) exploratory study examined parent and teacher perceptions of behaviors of gifted students with ADHD and concluded that behavior rating scales failed to provide adequate agreement for definitive dual diagnosis. Furthermore,
dissertation to parent and teacher ratings indicated that symptoms might vary with context. Chae et al. (2003) observed that behavior checklists resulted in significantly more ADHD diagnoses than would be expected from clinical evaluations.

A gifted student may have ADHD even when standardized measures of attention fail to indicate ADHD (Foley-Nicpon et al., 2011). Brown et al. (2011) noted that neuropsychological tests of executive function may lack sensitivity to detect the full range of impairments in gifted children with ADHD. Continuous performance tests have also been found lacking sensitivity to detect ADHD in gifted children. Chae et al. (2003) reported that gifted children with and without ADHD performed similarly on continuous performance tests; furthermore, gifted children with ADHD demonstrated fewer commission and omission errors and less response variability than nongifted children with ADHD. Chae et al. suggested that higher norms on continuous performance tests might be necessary for detecting ADHD in gifted children. Park et al. (2011) compared gifted and nongifted children with ADHD on a visual–auditory continuous performance test and found that gifted children with ADHD performed better despite equivalent ADHD symptom severity; differences between the groups were more pronounced on auditory variables. Park et al. concluded that predictive validity of the continuous performance test was lower for gifted children with ADHD than for nongifted children with ADHD. Overall, these findings suggest that continuous performance tests may fail to detect ADHD in gifted children.

Comprehensive clinical and psychological evaluation avoids confounding ADHD symptoms with ADHD-like gifted behaviors (Brown et al., 2011; Cordeiro et al., 2011). Teachers, parents, and diagnosticians should consider the situation in which a child exhibits characteristics such as inattention and impulsivity in order to more clearly distinguish between behaviors associated with giftedness, behaviors associated with ADHD, and behaviors associated with being twice exceptional. For example, if appropriate academic placement diminishes problem behavior, or problem behavior only occurs in one setting, such as school, but not in other settings (e.g., home, extracurricular sports activities), ADHD may not be a concern. Recently, the National Commission on Twice Exceptional Students adopted a definition of twice-exceptional learners that includes gifted students with ADHD. The new definition states that “identification of twice-exceptional learners requires comprehensive assessment in both the areas of giftedness and disabilities, as one does not preclude the other” (Reis et al., 2014, p. 222) and advised identification by professionals from both disciplines with knowledge about twice-exceptionality.

**INTERVENTIONS AND STRATEGIES IN DEALING WITH A DUAL DIAGNOSIS**

Most strategies and interventions for gifted children with ADHD lack supporting evidence (Edwards, 2008), but available evidence indicates that dually diagnosed children respond well to targeted strategies. Though patterns of behavior and cognitive impairment are similar in nongifted and gifted children with ADHD, not all ADHD interventions are appropriate for gifted children (Edwards, 2008).

**Strength-Based Approaches**

Hua, Shore, and Makarova (2014) contrasted deficit-focused with strength-based strategies such as inquiry and problem-based learning. Deficit-focused approaches, often driven by Section 504 plans, help students cope with ADHD impairments (Hua et al., 2014). Coping strategies may include study habits, extra time on assignments, and breaking assignments into smaller pieces. Gifted adolescents may feel stigmatized by deficit-focused accommodations (Willard-Holt et al., 2013). Furthermore, for dually diagnosed students, typical strategies such as breaking tasks into simple parts can cause frustration and inattentiveness (Moon, 2002). Hua et al. (2014) argued that deficit approaches treat knowledge as a commodity and may prevent dually diagnosed students from connecting learning with deeper meaning. Strength-based approaches, on the other hand, give purpose and ownership to the student and enhance self-esteem. Hua et al. (2014) asserted that inquiry-based learning in the context of cognitive apprenticeship has strong positive effects on the academic outcomes of gifted students with ADHD. Inquiry-based learning allows those students to relinquish the underachiever identity, create a personal cognitive framework around the problem, capitalize on idealism, and assume new roles. Hua et al. (2014) believe, however, that some teachers avoid strength-based strategies over worry that students with ADHD, gifted or not, lack the requisite organization and attention to succeed.

Talent development is a strength-based approach with potential to improve long-term academic outcomes; increased attention and persistence may help the student overcome organizational problems (Zentall et al., 2001). Edwards (2008) noted that gifted children with ADHD were stimulated and engaged by tasks in their interest and talent areas. Working in strength areas may induce hyperfocus in dually diagnosed students; hyperfocus may orient the student toward learning goals and thereby diminish barriers to potential.

Fugate et al. (2013) argued that divergent thinking and creativity may be compensatory strengths in gifted students with ADHD and could be used to enhance educational programming. Problem-based learning, creative writing,
alternative assessments, and revisions of products for different audiences are all strategies that demand divergent thinking and may be particularly suited to dually diagnosed students.

Dually Diagnosed Students’ Perspective on What Works

Gifted elementary students with ADHD favored verbal participation, hands-on involvement, and an active role in the selection of tasks and learning conditions (Zentall et al., 2001). Edwards (2008) observed that gifted students with ADHD preferred strategies involving tasks that were interesting, visual, purposeful, allowed movement, and involved use of the computer. Most dually diagnosed students preferred tasks that resulted in a tangible product, possibly because such tasks have clear purpose. These students preferred to move freely around the classroom but also indicated a desire for structure and limited choices. Teachers can enhance learning by incorporating appropriate ways to move around the classroom into the curriculum. Although computer use can be beneficial, parents indicated that overuse of the computer could lead to their children’s anger and frustration; Edwards (2008) advised setting time limits at the computer for gifted children with ADHD.

Classroom Strategies

Antshel et al. (2009) advised that teachers be aware of discrepancies between ability and performance in gifted students with ADHD and set expectations based on ability, not past performance. Zentall et al. (2001) emphasized the need for teachers not to limit assignments to rote, repetitive tasks because of the student’s need for challenge. Gifted elementary students with ADHD benefit from complex assignments, shorter assignments, more direction, reminders and cues, frequent feedback, incentives for persistence, and performing a helper or leader role. Zentall et al. found that the most helpful motivational strategy for gifted boys with ADHD was a teacher’s individual attention and personal interest. Working memory deficits may pose a challenge for gifted students with ADHD during classroom discussions; writing out responses in advance may help compensate (Willard-Holt et al., 2013). Organizational cues such as graphic organizers and memory strategies were demonstrated to have long-term positive effects on dually diagnosed students’ working memory (Whitaker et al., 2015). Further, dually diagnosed students benefited from additional time to complete assignments provided that the time was structured. Structural and organizational supports may improve access to higher-level reasoning abilities for these students when learning new concepts and behaviors.

Behavioral Strategies

Gifted individuals with ADHD are motivated by fear of immediate negative consequences when performing uninteresting tasks and tend to procrastinate, often severely (Brown et al., 2009). Behavioral interventions hold promise for gifted students with problem behaviors associated with ADHD, such as procrastination and brinkmanship. The success of behavioral interventions with gifted students may depend on the reinforcers; gifted students may prefer different reinforcers than are typically desired by nongifted students (Foley-Nicpon et al., 2011).

Single-subject research designs are useful when working with small, exceptional cohort groups such as twice-exceptional students (Walsh & Kemp, 2013) by allowing the application of a learning strategy while systematically collecting data on its efficacy (Simonsen & Little, 2011). The reversal design, or ABAB design, is a single-case experiment that involves the sequential application and withdrawal of an intervention to verify its effect. The ABAB design begins with a baseline phase (A) followed by a treatment phase (B), a return to baseline (A), and another treatment phase (B). An ABAB experiment could be used to study the effect of a self-management strategy on the on-task behavior of a gifted student with ADHD. The teacher would begin by recording baseline on-task behavior for several days (A). After teaching the student how to apply the strategy, the teacher would record on-task behavior with the strategy in place (B). Finally, the teacher would repeat the baseline (A) and treatment (B) phases. An effective strategy would be one that improves the student’s behavior with each introduction of the strategy.

Medical Intervention

Katusic et al. (2011) reported similar rates of stimulant treatment, age at treatment onset, and treatment duration in intellectually gifted, average, and below average children with ADHD. Grizenko et al. (2012) compared gifted, average, and below-average children with ADHD on their response to stimulant treatment in a double-blind, placebo-controlled medical trial. Similar response to treatment was observed across all participants, although the gifted children with ADHD presented less severe symptoms than the other two groups. Grizenko et al. (2012) suggest that stimulant treatment may be appropriate and helpful for gifted children with ADHD.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The empirical studies in our review varied in design and approach. The majority of studies were quantitative; others
used mixed methods or were qualitative. A common limitation involved the use of small or convenience samples. Small samples limit statistical power and increase the likelihood of failing to detect significant effects. Findings based on convenience samples cannot be generalized outside the sample population because participants may differ systematically from the target class of interest in the general population. For example, gifted students recruited from summer residential programs for high-ability students may differ socioeconomically from gifted students who do not enroll in those programs. Similarly, clinically referred samples are more likely to represent persons with coexisting disabilities (Fugate et al., 2013). Another common limitation was lack of careful experimental control. Control varied across studies and included comparison groups of gifted children with and without ADHD, gifted and nongifted children with ADHD, or more than two groups. Several studies excluded controls and, instead, compared participants with published age-based norms. Overlapping gifted and ADHD characteristics complicated research designs, making it difficult to rule out plausible alternative causes of observed effects. Despite those limitations, it is important to recognize that small populations, such as our population of interest, offer few opportunities for rigorous statistical analyses or experimental research designs. Smaller studies explore new phenomena, offer preliminary findings, and suggest future directions for research.

Definitions of giftedness and ADHD varied across studies. Most used a full-scale IQ score of at least 120 to determine giftedness eligibility. Other studies used General Intelligence Index, Verbal Comprehension Index, or Perceptual Organization Index scores from the Wechsler Intelligence Scale for Children (Wechsler, 1991). Other types of giftedness such as creativity and talent were seldom investigated, and studies of highly gifted children with ADHD were absent. Eligibility for an ADHD diagnosis varied across studies and included behavior rating checklists, executive functioning measures such as continuous performance tests, and professional clinical diagnoses based on multiple assessments.

Future research should address these noted limitations to strengthen the conclusions drawn. Foley-Nicpon et al. (2011) recommended further research into effects of gifted programs such as acceleration on dually diagnosed students’ self-esteem and self-concept. Similarly, Antshel et al. (2007) suggested further research into relationships between gifted program participation, achievement, and social adjustment of gifted students with ADHD. Remaining questions include the effects of dually diagnosed children’s identity as gifted on academic and social functioning (Foley-Nicpon et al., 2012), differences between highly and moderately gifted individuals with ADHD (Katusic et al., 2011), and the relationship between ADHD and other forms of giftedness such as creativity and talent (Fugate et al., 2013). Questions also remain regarding effects of multiple comorbidities in dually diagnosed children. Antshel et al. (2007) recommended longitudinal studies exploring how giftedness protects children from ADHD over the course of development. Fugate et al. (2013) recommended replication with a larger sample, improved controls, and a wider range of IQ to better understand the relationship between intelligence and creativity.

CONCLUSION

It is vital that ADHD remain a diagnosis of exclusion. Though misdiagnosis is a recognized problem, giftedness and ADHD also occur together. Characteristics shared between ADHD and giftedness can make it difficult to tell the two conditions apart. What is more, when the two conditions coincide, they interact in unfamiliar ways that blur distinctions and disguise both conditions. Kaufmann, Kalbfeisch, and Castellanos (2000) noted that gifted children’s overreliance on strengths inadvertently obscures ADHD impairments and may lead to diagnostic errors of omission. Accurate identification is challenging. Distinguishing between giftedness, ADHD, and the combination of the two is not so much a need to identify symptoms as it is to identify a fingerprint: a set of characteristics and their interaction that, together, form the basis for a diagnosis. There is no one litmus test. Of the adults who make up a child’s support structure, teachers most frequently find themselves in the position of concluding which students are likely prospects for special educational programming. Teachers are not trained diagnosticians, nor are they expected to make diagnostic decisions. However, teachers frequently lack the specialized training needed to recognize subtle distinctions between gifted characteristics and ADHD symptoms when the two overlap. In dually diagnosed children, giftedness insulates the child from ADHD impairments to some degree. This masking effect mitigates some observable ADHD characteristics and can reduce the sensitivity of ADHD tests when used with gifted children. Though research in this area has increased, there remains an unmistakable need for more empirical research. Future research should seek to identify interactions between gifted and ADHD characteristics and other comorbidities, evaluate the responsiveness of dually diagnosed children to various interventions and programs, examine the effects of professional training on teacher perceptions, and give attention to highly gifted and highly creative children with ADHD.

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