

Special Issue on the Topic of Autism Spectrum Disorder

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For this first special issue of the *Scandinavian Journal of Child and Adolescent Psychiatry and Psychology (SJCAPP)*, we invited authors to submit papers about autism spectrum disorder (ASD). The topics of the final accepted manuscripts include the replication of some previous findings as well as new information in understudied areas.

One important and inadequately studied area is gender differences in the presentation of ASD (1). Some investigators have expressed concerns that high-functioning girls with ASD may be underidentified as a result of differences in their symptom presentation (1-3), and sex differences in ASD symptom presentation have also been suggested by some studies of lower-functioning individuals (4). Because the type and severity of specific ASD-related behaviors may be different in females with ASD as compared with males with ASD—for example, restricted-repetitive behaviors (RRBs) may be less severe in girls—it has been suggested that new assessment methods are needed to detect the types of ASD symptoms that most commonly occur in females (1-3).

In the current special issue, Nguyen and Ronald (5) compare ASD symptom presentation and other characteristics of low-functioning girls with ASD ($n = 27$) with those of typically developing (TD) girls ($n = 17$) and also with those of low-functioning boys with ASD ($n = 27$). The TD girl group was younger (mean age, 10 years) than the other two groups (mean ages, 15 years and 14 years for girls and boys, respectively) because the ASD groups had relatively low IQs and groups were matched for mental age. The authors found the ASD symptom presentation of low-functioning boys and girls with ASD to be largely similar, but the data do show

trends that suggest that girls with ASD may have lower scores for many aspects of RRBs and higher scores for self-injurious behavior as compared with boys with ASD. These possible differences were not statistically significant after adjustment for multiple testing, but they may be worth further study in larger samples. Boys with ASD scored significantly higher than girls with ASD or TD girls on a test intended to measure attention to detail (the Wechsler Intelligence Scale for Children, Revised, or the Wechsler Abbreviated Scale of Intelligence block design task), which suggests that any relative strength on the block design task in children with ASD versus TD controls may be unique to males. Further studies with larger samples and the inclusion of a control group of TD boys would help to clarify whether this sex difference in block design performance is related to sex differences in ASD presentation or to an overall tendency for males (with or without ASD) to perform relatively well on this task.

Although Nguyen and Ronald focused on low-functioning children and adolescents (i.e., those 7 to 19 years old) with ASD, it is also important to examine the presentation of ASD among females at older ages and in those with higher levels of cognitive functioning. Trubanova and colleagues (6) present a case series of high-functioning young adult females with ASD to illustrate some characteristics that may contribute to the underidentification of ASD in females. Although these young women with ASD are clearly socially impaired, they may have high interest in friendships, and they may even become hyper-focused on aspects of friendship and social relations in a stereotyped manner, similar to the way in which

boys with ASD may focus on non-social special interests. This case series also illustrates that some young women with ASD may have borderline personality disorder traits and self-harm behaviors. The observation of self-harm behaviors among young women with ASD is consistent with the possible trend toward increased self-injury behaviors seen among girls in Nguyen and Ronald's study that was just described. This observation is also of interest in the context of some recent literature regarding attention-deficit/hyperactivity disorder (ADHD) in females. One recent longitudinal study of girls with ADHD demonstrated that these individuals are at high risk for suicidal and self-injury behaviors as they mature into adolescence and young adulthood (7). Given the frequent co-occurrence of ADHD with ASD (8) and the evidence for a strong association between RRBs and impulsivity (9) in population-based samples, it would be of great interest for future studies to investigate whether the risk for self-injury in girls with ASD is increased by the presence of ADHD symptoms and whether girls with ADHD have a higher risk for self-injury when they have co-occurring ASD. Additional research is needed to confirm whether the patterns of behavior illustrated in this case series are generally more common among females with ASD as compared with males with ASD. However, the case series itself has clinical implications, because it illustrates how RRBs in females may be missed in patients in whom the topics of special interest or the characteristics of the RRBs are qualitatively different as compared with the classic descriptions of ASD-related behavior in males.

Another topic of recent focus in the ASD literature is the transition from adolescence to adulthood, including the seeking of independence and productivity through employment (10). In many cases, young people with ASD receive much of their treatment and services through their school systems, so they may suddenly be without resources after they finish high school. In the United States, the National Longitudinal Transition Study-2 showed that employment outcomes of young adults with ASD who were 21 to 25 years old were worse than those of young adults with other developmental disabilities who had received special education services during high school (10). The article in this issue by Kirchner and colleagues (11) explores factors that may facilitate or interfere with satisfactory employment experiences among young adults with ASD. Kirchner and colleagues found that the majority of high-functioning adults with ASD report that it is useful for employers and colleagues to be aware of their ASD diagnoses. Some of the more common interfering factors

included sensory sensitivities in the workplace and mental overload. In addition, the authors' findings suggest that many young adults with ASD may benefit from working in an area related to their special interests. This article may help to inform the development of improved work environments for individuals with ASD, which may then help these individuals to use their strengths and special interests to succeed in the workplace.

A relatively new area of ASD research relates to substance use and substance use disorders. Although substance use seems unlikely among severely affected low-functioning individuals with ASD who may not have the social or language skills necessary to obtain substances on their own, higher-functioning forms of ASD have now been well recognized for years, and it is unclear whether individuals with these variations have a high or low risk of substance use as they move into adolescence and adulthood. Existing research has suggested that ASD may actually be protective against substance use in adolescents (at least as compared with individuals with other psychiatric diagnoses) and that adolescents with ASD who do use substances tend to also have co-occurring ADHD diagnoses (12). This has not previously been studied with large epidemiological samples of adolescents. In the current issue of *SJCAPP*, Mulligan and colleagues (13) examine rates of parent-reported substance use in a population-based large sibship sample. The authors found evidence that adolescents with clinically elevated ASD symptoms (but without ADHD) are not at a statistically significant increased risk for alcohol or tobacco use as compared with controls without ASD or ADHD. However, these adolescents are at increased risk for other drug use as identified by a Child Behavior Checklist (14) item regarding the use of drugs (other than alcohol and tobacco) for non-medical purposes. Adolescents with a combination of high levels of ASD symptoms and ADHD were at elevated risk for alcohol, tobacco, and other drug use. Although the quality of data for this study was not ideal (i.e., the only measures of substance use were three parent-report Child Behavior Checklist items), the results suggest that clinicians should not assume that high-functioning patients with ASD are at low risk for substance use, especially when they also have co-occurring ADHD. This article suggests a need for the further study of factors that influence risk for substance use and its progression to dependence among high-functioning adolescents and adults with ASD. In fact, there is already one recent population-based study that involved more detailed substance use data; its results showed that the presence of elevated ASD traits does indeed put individuals at risk for alcohol, tobacco, and drug

dependence during adulthood, even after controlling for ADHD symptoms (15).

In summary, the current issue of *SJCAPP* focuses on a number of timely topics related to ASD. Further work is needed to clarify sex differences with regard to ASD risk, symptom presentation, comorbidity, and response to treatment; to explore the vocational experiences and employment needs of individuals with ASD who are transitioning from adolescence to adulthood; and to determine whether high-functioning individuals with ASD will benefit from specialized substance use prevention and treatment interventions. Beyond the scope of the articles in this special issue are many other expanding areas of ASD research that are worthy of further study, particularly in the realms of genetics, brain mechanisms, and new treatment interventions for ASD. We hope that *SJCAPP* will have the opportunity to help disseminate some of this important work.

References

1. Van Wijngaarden-Cremers PJ, van Eeten E, Groen WB, Van Deurzen PA, Oosterling IJ, Van der Gaag RJ. Gender and age differences in the core triad of impairments in autism spectrum disorders: a systematic review and meta-analysis. *J Autism Dev Disord* 2014 Mar;44(3):627-35.
2. Kopp S, Gillberg C. The Autism Spectrum Screening Questionnaire (ASSQ)-Revised Extended Version (ASSQ-REV): an instrument for better capturing the autism phenotype in girls? A preliminary study involving 191 clinical cases and community controls. *Res Dev Disabil* 2011 Nov-Dec;32(6):2875-88.
3. Frazier TW, Georgiades S, Bishop SL, Hardan AY. Behavioral and cognitive characteristics of females and males with autism in the Simons Simplex Collection. *J Am Acad Child Adolesc Psychiatry* 2014 Mar;53(3):329-40.e1-3.
4. Lord C, Schopler E, Revicki D. Sex differences in autism. *J Autism Dev Disord* 1982 Dec;12(4):317-30.
5. Nguyen C, Ronald A. How do girls with low functioning autism compare to boys with autism and typically developing girls with regard to behavior, cognition, and psychopathology? *Scand J Child Adolesc Psychiatr Psychol* 2014;2(2):55-65.
6. Trubanova A, Donlon K, Kreiser NL, Ollendick TH, White SW. Underidentification of autism spectrum disorder in females: a case series illustrating the unique presentation of this disorder in young women. *Scand J Child Adolesc Psychiatr Psychol* 2014;2(2):66-76.
7. Hinshaw SP, Owens EB, Zalecki C, Huggins SP, Montenegro-Nevado AJ, Schrodek E, et al. Prospective follow-up of girls with attention-deficit/hyperactivity disorder into early adulthood: continuing impairment includes elevated risk for suicide attempts and self-injury. *J Consult Clin Psychol* 2012 Dec;80(6):1041-51.
8. Reiersen AM, Constantino JN, Volk HE, Todd RD. Autistic traits in a population-based ADHD twin sample. *J Child Psychol Psychiatry* 2007 May;48(5):464-72.
9. Ronald A, Larsson H, Anckarsäter H, Lichtenstein P. Symptoms of autism and ADHD: A Swedish twin study examining their overlap. *J Abnorm Psychol* 2014 May;123(2):440-51.
10. Roux AM, Shattuck PT, Cooper BP, Anderson KA, Wagner M, Narendorf SC. Postsecondary employment experiences among young adults with an autism spectrum disorder. *J Am Acad Child Adolesc Psychiatry* 2013 Sep;52(9):931-9.
11. Kirchner JC, Dziobek I. Toward the successful employment of adults with autism: a first analysis of special interests and factors deemed important for vocational performance. *Scand J Child Adolesc Psychiatr Psychol* 2014;2(2):77-85.
12. Santosh PJ, Mijovic A. Does pervasive developmental disorder protect children and adolescents against drug and alcohol use? *Eur Child Adolesc Psychiatry* 2006 Jun;15(4):183-8.
13. Mulligan RC, Reiersen AM, Todorov AA. Attention-Deficit/Hyperactivity Disorder, autistic traits, and substance use among Missouri adolescents. *Scand J Child Adolesc Psychiatr Psychol* 2014;2(2):86-92.
14. Achenbach TM, Rescorla LA. *Manual for the ASEBA School-Age Forms & Profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families; 2001.
15. De Alwis D, Agrawal A, Reiersen AM, Constantino JN, Henders A, Martin NG, et al. ADHD symptoms, autistic traits, and substance use and misuse in adult Australian twins. *J Stud Alcohol Drugs* 2014 Mar;75(2):211-21.