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Neurodivergence in AFAB Individuals

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Abstract

Since their first conceptualizations in the early 20th century, autism spectrum disorder and attention deficit/hyperactivity disorder have been perceived as predominantly, or even exclusively male conditions (Kreiser & White, 2013). Over recent years, support has grown for the hypothesis that this ratio is caused not by differences in prevalence but rather, differences in likelihood of diagnosis, with AFAB people being frequently under- and misdiagnosed. This is in part due to the difference in presentation of ASD and ADHD. The causes behind the underdiagnosis of AFAB individuals as well as their unique presentation of symptoms are discussed.

Key

ASD: autism spectrum disorder
ADHD: attention-deficit/hyperactivity disorder
AFAB: assigned female at birth
AMAB: assigned male at birth
ASAB: assigned sex at birth

Introduction

Since their first conceptualizations in the early 20th century, autism spectrum disorder (ASD) and attention deficit/hyperactivity disorder (ADHD) have been perceived as predominantly, or even exclusively male conditions (Kreiser & White, 2013). This is rooted in and often seen as justified by prevalence rates, with

gender ratios ranging from 10:1 to 3:1 for ADHD (Quinn, 2011), and hovering around 4-5:1 for ASD (Ratto et al., 2017*)*. Over recent years, however, increasing support has been vocalized for the hypothesis that this ratio is caused not by differences in prevalence but rather, differences in likelihood of diagnosis, with AFAB people being frequently under- and misdiagnosed.

For the purpose of this essay, the term "neurodivergence" is defined as neural function deviating significantly from that of the majority of the human population, such as ASD, ADHD, dyslexia, or dyspraxia; particular focus is given to ASD and ADHD, though these are by no means the only forms of neurodivergence. The term "assigned female at birth" (AFAB) is used to refer to individuals who were born with XX chromosomes; analogously "assigned male at birth" (AMAB) individuals were born with XY chromosomes. This is done on the understanding that assigned sex at birth (ASAB) does not necessarily correspond with one's gender, and to refer to all AFAB and AMAB people as female and male respectively would be cisnormative and trans-exclusionary. However, assigned sex at birth may still have important psychiatric implications, especially when it comes to conditions often diagnosed in childhood, before trans individuals typically "come out".

Neurodivergence

ASD, previously known as simply "autism" or "Asperger's syndrome", is a lifelong neurodevelopmental condition characterized by atypical development in the realms of social interaction, flexibility, and sensory processing (APA, 2013). It is considered a spectrum condition, in that it is characterized by a range of core symptoms which vary in intensity and manifestation from individual to individual. Similarly to ASD, ADHD is a lifelong neurodevelopmental condition, though the core traits of ADHD are much less known. In particular, ADHD is commonly perceived as characterized by inattentiveness, impulsivity, and hyperactivity (Quinn, 2011). In recent years, however, increasing recognition has been given to the AMAB-centered basis of these

alleged core signs (Quinn & Madhoo, 2014). ASD and ADHD are present from birth, albeit often diagnosed much later in life, especially among AFAB individuals.

Prevalence rates

In clinical samples, the AMAB-to-AFAB ratio of ASD has been found to be around 4:1 or higher (Bargiela, Steward, & Mandy, 2016), and anywhere between 3:1 and 9:1 in ADHD (Quinn, 2011). Historically, the most common explanation of these drastic differences has been that AMAB individuals are simply more likely that AFAB individuals to have these conditions. Little evidence has been found to support this (Ratto et al., 2017), however, and that which does exist is questionable, stemming from a self-reaffirming grounding.

This self-fulfilling cycle was initiated in the very first studies of ASD and ADHD. The first descriptions of these conditions by Kanner (1943), Asperger (1944), and Sir George Still (Lange, Reichl, Lange, Tucha, & Tucha, 2010) were based on primarily AMAB samples (Gershon, 2002). From their initial conceptualizations, therefore, diagnostic criteria of the conditions were biased to exclude AFAB individuals. This trend prevailed through the majority of initial research on the conditions (Hasson & Fine, 2012; Thompson, Caruso, & Ellerbeck, 2003). With time, increasing efforts had been made to include AFAB individuals in research, but the structural barriers had already been established; the majority of research on ASD and ADHD focuses solely on individuals who had received a diagnosis, and due to greater awareness of the AMAB manifestations of these conditions, the vast majority of individuals with diagnoses were AMAB. In other words, the exclusion of AFAB individuals from initial studies of ASD and ADHD made AFAB folk with ASD and/or ADHD harder to identify and study in later research, thereby precluding clinicians from learning about the AFAB manifestations thereof and adjusting diagnostic criteria accordingly. This self-fulfilling cycle continues to this day, with 81% of research participants in ADHD studies

published between 1987 and 1994 being AMAB (Hartung & Widiger, 1998).

The difference in AFAB presentation of ADHD and ASD symptoms relative to AMAB folk is compounded by the fact that the former show an increased tendency to mask their symptoms. In particular, AFAB individuals with ASD seem to be better at, and more likely to imitate social norms and socially acceptable behaviour so as to hide their conditions - a behaviour known as "camouflaging" (Ratto et al., 2017). Indeed, Lai et al. (2014) found that AFAB individuals on the autism spectrum show less evident autistic behaviour in interpersonal context. This is likely to be a result of gender norms and differences in standards against which AFAB folk are upheld, in comparison with AMAB folk. In other words, the most typical symptoms of ASD in children, such as anger outbursts or deficits in social communication, are more tolerated in AMAB children (Lai et al., 2014). When a young boy throws a temper tantrum in public or responds to frustration with violence, this is explained away with "boys will be boys"; when a girl does this, however, she is told to act more ladylike. AFAB folk therefore learn to suppress and internalize their feelings, making eye contact and using pre-learned bodily and verbal responses or mimicking others' behaviour when necessary.

Indeed, clinician expectancy bias is likely to play a role in the underdiagnosis of neurodivergent AFAB individuals. Hartung and Widiger (1998) found that when features of a given condition are more stereotypical of one gender, or when that condition is believed to occur more in one gender, clinical expectancies result in diagnostic patterns biased against the opposite gender. It is therefore plausible that the general societal perception of ADHD and ASD as "male" conditions contributes to the underdiagnosis of AFAB individuals in a self-perpetuating and self-affirming cycle.

Accordingly, clinicians are found to be less likely to diagnose AFAB folk with ASD, even when they present with similar levels of social impairment to AMAB individuals (e.g. Giarelli et al., 2010). AFAB persons have been found to require more severe autistic symptoms and greater cognitive and behavioural problems

(Russell, Ford, Steer, & Golding, 2010) than AMAB persons to be diagnosed with ASD. In a 2009 study by Ohan & Visser, parents and teachers were asked to read a series of vignettes; all vignettes were almost identical, differing only in whether a traditionally male or female name was used. Both parents and teachers were less likely to seek or recommend ADHD services when a female name was used. The misconception of ADHD and ASD as "male" conditions is therefore problematic both in its origins and its effect on practitioners, parents, and above all, those who remain undiagnosed as a result.

An AFAB phenotype?

Increasing prominence is therefore given to the idea that there may be a particular AFAB phenotype of ASD and ADHD - in other words, that the conditions may manifest themselves differently depending on ASAB (Haney, 2016). This AFAB phenotype is less recognized by both clinicians and ordinary individuals. Indeed, a 2005 study by Ohan & Johnston found that mothers of AFAB children with ADHD consider DSM-IV criteria for ADHD to more accurately describe AMAB individuals.

This begs the question - how do ASD and ADHD manifest themselves in AFAB individuals? With regards to ADHD, growing evidence supports the thesis that AFAB people are more likely to show inattentive rather than hyperactive symptoms of ADHD. This both contributes to and is perpetrated by the misconception of ADHD as an AMAB condition. Firstly, inattentive symptoms are less disruptive, harder to notice, more likely to be misdiagnosed than hyperactivity, and are therefore often missed by teachers and parents of AFAB folk. Secondly, even if ADHD in an AFAB person were to manifest itself via hyperactivity, it is more likely to be suppressed by the individual's parents and peers due to societal gender norms against such behaviour in AFAB individuals. In other words, inattentiveness in AFAB people is tolerated and often unnoticed, fitting neatly into societal gender norms and expectations; it is likely to be misinterpreted as simply forgetfulness and disorganization. Indeed, Gaub & Carlson (1997)

have found that AFAB people with ADHD are more likely to be ignored by clinicians if they show only inattentive behaviours, and the majority of clinically referred AFAB individuals with ADHD show particularly hyperactive symptoms. This contributes to societal misunderstanding of the AFAB phenotype of ADHD, as most AFAB individuals with the condition do not present in such a way.

AFAB individuals with ADHD also show greater levels of internalizing symptoms, such as anxiety or depression (Arnold, 1996); the same appears to hold for AFAB individuals on the autism spectrum, with AMAB folk showing more externalizing symptoms (Lai et al., 2014). This may lead to the misdiagnosis of these individuals as dealing solely with mood or anxiety disorders. Moreover, volatility of emotions and similar symptoms of mood disorders are often explained away in AFAB individuals as simply being "hormonal" or overreacting. Poor self-efficacy, ineffective coping mechanisms, disrupted social structures, lack of confidence in social relationships, and greater sensory processing disturbance also appear to be more specific to AFAB individuals with ADHD (Rucklidge, 2010). Indeed, a growing body of evidence supports the thesis that AFAB individuals with ADHD show symptoms outside the commonly cited triad of inattentiveness, hyperactivity, and impulsivity (Quinn & Madhoo, 2014); research has found that although they show fewer symptoms than AMAB people as measured by DSM-V criteria, AFAB people are just as impaired by them.

With regards to ASD, meta-analyses suggest that AFAB people show difficulties in social communication comparable to that in men, but fewer repetitive, restricted patterns of behaviours and interests (Lai, Lobardo, Auyeung, Chakrabarti, & Baron-Cohen, 2014). As discussed, AFAB individuals are more likely to mask their autism, and, as such, their symptoms may appear less intense; in reality, however, the underlying distress and effect thereof is just as, if not more harmful. Furthermore, as is the case with ADHD, traditional gender roles and expectations affect the perception of ASD in AFAB people; it is more socially acceptable and even

encouraged for AFAB people to be shy, timid, and reserved, and thus such behaviour is unlikely to be noted as unusual or worrisome. Dworzynski, Ronald, Bolton, & Happe (2012) also found that AFAB people are less likely than AMAB people to meet diagnostic criteria, even when presenting with high levels of ASD traits, implying that diagnostic criteria are biased to exclude AFAB folk.

Age of diagnosis

The existence of an ASAB bias in diagnosis of neurodivergence is supported by the finding that AFAB individuals are usually diagnosed at a much later age than AMAB folk, with both the ADHD and ASD ASAB ratios moving closer and closer to 1:1 with age (Begeer et al., 2013). Indeed, Begeer et al., (2013) found that AFAB individuals with ASD are diagnosed at a significantly older age, relative to AMAB individuals with the condition. Furthermore, it was found that the average time between the noticing of first signs of the condition and the identification thereof was greater in AFAB folk.

This is consistent with the observation that AFAB individuals are more likely to mask their behaviour; most AFAB neurodivergent individuals receive their diagnosis in young adulthood, often soon after starting college, when their symptoms become increasingly more bothersome and more difficult to hide (Waite, 2007). For example, many AFAB people with ADHD are seen as "gifted" in school, performing very well while doing very little; when they get to college, however, material becomes drastically more difficult, and deficits in attention and executive function begin to be truly troublesome. Similarly, in the case of ASD, structures and routines tend to fall apart in college, as college life is necessarily more disorganized and requires greater self-regulation, especially if one moves out of home and must fend for themselves. Neurodivergent AFAB people are therefore likely to be diagnosed late in life, whereas neurodivergent AMAB individuals are usually diagnosed in childhood (Waite, 2007).

A public health issue

The late diagnosis of AFAB individuals with ASD and ADHD poses a great risk to their general mental health. Barkley (2002) found that AFAB individuals with undetected ADHD engage in more risky behaviours with dangerous outcomes, such as substance abuse and traffic accidents. Low self-esteem and general psychological distress is more common in AFAB people with ADHD, relative to both AMAB people with ADHD and AFAB people without it (Quinn & Madhoo, 2014). Anxiety and affective disorders are common comorbidities in AFAB individuals with ADHD, particularly when ADHD is diagnosed late in life (Hinshaw, 2002). Conversely, AFAB individuals with a diagnosis of ADHD report feeling more in control and forgiving of past mistakes; the diagnosis provides a sense of relief and freedom from the self-blame which often accompanies them prior to diagnosis (Quinn, 2011).

Similarly, camouflaging in AFAB individuals with ASD is associated with increased stress, anxiety, depression, and even a negative impact on the development of one's identity (Lai et al., 2017). Furthermore, the timely identification of ASD appears to improve individuals' quality of life in the long term, increasing access to necessary services, reducing self-criticism, and fostering a positive sense of identity (Bargiela et al., 2016).

Conclusions

A growing body of evidence appears to support the thesis that ASAB differences in rates of neurodivergence are reflective not of differences in prevalence but differences in diagnosis. AFAB individuals appear to present differently, in ways that are yet to be wholly understood; this is, in part, due to an overwhelming amount of research in the area being conducted exclusively or primarily on AMAB individuals. It is imperative that a greater understanding of neurodivergence in AFAB individuals is acquired, as late diagnosis is associated with a variety of negative consequences in the realm of mental health, such as low self-esteem and substance abuse (Barkley, 2002; Quinn & Madhoo, 2014).

Bibliography

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). Washington DC: American Psychiatric Association.

Arnold, L.E. (1996). Sex differences in ADHD: conference summary. *Journal of Abnormal Child Psychology, 24*, 555-569

Asperger, H. (1944). Die "Autistischen Psychopathen" im Kindesalter. *Archiv für Psychiatrie und Nervenkrankenheiten, 117*(1), 76-136.

Bargiela, S., Steward, R., & Mandy, W. (2016). The experiences of late-diagnosed women with autism spectrum conditions: An investigation of the female autism phenotype. *Journal of Autism and Developmental Disorders, 46*(10), 3281-3294.

Barkley, R. A. (2002). Major life activity and health outcomes associated with attention-deficit/hyperactivity disorder. *Journal of Clinical Psychiatry, 63*(12), 10-15.

Begeer, S., Mandell, D., Wijnker-Holmes, B., Venderbosch, S., Rem, D., Stekelenburg, F., & Koot, H. M. (2013). Sex differences in the timing of identification among children and adults
with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 43*(5), 1151-1156.

Dworzynski, K., Ronald, A., Bolton, P., & Happe, F. (2012). How different are girls and boys above and below the diagnostic threshold for autism spectrum disorders? *Journal of the American Academy of Child and Adolescent Psychiatry, 51*(8), 788-797.

Gaub, M., & Carlson, C. L. (1997). Gender differences in ADHD: A meta-analysis and critical review. *Journal of the American Academy of Child & Adolescent Psychiatry, 36*(8), 1036-1045.

Gershon, J. (2002). A meta-analytic review of gender differences in ADHD. *Journal of Attention Disorders, 5*(3), 143-154.

Giarelli, E., Wiggins, L. D., Rice, C. E., Levy, S. E., Kirby, R. S., Pinto-Martin, J., et al. (2010). Sex differences in the evaluation and diagnosis of autism spectrum disorders among children. *Disability and Health Journal, 3*(2), 107-116.

Haney, J. L. (2016) Autism, females, and the DSM-5: Gender bias in autism diagnosis, *Social Work in Mental Health, 14*(4), 396-407.

Hartung, C. M., & Widiger, T. A. (1998). Gender differences in the diagnosis of mental disorders: Conclusions and controversies of DSM-IV. *Psychological Bulletin, 123*, 260-278.

Hasson, R., & Fine, J. D. (2012). Gender differences among children with ADHD on Continuous Performance Tests: A meta-analytic review. *Journal of Attention Disorders, 16*(3), 190-198.
Hinshaw, S. P. (2002). Preadolescent girls with attention-deficit/ hyperactivity disorder, 1: background characteristics, comorbidity, cognitive and social functioning, and parenting practices. *Journal of Consulting and Clinical Psychology, 70*(5), 1086-1098.
Kanner, L. (1943). Autistic disturbances of affective contact. *The Nervous Child, 2*,
217-250.
Kreiser, N. L., & White, S. W. (2013). ASD in females: Are we overstating the gender difference in diagnosis? *Clinical Child and Family Psychology Review, 17*(1), 67-84.
Lai, M. C., Lombardo, M. V., Auyeung, B., Chakrabarti, B., & Baron-Cohen, S. (2015). Sex/gender differences and autism: setting the scene for future research. *Journal of the American Academy of Child and Adolescent Psychiatry,* 54(1), 11–24.
Lai, M. C., Lombardo, M. V., Ruigrok, A. N., Chakrabarti, B., Auyeung, B., Szatmari, P., ... & MRC AIMS Consortium. (2017). Quantifying and exploring camouflaging in men and women with autism. *Autism, 21*(6), 690-702.
Lange, K. W., Reichl, S., Lange, K. M., Tucha, L., & Tucha, O. (2010). The history of attention deficit hyperactivity disorder. *ADHD Attention Deficit and Hyperactivity Disorders, 2*(4), 241-255.
Ohan, J. L., & Johnston, C. (2005). Gender appropriateness of symptom criteria for attention-deficit/hyperactivity disorder, oppositional-defiant disorder, and conduct disorder. *Child Psychiatry and Human Development, 35*(4), 359-381.
Ohan, J. L., & Visser, T. A. (2009). Why is there a gender gap in children presenting for attention deficit/hyperactivity disorder services?. *Journal of Clinical Child & Adolescent Psychology, 38*(5), 650-660.
Quinn, P. O. (2011). *100 questions & answers about attention-deficit hyperactivity disorder (Ad/Hd) in women and girls*. Sudbury, MA: Jones & Bartlett Learning.
Quinn, P. O., & Madhoo, M. (2014). A review of attention-deficit/ hyperactivity disorder in women and girls: Uncovering this hidden diagnosis. *The Primary Care Companion for CNS Disorders, 16*(3).
Ratto, A., Kenworthy, L., Yerys, B., Bascom, J., Trubanova, A., White, S., Wallace, G., Pugliese, C., Schultz, R., Ollendick, T., Scarpa, A., Seese, S., Register-Brown, K., Martin, A., & Anthony, L.. (2018). What About the

Girls? Sex-Based Differences in Autistic Traits and Adaptive Skills. *Journal of Autism and Developmental Disorders, 48*, 1-14.\
Rucklidge, J. J. (2010). Gender differences in attention-deficit/ hyperactivity disorder. *Psychiatric Clinics, 33*(2), 357-373.
Russell, G., Ford, T., Steer, C., & Golding, J. (2010). Identification of children with the same level of impairment as children on the autistic spectrum, and analysis of their service use. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 51*(6), 643-651.
Thompson, T., Caruso, M., & Ellerbeck, K. (2003). Sex matters in autism and other developmental disabilities. *Journal of Intellectual Disabilities, 7*(4), 345-362.
Waite, R. (2007). Women and attention deficit disorders: A great burden overlooked. J*ournal of the American Academy of Nurse Practitioners, 19*, 116-125.