

**Understanding and Comparing the Female ASD Phenotype to Current ASD Diagnostic  
Practices**

Barbara Tkachenko

Division of Arts and Sciences, City University of Seattle

CPC 695: Counselling Psychology Research Project

Mike Sornberger, Ph.D., R. Psych.

September 9, 2022

## **Abstract**

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by impairments in social communication and social interaction. ASD symptoms present differently in different individuals and can include: repetitive behaviours, interests or activities; poor non-verbal and verbal communication; lack of eye contact; and specific facial expressions (APA, 2013). Females are less likely to receive an ASD diagnosis than males when there is no presentation of intellectual disabilities. Late diagnosis of ASD in females may cause extra suffering that could be reduced with early formal diagnosis and access to support services. Research suggests that the low prevalence of ASD in females may be a result of biased diagnostic practices due to lack of understanding of the female phenotype and biased diagnostic tools used to assess ASD in females. This paper reviews the literature on understanding the female ASD phenotype and compares it to current diagnostic practices. It also explores a brief history of ASD and psychological diagnostics, current practices when diagnosing ASD (including gold standards tools), and implications for counselling. Finally, this paper makes recommendations to improve diagnostic practices to allow for earlier identification and treatment of females with ASD.

*Key Words:* autism, autism spectrum disorder, female phenotype, diagnostic practices

## Understanding and Comparing the Female ASD Phenotype to Current ASD Diagnostic Practices

Autism spectrum disorder (ASD) is defined by the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM–5; American Psychiatric Association [APA], 2013) as a neurodevelopmental disorder characterized by impairments in social communication and social interaction. ASD symptoms present differently in different individuals, and can include: repetitive behaviours, interests or activities; poor non-verbal and verbal communication; lack of eye contact; and specific facial expressions (APA, 2013). In order to meet diagnostic criteria, ASD symptoms must manifest during the first years of life; however, exceptions can happen when individuals with high functioning ASD learn to camouflage their symptoms throughout their life (APA, 2013).

According to the DSM-5, females are less likely to receive an ASD diagnosis than males (there is a 4:1 ratio of males to females) if there is no presentation of intellectual disabilities. According to the Centers for Disease Control and Prevention (2012), males are three to eight times more likely than females to be diagnosed. Reasons for the gender discrepancy in the diagnosis of ASD are uncertain. The DSM-5 mentions the different presentation of symptoms in girls and boys with ASD, without further details (APA, 2013). More recent research provides some insight. For instance, females are more inclined to mask behaviours using imitation, while males tend to manifest more repetitive behaviours (Green et al., 2019; Ormond et al., 2018).

Recent studies suggest that the prevalence of ASD in males may be due to genetic factors such as gene mutations on the X/Y chromosome (Ferri et al., 2018) and neurotransmitter levels such as serotonin (Shuffrey et al., 2017). According to Shuffrey et al. (2017), 30% of the ASD population exhibit high levels of serotonin (5-HT), which could be related to sexual dimorphism.

Conversely, different studies imply that females are underdiagnosed with ASD due to differences in the expression of symptoms and diagnostic practices (Beggiato et al., 2017; Lai et al., 2015; Lonergan, 2021). These researchers contend that the lack of understanding of the ASD female profile and symptoms may relate to lacking diagnostic practices. Lai et al. (2015) highlight the need to develop better diagnostic instruments with reliability and validation when assessing female populations.

It is necessary to understand the diagnostic practices used to assess ASD in female populations in order to minimize the psychological suffering of girls and women living with ASD without formal diagnoses. According to Zener (2019), undiagnosed autistic females struggle in countless domains, including social functioning, self-awareness, communication, and in accessing support programs. This paper aims to understand and compare the high functioning female ASD phenotype to current diagnostic practices, and to answer the following questions:

1. How is the female ASD phenotype represented in the diagnostic process?
2. How can we improve diagnostic practices for ASD in females, and prevent further distress for this population which sometimes occurs when females are not diagnosed until late in life?

Following a self-positioning statement, the review of literature includes: the history of the DSM; an overview of ASD diagnosis history; current diagnostic practices for females with ASD; the phenotype of females with ASD; integration of current diagnostic practices and phenotype of females with ASD; the consequences of late diagnosis; and the benefits of early diagnosis.

### **Self-Positioning Statement**

Growing up in an underdeveloped country, I heard many stories about "demonized" children kept in basements, raised as animals, and without access to basic needs to survive.

These children, living in uncivilized conditions, were also described as feral children (Brown, 2013). Every other month I heard a neighbour's story about one of these children and how dangerous they were to society. Fed by fear from widespread common narratives, my imagination developed a pragmatic curiosity about these feral children, which led me to my undergraduate degree in psychology. While stories of children raised as animals were rare in the 1990s, with increased knowledge, I understood that these children most likely had an unknown mental health condition. According to the controversial work of Bruno Bettelheim (1959), there was no evidence of feral children who were actually raised by wolves, but instead they were raised by non-nurturing mothers. At first, I remember feeling angry every time I learned of a case involving children with a mental health disorder and their living conditions. I started feeling empowered by my education and began judging those parents. A few years into my program, I realized that people fear the unknown; when people in poverty have reduced access to knowledge, this impacts their understanding and practice as parents.

My eagerness to learn and develop knowledge led me to join a research project to understand autism; this experience was my first direct contact with ASD. Since then, my goal is to work with this population. During my early work in the ASD world, I noted the lack of representation of females in schools. I began to research and listen to females with ASD to further comprehend their experiences during the diagnostic process. Many of the individuals I met and worked with were diagnosed later in life, and suffered throughout their lives to get the supports they needed.

Because I have been working with children diagnosed with ASD for a long time, I have developed a deeper understanding of the disorder rooted in both theory and practice. However, I also have assumptions regarding the theme, including my strong belief that females are

underdiagnosed as a result of lack of a profound knowledge about their phenotype and that there is a need for better diagnostic practices. To address my biases and answer my research questions effectively in spite of my biases, I sought out and thoroughly reviewed valid research from different perspectives, and have documented these findings in this research paper.

This project aims to understand the female experience and female phenotype of autism and to compare this with the diagnostic criteria. I summarize the history of ASD, outline psychological diagnostic practices, and describe the consequences of under-diagnosis or diagnosis later in life for women in order to argue that practices employed when assessing and diagnosing females with ASD need to change. It is my hope that females with ASD in the future have equal opportunities to be diagnosed and to access the support services they need to achieve their full potential as individuals.

## **Review of the Literature**

### **A Brief History of ASD and Psychological Diagnostics**

The history of the DSM is relevant because it provides foundational knowledge regarding how the conceptual framework, diagnostic criteria and diagnostic processes used when diagnosing ASD were established over time (Cooper, 2018). An examination of this history also provides an understanding of how previous diagnostic practices impact current practices employed when diagnosing ASD. The DSM has changed over time, and these changes are reflected in the current version: the DSM-5. This paper outlines the history of the DSM up to and including the the DSM-5. It also presents a history of autism, starting from when it was first mentioned and conceptualized in the scientific world, and the impact of this history on current understandings of the disorder. Finally, this paper integrates the history of psychological diagnostic practices and historical understandings of ASD to explain how our current practices

when diagnosing ASD contribute to the under-diagnosis of women and girls with ASD with negative consequences.

### ***Diagnostic and Statistical Manual of Mental Disorders***

The first *Diagnostic and Statistical Manual of Mental Disorders* (DSM-I) was published in 1952, and a decade later, a second edition was published (Pomerantz, 2017). Both versions, the DSM-I and the DSM-II, were primarily used to categorize soldiers after World War II. These two versions had brief descriptions of each diagnosis, were aetiological, and drew from a psychodynamic perspective (Clegg, 2012; Pomerantz, 2017; Tsou, 2016). In both the DSM-I and the DSM-II descriptions of disorders were based on experts' understanding of a disorder, with no reliable or scientific evidence to support the information provided (Pomerantz, 2017; Tsou, 2016).

The third published edition of the DSM in 1980 represented a historical shift as this edition used a descriptive, categorized, and atheoretical approach (Clegg, 2012; Tsou, 2016). The DSM-III also adopted a multi-axial system, with five axes; I- episodic clinical disorders; II- stable or enduring clinical disorders; III- relevant medical conditions; IV- relevant psychosocial or environmental problems; and V- Global Assessment of Functioning scale. In this new system, a person could receive more than one diagnosis within the five axes of the DSM (Pomerantz, 2017). Although the DSM-III was considered a controversial approach, it became popular, and its usage was widespread among health professionals (Clegg, 2012; Pomerantz, 2017).

Subsequent versions of the DSM were less substantial in terms of revolutionary changes. In 1983 there was a proposed revision of the DSM-III following recommendations to rename and reorganize some disorders to align with emerging research data (Clegg, 2012). According to Pomerantz (2017), a decade later, the DSM-IV was published with a few changes in terms of the

inclusion and exclusion of disorders and changes in the diagnostic criteria. In this edition, symptoms needed to be causing significant distress or impairment in order for individuals to receive a diagnosis (Pomerantz, 2017). Although the DSM-IV included a discussion of cultural implications for mental health diagnosis, its main distinction was in terms of its development process rather than the product itself (Pomerantz, 2017). The process used to review and publish the DSM-IV was more systematic, empirical, and methodical compared to previous versions. The goal was to produce a less biased version of the document based on scientific evidence (Pomerantz, 2017). A revised version of the DSM-IV was published in 2000, and this version included minor changes to the diagnostic criteria based on emerging data in the research (Clegg, 2012; Pomerantz, 2017).

The most recent version of the DSM was published in 2013 and it includes significant changes. The 12-years it took to develop of the DSM-5 was intense and involved a series of revisions (Pomerantz, 2017). First, an external committee was created to revise the DSM-5 and to ensure consistency throughout the process. The committee's responsibilities were to evaluate the manual and compare it to the available empirical data, using objective and structured methods to counsel the APA president (Kendler, 2013). Secondly, the DSM-5 was written to be more consistent with the International Classification of Diseases -10 (ICD-10; World Health Organization, 2010) published by the World Health Organization (WHO). The ICD is used worldwide in the medical community, while the DSM is mainly used in North America (Pomerantz, 2017). Thirdly, the title on the DSM-5 changed from Roman to Arabic numerals to facilitate the process of including and integrating updated information in upcoming versions (Pomerantz, 2017). Lastly, the DSM-5 no longer uses the multi-axial system introduced in the third version (Cooper, 2018; Pomerantz, 2017). Some other significant changes in the DSM-5



include: a revised definition of a mental disorder; the inclusion of a theoretical approach about aetiology; the grouping of disorders to provide information about their nature; and the inclusion of ethical considerations for each disorder (Cooper, 2018). The previous version defined mental disorders according to the harm caused, whereas the DSM-5 states that the disorder may or may not cause harm, allowing individuals to be diagnosed with a disorder regardless of the harm caused by symptoms (Cooper, 2018).

Over this long history, many diagnoses and criteria have been included, revised, or removed in each edition of the DSM. As a result, the definition, classification, and diagnostic criteria for ASD has also evolved throughout the years as well. To understand current practices in the diagnosis of ASD and gender discrepancies, it is necessary to understand the history of autism, and changes in diagnostic criteria and practices over the years.

### *Autism Spectrum Disorder*

The first time autism was mentioned in written history was in 1910 by Eugen Bleuler who described autism as an extension of schizophrenia (Haroon, 2019a). Almost two decades later, Grunya Sukhareva, a Russian child psychiatrist, published an article describing autism and its features in terms of a unique diagnostic profile based on the similar clinical features of six young boys (Haroon, 2019a; Manouilenko & Bejerot, 2015; Posar & Visconti, 2017). Many studies suggest that her work was not recognized worldwide for political reasons, and thus the foundational credit for identifying autism was given to Leo Kenner in 1943 and Hans Asperger in 1944 (Fitzgerald, 2019; Haroon, 2019a; Manouilenko & Bejerot, 2015). Manouilenko and Bejerot (2015) highlight factors such as Sukhareva's being Jewish, a woman, and a Soviet Union citizen as the cause of the lack of recognition of her work. Given the likely underrepresentation of women and girls diagnosed with autism (Bargiela et al., 2016), the fact that a woman was the

first person to describe autism and then was herself underrepresented in the historical record, is a relevant and fascinating parallel. Sukhareva's contribution to the autism field was vital as it differentiated autism from schizophrenia and used the term "autistic (pathological avoidant) psychopathy" instead of "schizoid psychopathy" as initially used by Eugen Bleuler (Manouilenko & Bejerot, 2015, p. 480). Sukhareva also acknowledged the presence of motor, social and cognitive impairments and started a training trial to support children to thrive in school environments (Manouilenko & Bejerot, 2015).

An early and controversial theory of the cause of autism was popularized in the 1950s by Bruno Bettelheim. His central premise was that poor parent-child interactions caused autism, and he advocated for considering it an affective disorder. Bettelheim's theory blamed the parents, specifically mothers, who were misjudged as "refrigerator mothers" (Haroon, 2019a, p. 10; Van Rosmalen et al., 2020). According to his theory, the cure for autism was to institutionalize children and remove them from their cold and oppressive parents (Van Rosmalen et al., 2020). Hallow and Bowlby, two well-known researchers at that time, disagreed with Bettelheim's theory, and argued that autism could be caused by an unknown brain disfunction (Van Rosmalen et al., 2020). Bettelheim's theory was debunked: the children who participated in his research were not autistic, and his therapy methods were unethical (Van Rosmalen et al., 2020).

The focus in the literature shifted in the 1960s from a nurture-based understanding of aetiology to one that was more nature-based (Haroon, 2019a). More current research suggests that ASD is strongly correlated to genetic factors. For instance, monozygotic twin siblings of children with ASD are more likely to be born with ASD than dizygotic twins (Yoon et al., 2020). According to Lodge (2019), individuals have a higher chance of being born with ASD when there is a history of ASD in the family. ASD is also correlated with other syndromes such as the

fragile X syndrome (Klusek et al., 2014; Lodge, 2019). Navarro-Pardo et al. (2021) highlight that nearly 70 different genes are associated with the incidence of ASD, including those associated with fragile X syndrome and Turner syndrome.

Although genetic factors are well-researched and considered in the aetiology of ASD (Woodbury-Smith & Scherer, 2018), environmental factors are also relevant. These factors include the age of the parents at conception, substance use, infections during the prenatal period, and medications (Gialloreti et al., 2019; Sultana et al., 2017). Sultana et al. (2017) suggest that mothers should avoid exposure to environmental risk factors for ASD during the first weeks of pregnancy. It is necessary to be careful when considering environmental risk factors for ASD as this may once again encourage the nurture-based causality explanation of ASD and again blame mothers for their children's diagnoses. On the other hand, Tick et al. (2016) advocate for caution regarding the emphasis on environmental factors to explain the aetiology of ASD without solid scientific studies and evidence. The meta-analytical research conducted by Tick et al. (2016) points to the heritability of ASD in twins, and their findings suggest strong genetic correlations with diagnoses of ASD. Regardless of the back-and-forth discussion historically about what causes ASD, it is relevant to understand how ASD heterogeneity manifests in males and females. Identifying symptoms in males and females supports early diagnosis and provides treatment options so individuals can learn strategies to cope with their symptoms and achieve their full potential in society.

### ***DSM-5 Definition of ASD***

ASD was initially understood as a single innate disorder in children who did not have the ability to socially interact with others. This concept was called *infantile autism* by Leo Kanner in 1943 (Fitzgerald, 2019; Harris, 2018; Rosen et al., 2021). Nearly thirty years later, Rutter

included language delays and repetitive and restricted interests in the definition of autism; his findings were adopted and used on the DSM-III (Rosen et al., 2021). The DSM-III included autism in the Pervasive Developmental Disorders (PDDs) class, with monothetic and non-flexible criteria to consider the broader aspect of the disorder (Rosen et al., 2021). The revised version of the manual, DSM-III-R, changed the name “infantile autism” to “autistic disorder,” reflecting the many layers of autism (Rosen et al., 2021, p. 4255). The following DSM-IV included a diagnosis for Asperger’s syndrome separate from autistic disorder. Asperger syndrome is embedded in the ASD diagnostic criteria in the DSM-5 (Rosen et al., 2021).

The DSM-5 defines autism as a neurodevelopmental disorder characterized by challenges with social interactions and communication, repetitive behaviours, and restrictive interests (APA, 2013). ASD symptoms must significantly impact one's functioning, including in social and in occupational areas. The term spectrum refers to the heterogeneity of the disorder, marked by severity levels, adding a developmental perspective to understandings of the disorder (Rosen et al., 2021). Severity is specified with the diagnosis to describe the symptoms for each individual, based on the level of support they require to function (APA, 2013).

Diagnostic features on the spectrum highlight how the disorder might manifest and vary from one individual to another, depending on development and environmental factors (APA, 2013). For instance, verbal and nonverbal communication deficits can be expressed differently depending on age, intellectual level, and history of treatment and support. Some individuals diagnosed with ASD present intact formal language skills but impaired language use in social interactions (APA, 2013). Social-emotional reciprocity can also be differently expressed on the ASD spectrum, depending on developmental and environmental factors (APA, 2013). For instance, a child might present with reduced emotional expressions, whilst an adult might imitate

others' emotional expressions and use compensational skills to fit in to society (APA, 2013). Communication deficits manifest differently for each individual, and present in terms of reduced or lack of eye contact, absent non-verbal expressions, or impaired joint attention (APA, 2013). ASD features also include reduced ability to develop, sustain, and interact in relationships. Those diagnostic features consider age, gender, and other demographics (APA, 2013).

A review of the history of autism and the DSM fails to clearly explain the lack of female representation in those diagnosed with ASD; data points to a prevalence of males in ASD populations (Edwards et al., 2012; Evans et al., 2019; Watkins et al., 2014). According to Evans et al. (2019), the majority of research on the processes of assessing for ASD are based on diagnosed individuals, and “although such studies provide insight into clinical populations, they do relatively little to improve the assessment of boys and girls whose ASD diagnostic status is unknown. This is a major gap in the literature” (p. 842). Ignoring this fact throughout history has led to current diagnostic practices that do not adequately address sex differences in those with ASD (Evans et al., 2019; Lai et al., 2015).

According to the DSM-5, 1% of the populations in the U.S. and non-U.S. countries are diagnosed with ASD; males are four times more likely to receive the diagnosis than females (APA, 2013). Although the DSM-5 addresses cultural and risk factors for autism, there is a notable lack of information on gender. The DSM-5 covers development and outlines criteria for diagnosis, highlighting relevant developmental pattern considerations. Symptoms are generally understood to be identifiable in the second year of life (12-24 months); severe symptoms are expressed earlier in life (APA, 2013). Sometimes, symptoms can be camouflaged and individuals fit in with peers, but according to the DSM-5, most people with ASD struggle with life functioning skills and continue to need support into adult life (APA, 2013).

To meet the diagnostic criteria and receive an ASD diagnosis, the DSM-5 establishes that an individual must present: (a) persistent deficits in social communication and interaction; (b) restricted and repetitive behaviours and interests; (c) symptoms must be present during earlier childhood, with attention to masked behaviours; and (d) symptoms cause great social, functioning, and occupational impairments (APA, 2013). Professionals assessing individuals using the DSM-5 must be aware of the female phenotype and be competent to identify ASD in both females and males, using both assessment tools and clinical judgment throughout the process.

### **Gender and Autism Spectrum Disorder**

According to the National Autism Spectrum Disorder Surveillance System (Public Health Agency of Canada, 2018), approximately 1.5% of Canada's children and adolescents are diagnosed with autism spectrum disorder. This population of individuals diagnosed ASD includes four times more males than females. In Nova Scotia, one male out of every 43 is diagnosed with ASD, whilst the prevalence rate for females is 1 in 175. (Public Health Agency of Canada, 2018). There are different explanations for the prevalence of males diagnosed with ASD, including genetic factors (Ferri et al., 2018) and the female protective effect (Hull et al., 2020). The female protective factor proposes that there is an interaction of genetic and environmental factors that prevents females from developing ASD (Navarro-Pardo, 2021). Another theory regarding why fewer females are diagnosed with ASD is that there is a lack of understanding of the female phenotype of ASD (Beggiato et al., 2017; Lai et al., 2015; Lonergan, 2021), which precipitates discriminatory diagnostic practices resulting in underdiagnosis of ASD in females (Hull et al., 2020).

Over the years, discussion of gender, gender identity, and sexual orientation has evolved. Historically, gender was understood as a binary classification; nowadays, there is a deeper understanding of gender associated with cultural beliefs and self-identity (American Psychological Association [APA], 2018). According to Cheung et al. (2020), “Gender variance, or gender nonconformity is an umbrella term used to describe gender identity, expression, or behavior that falls outside of culturally defined masculine or feminine norms” (p. 2673). Gender identity refers to a spectrum of ways in which individuals experience gender, whether female, male, non-binary, transgender or different from their birth-assigned sex (Murray et al. 2016 Schudson & Beischel, 2019). Sexual orientation, on the other hand, reflects a person’s attraction to others, whether romantically, emotionally, or sexually (Murray et al., 2016). In Canada, one in 300 people (15-years and older) identify as transgender or non-binary (Statistics Canada, 2022). At this time there is not enough scientific data exploring autistic traits from a non-binary lens (Kung, 2020). Since ASD was first identified, many theories explain its origins, including the Extreme Male Brain and the Female-Protective Effect, in the context of a gender binary framework (Kung, 2020). The present discussion abstains from further investigating the overlap between gender identity and autism, and focuses reviewing literature from a binary framework to answer the research question regarding the reasons why females with ASD are diagnosed later in life.

According to Schudson & Beischel (2019), researchers debate which nomenclature to use and how to distinguish between sexual orientation and gender identity (Schudson & Beischel, 2019). For example, the terms male/female are often used for sex categories, while woman/man refers to gender (Schudson & Beischel, 2019). Although there may be debate about the correct use of terms to describe sex and gender, hereafter in this research paper, I use the terms “female”

and “male” to describe birth-assigned sex and differences. This literature review will not discuss sexual orientation or gender identity in ASD populations, but rather, focuses on research conducted using binary frameworks and existent aetiology theories about ASD.

### ***Phenotype of Females with ASD***

In recent years, more girls have been diagnosed with ASD; some of these diagnoses occurred later in life rather than in the early years of childhood (Estrin et al., 2021; Rynkiewicz et al., 2016; Young et al., 2018). As explained above, many studies have suggested that females with high functioning ASD are under-diagnosed or diagnosed later in life due to a lack of representation in assessment tools (Begeer et al., 2013; Duvekot et al., 2017; Hiller et al., 2014; Hull et al., 2020; Gould, 2017; Loomes et al., 2017; Kreiser & White, 2014).

Duvekot et al. (2017) suggest that there is a lack of understanding of how males and females with ASD present differently due to the lack of female representation in past ASD research samples, including in normative sampling for assessment tools. According to Duvekot and colleagues, the female phenotype may not be adequately captured in the current processes used to diagnose ASD. Many studies point to repetitive behavioural differences between boys and girls; girls tend to present with fewer repetitive and stereotyped behaviours than boys (Antezana et al., 2019; Kreiser & White, 2018; McFayden et al., 2019; Ormond et al., 2018). McFayden et al. (2019) discuss how autistic females demonstrate more socially appropriate interests, and Backer et al. (2017) describe autistic females as presenting with better social-emotional reciprocity than boys with ASD. Because females are less likely to demonstrate these well-known symptoms, ASD may less often be part of the working hypothesis. This may occur at any stage of the diagnostic process: from parent and teacher observations to family doctor examination, and during specialist assessment.



Girls internalize and externalize behaviours differently compared to boys (Duvekot et al., 2017). Girls with ASD appear to be more able to integrate non-verbal and verbal behaviours, initiate friendships and sustain back-and-forth conversations with peers (Hiller, 2014). Girls with ASD are also more likely to develop better social skills in school environments and present fewer behavioural challenges when compared to boys (Hiller, 2014). Angell et al. (2021) also identify similar internal and external behavioural differences in girls and boys with ASD. Girls with autism are more likely to present anxiety, mood, metabolic, and sleep disorders compared to boys, but are less likely to present with externalizing disorders such as Attention-Deficit/Hyperactivity Disorder (ADHD) (Angell et al., 2021).

Females with ASD are more likely to develop friendships; however, sustaining long-term friendships can be challenging for autistic females (Hull et al., 2020; Wodka et al., 2022). Girls with ASD tend to camouflage their ASD behaviours through the use of strategies such as social imitation and mimicking facial expressions (Dean et al., 2017; Hull et al., 2019; Lai et al., 2017; Lehnhardt et al., 2016). Due to the ability of females to mask ASD symptoms and the consequent diagnosis bias, the Camouflaging Autistic Traits Questionnaire (CAT-Q) was developed and has demonstrated high internal consistency and scientific support (Hull, 2019). Further research into social camouflage of ASD in girls is needed as this can correlate with increased anxiety, stress, and depression (Lai et al., 2017). Several studies have researched the phenomenon of camouflage in ASD to understand the motivation behind the behaviour. Results have shown that girls are usually motivated by their desire to make friends and to fit in with their peers (Tierney et al., 2016); these individuals are also attempting to avoid negative aspects of having ASD such as the threat of bullying (Milner et al., 2019; Sedgewick et al., 2018).

### ***The Extreme Male Brain Theory***

The concept of the Extreme Male Brain (EMB) suggests biological sex differences in the human brain (Baron-Cohen, 2002; Tierney & Burns, 2017). According to this theory, the male brain is generally more systematic than the female brain, and the female brain tends to empathize more than the male brain (Baron-Cohen, 2002; Tierney & Burns, 2017). As a result it is posited that the male brain is more skilful in understanding rules, organizing systems, and predicting behaviours of a system, whilst the female brain is better at predicting the behaviours of others and understanding their emotions and thoughts (Baron-Cohen, 2002; Tierney & Burns, 2017).

Baron-Cohen (2002) introduced five types of brain based on systemizing versus empathizing traits and suggested that although males tend to have a more systematic brains, not all males will share the same brain type, and the same goes for the female brain. Within the five types, Baron-Cohen (2002) point out that autistic individuals usually have the extreme male brain, according to their common characteristics. The extreme male brain refers to overdeveloped systemized traits and underdeveloped empathizing features (Baron-Cohen, 2002). Hans Asperger was the first known person to refer to the EMB theory (Baron-Cohen, 2002), and since then, many other explanations for the prevalence of males diagnosed with ASD have emerged. The EMB theory is now considered controversial for its disregard of social and environmental factors (Tierney & Burns, 2017).

### ***The Female-Protective Effect Theory***

The idea of a female protective effect (FPE) emerged from a group of researchers trying to explain the prevalence of males diagnosed with ASD through genetic findings on sexual dimorphism (Navarro-Pardo et al., 2021). For instance, there are several genetic syndromes associated with and present in almost 10% of diagnosed ASD cases (Navarro-Pardo, 2021; Schuch, et al., 2015). According to Navarro-Pardo et al. (2021),

Some of the syndromes associated with ASDs seem to develop more in females (i.e., such as Rett or Turner syndrome). However, forms of ASD that are related to X-linked genes such as FMR1 (Fragile X syndrome), MECP2 (Rett syndrome) and other mutations only represent a small fraction of ASD cases, although more than 70 genes have been identified as being involved in ASDs. (p. 2)

Schuch et al. (2015) suggests the possibility of other chromosome loci affecting the development of ASD. This led researchers to a multifactorial theory of a possible interaction between genetic and environmental factors with female characteristics, such as hormones, generating protective factors against the development of ASD in females (Jacquemont et al., 2014, McCarthy & Wright, 2017; Navarro-Pardo, 2021; Werling et al., 2016; Zhang et al., 2020).

This explanation draws on research into genetic and environmental risk factors to explain the aetiology of ASD. The FPE presumes that a genetic condition prevents females from developing ASD traits significant enough to meet the diagnostic threshold. (Hull et al., 2020; Robinson et al., 2013). Robinson et al. (2013) compare the relationship between familial etiologic load and autistic impairments in males and females using dizygotic twin pairs. Their findings suggest an innate factor protecting females from autistic traits, even when the genetic load between males and females is similar (Hull et al., 2020; Robinson et al., 2013). Interesting, FPE also posits that those females who are affected by ASD are more likely to present greater etiological load, including genetic variants or environmental influences, than males with ASD who lack the FPE (Hull et al., 2020; Tick et al., 2016). Few studies support this theory because it lacks strong evidence in research and further exploration of data is required (Tierney & Burns, 2017).

### ***The ASD Female Bias Theory***

Another explanation for gender differences in the diagnosis of ASD is a biased diagnostic process that over-identifies males and under-identifies females (Beggiato et al., 2017; Lai et al., 2015; Lonergan, 2021; Tierney & Burns, 2017). For instance, there is evidence that the Autism Diagnostic Observation Schedule, Second Edition (ADOS-2), the main diagnostic tool for ASD, may be biased in terms of its interpretation of sex and race (Kalb et al., 2022; Lefort-Besnard et al. 2020). For instance, social and communication symptom deficits are less visible in teenaged male patients assessed using the ADOS (Lefort-Besnard et al., 2020).

Strong evidence supports the hypothesis that male detection of ASD occurs as a result of two factors: stereotypical understandings of ASD and biased instruments to assess ASD in females (Aggarwal & Angus, 2015; Estrin et al., 2021 Hull et al., 2020; Russel et al., 2011; Tierney & Burns, 2017). Individuals diagnosed with ASD require appropriate support services, such as therapy and social skills groups, to learn to function in society and to reach their full potential (Public Health Agency of Canada, 2018). If it is true that females are being underdiagnosed with ASD due to a lack of understanding of their phenotype, it is necessary to promote a movement to adjust practices used when diagnosing ASD and to develop non-biased screening tools to better capture the phenotype traits of females with ASD.

### **Current Practices When Diagnosing ASD**

Parents and teachers are usually the first to raise concerns about a child's autistic profile, and family doctors are typically the first point of professional evaluation and examination for diagnosis; family doctors will typically refer families to a specialist for specific assessment (Becerra-Culqui, 2018; Haroon, 2019b). A thorough autism assessment that leads to a reliable diagnosis usually includes a multidisciplinary approach to gathering data such as clinicians' observations, psychometric tools, caregiver history and input, and self-report (APA, 2013).

Clinicians' observations might include the use of screening tools to identify autism features. Those tools look for signs of autism in different settings (e.g., at home and school), including (but not limited to) pre/perinatal antecedents, social and cognitive development history, odd behavioural presentations, and speech delays (Fuentes et al., 2021; Haroon, 2019b). Input from caregivers and teachers is relevant to the diagnostic process, as is an examination of genetic predisposition, family medical history and background (Fuentes et al., 2021; Haroon, 2019b).

### ***Assessment Tools for ASD***

There are various tools used to assess autism; however, some are used more than others in the medical community. According to La Roche and Bush (2018), the most popular instruments include the Autism Diagnostic Observation Schedule (Lord et al., 2000), the Autism Diagnostic Interview-Revised (Lord et al., 1994; Rutter & Lord, 2003), the Social Responsiveness Scale (Constantino & Grubber, 2005), the Childhood Autism Rating Scale (Schopler et al., 1980), and interactive clinical observations.

**Autism Diagnostic Observation Schedule (ADOS).** The ADOS is a semi-structured tool used to assess social interaction, communication and play that is often used in the process of diagnosing autism and other developmental disorders (Lord et al., 2000). The most updated version is the second edition (ADOS-2), which expanded diagnostic algorithms and added a Toddler Module (McCrimmon & Rostad, 2014). Although the ADOS-2 is used worldwide, Harrison et al. (2017) raise important questions about cultural biases within the ADOS items. Areas of concern include the positioning of race, ethnicity, and gender. Results of empirical reviews of the ADOS-2 have shown significant item-level bias for race and ethnicity but no significant results for gender discrepancy (Harrison et al., 2017). Rynkiewicz et al. (2016) point out that the ADOS-2 validation process was mainly based on the male phenotype of autism,

meaning that research samples during instrument validation involved mostly male participants. In accordance with Rynkiewicz et al.'s (2016) findings, Lefort-Besnard et al. (2020) find that there is sex discrepancy within the ADOS-2 tool. For instance, social and communication symptom discrepancies are less visible in teenaged male patients during the diagnostic process (Lefort-Besnard et al., 2020).

There is conflictual information regarding sex bias in the ADOS-2. Kalb et al. (2022) researched sex and race bias in the ADOS-2. Although they found bias in repetitive/restricted behaviour items, this bias was minimal and thus was not considered to be significant (i.e. two items within the whole instrument). The research regarding standard diagnostic tools for ASD are constantly evolving, and more research is needed to further understand the validation process of the ADOS-2 and its possible sex bias during the process of diagnosing ASD.

**Autism Diagnostic Interview-Revised (ADI-R).** The ADI-R is a semi-structured, inquiry-based assessment tool used to interview parents or caregivers of individuals with suspected ASD (Lord et al., 1994; Rutter & Lord, 2003). To develop the ADI-R, the psychometric data for reliability used eight males and two females subjects diagnosed with ASD and eight males and two females with language impairments. The children who participated in the study to develop the ADI-R were diagnosed using the DSM-III and ICD-10. Interviews were held and videotaped with the caregivers of the subjects, and reliability results were higher than expected considering the small sample (Lord et al., 1994). The data available for validity shows that 15 individuals with ASD and 15 without an ASD diagnosis were recruited to participate in the study, but no gender or additional demographic information was provided (Lord et al., 1994).

According to Lefort-Besnard et al. (2020), the ADI-R diagnostic tool is “not informative about the sex” (p. 10). This finding corroborates previous studies that have identified sex

differences in social symptoms within the ADI-R. For instance, Beggiato et al. (2017) suggest that there are sex differences in the ADI-R in at least six items in the reciprocal social interactions domain, communication domain and in repetitive and stereotyped behaviours. Some of those sex differences include range of facial expressions used in non-verbal and verbal communication, imaginative play and interests that are manifested differently between males and females (Beggiato et al., 2017).

Current studies are attempting to validate the ADI-R with different populations, and results have shown to be positive with high internal consistency. This research indicates that the ADI-R could be used to assess deaf children with possible ASD (Wright et al., 2022), Korean male populations with ASD (Oh et al., 2021), and the adult population (Mandy et al., 2017). Further research is needed to explore the effectiveness of the ADI-R when assessing older children and adults and to explore sex differences in the ADI-R (Lord et al., 1994).

***ADOS and ADI-R.*** Both the ADI-R and ADOS have limits in terms of their validity due to their development and use on non-heterogenous samples-mainly cisgender, heterosexual males (Navarro-Pardo et al., 2021). Another concern regarding these assessment tools is that they are most effective when used together to provide additional data and to support the clinician's judgment. Despite this, these tools are usually utilized separately due to high costs, and time and expertise restraints (Lefort-Besnard et al., 2020). Although the use of both tools during the diagnostic process increases accuracy in terms of identifying the severity of ASD, assessments that employ both tools take longer, and may cause distress for families (Lefort-Besnard et al., 2020).

Lefort-Besnard et al. (2020) show that "(i) the ADI-R and ADOS are differently useful to uncover relevant information about patients with autism, and that (ii) sex differences might be

more contrasting through the ADOS rather than through the ADI-R domains" (p. 10). In summary, the ADI-R does not distinguish the sex of the individual being assessed and the ADOS is more efficient in capturing sex differences in social communication among individuals with potential ASD (Lefort-Besnard et al., 2020). There is a need to optimize the cost-benefit by using both tools concomitantly, since one compliments the other in the diagnostic process.

**Social Responsiveness Scale (SRS).** The SRS is a parenting-based questionnaire with 65-items to investigate a child's level of emotionally appropriate reciprocal social interactions (Constantino et al., 2003). The SRS is often used to estimate the severity of ASD, and many items assess social and communication impairments and repetitive behaviours (Constantino et al., 2003). It is essential to consider other factors that may be at play when using the SRS to assess ASD phenotypes, such as age, cognitive level, and behavioural challenges (Constantino et al., 2003). According to Chen et al. (2018), the items on SRS investigate the absence of social skills in children, such as social awareness and motivation. It is important to consider that females with ASD often learn to camouflage their ASD symptoms by imitating peers and mimicking social interactions (Dean et al., 2017; Hull et al., 2019; Lai et al., 2017; Lehnhardt et al., 2016).

In terms of the SRS validation process, Sturm et al. (2017) suggests there is a need to reduce biases in the SRS instrument, as many studies highlight lack of precision when identifying ASD traits, including age, gender, and expressive language (Charman et al., 2007; Frazier et al., 2013; Havdahi et al., 2016; Sturm et al., 2017). Sturm et al. (2017) propose a short form of the SRS with fewer items to reduce bias in and therefore increase the reliability of the SRS.



**Childhood Autism Rating Scale (CARS).** When the CARS was developed, 537 children (75% male) were assessed using the instrument. Of this normative sample, 55% of participants were six years of age or younger, and 11% were ten or older (Schopler et al., 1980). The CARS has 15 rating scale items to describe ASD symptom severity in children based on a clinical observation, (Moulton et al., 2019). Recent studies suggest that CARS is efficient and accurate in measuring ASD in children (Moon et al., 2019; Moulton et al., 2019; Park et al., 2018). However, the items in the CARS primarily focus on restricted and repetitive behaviours (Chen et al., 2018), and researchers have suggested that females with ASD usually displays less repetitive behaviours and restricted interests than males with ASD (Antezana et al., 2019; Kreiser & White, 2018; McFayden et al., 2019; Ormond et al., 2018). Further information is necessary to understand the effectiveness of the CARS when assessing females.

**CARS and SRS.** The CARS and the SRS should be used together during an assessment, as these tools complement each other and thus may generate a better understanding of an individual's ASD profile (Chen et al., 2018). It is worth noting that although those tools can give essential and reliable information regarding whether or not a person has ASD, the diagnostic process should always take into account the child's history, symptoms, clinical observations and confirmation (Navarro-Pardo et al., 2021).

Further research is necessary to understand the validation process used in the development of these gold standard assessment tools for ASD. For instance, what samples were used to validate those tools? How were factors such as female representation, race, and age taken into consideration? Only then will it be possible to comprehend possible bias in the diagnostic process and to refine these tools to improve diagnostic practices for detecting ASD in females, preventing further distress for this under-diagnosed population.

## **Consequences of Late Diagnosis for Females with ASD**

One recurrent consequence of late diagnosis for women with ASD is sexual abuse (Bargiela et al., 2016; Mademtzi et al., 2018). Fourteen women between 18 and 35 years participated in Bargiela et al.'s (2016) qualitative study. They were diagnosed later in life (15 years or older) and had no intellectual disabilities. Bargiela et al.'s (2016) study reveals themes that reflect negative consequences in the lives of subjects; some of the participants said they had to develop a passive personality to fit in, and most of the times they were misjudged by peers or labelled as lazy if they were lacking strong executive skills (Bargiela et al., 2016). These individuals also faced social risks as a result of not knowing their diagnosis and its social limitations, such as unhealthy relationships and exposure to high-risk situations, including an increased incidence of sexual abuse (Bargiela et al., 2016).

Nine out of 14 participants in Bargiela et al.'s (2016) study report experiencing sexual abuse within relationships. There are a number of possible explanations for this phenomenon. First, undiagnosed females with ASD tend to mimic others' behaviours in order to fit in. Participants in the study reported copying their partner's flirtatious interactions without being aware of it, and describe being forced to have sex without fully comprehending or desiring the sexual interaction. The second reason is that participants in Bargiela et al.'s (2016) study had difficulties reading others' intentions; this resulted in falling into traps or "being groomed" to have sex (p. 3288). Third, undiagnosed females have a high risk of experiencing sexual abuse because of their difficulties learning and internalizing social skills to keep them safe (Bargiela et al., 2016). Additionally, participants reported fear of rejection and the need to be accepted, which led them to be more vulnerable to experiencing sexual abuse. Lastly, Bargiela et al. (2016) highlight that participants faced more risks as a result of not fully understanding the social rules

needed to be assertive within relationships. This study supports the idea that it is necessary to assist and support under-identified females with ASD to reduce their chances of being sexually abused. This support might include explaining social rules and expectations at their level of understanding, and reinforcing safety measures. All participants described relief after receiving a late diagnosis due to the stress of a lifetime of masking their odd behaviours (Bargiela et al., 2016).

Although girls with ASD have better social skill performance in friendships, many experience hardship maintaining long-term friends (Milner et al., 2019). Late diagnosis impacts self-image and self-esteem. Many underdiagnosed girls with ASD mention in qualitative research how hard it was for them to fit in, how they lacked great friendship skills, how they felt different from peers, and how tiresome it is to camouflage their symptoms all the time (Bargiela et al., 2016; Milner et al., 2019). As females get older, fitting in becomes harder, and some individuals with ASD isolate and withdraw from social situations, leading to comorbidities such as anxiety and depression (Milner et al., 2019).

Another negative consequence of late diagnosis is lack of access to appropriate supports. Girls with ASD might have a different presentation compared to boys, but when compared to neurotypical girls of the same age, they present with a lot more discrepancy and struggles in their social and behavioral development (Ratto et al., 2018). It is challenging for females with undiagnosed ASD to try to fit in with peers and with cultural and role expectations without appropriate support (Green et al., 2019; Milner et al., 2019). A late diagnosis of ASD is a barrier. Studies highlight the challenge that clinicians and females go through to get a reliable diagnosis (Green et al., 2019; Mademtzi et al., 2018). Sometimes, females and caregivers lack sufficient

details about childhood to answer questions posed on the assessment tools with accuracy; other times, girls do not present with enough impaired traits.

Females with ASD develop coping strategies to process sensory input throughout their lives, whether consciously or not. Despite this, life-changing events such as pregnancy can cause an increase in struggles coping with their sensory profile (Talcier, 2021). Talcier (2021) interviewed eight women diagnosed with ASD later in life to further understand their profile. Some participants noticed that something was wrong with them during and after pregnancy and decided to seek professional help. They were struggling with intensified pregnancy symptoms, and difficulties with labour and birth. All participants did not have an ASD diagnosis at the time of labour and faced different struggles with doctors and nurses. For instance, nurses did not understand the need to adjust procedures to accommodate for the patients' sensory needs; additionally, medical staff did not believe in their reported levels of labour pain due to their lack of facial expressions (Talcier, 2021). Those women also struggled after childbirth, whether from the challenges of heightened auditory sensory experiences (baby's crying pitch), tactile sensory experiences (baby's skin), or olfactory sensory experiences (baby's smell). Those women also mentioned that after giving birth and having no time to use coping strategies, their ASD behaviours started to accentuate, leading them to seek help (Talcier, 2021). Once they received the diagnosis of ASD, life began to make sense again, and they could learn different strategies to cope with being a mother with ASD (Talcier, 2021).

### **Benefits of Early Diagnosis**

Undiagnosed females with ASD face many struggles throughout their lives that could be avoided with earlier diagnosis. Qualitative studies point to the benefits of early intervention for infants and young children with ASD (French & Kennedy, 2018; Vivanti et al., 2017), and this

includes females with ASD. Zener (2019) highlights that these women may feel relief and validation after receiving a diagnosis as they have been struggling their whole lives living with an unknown disorder. Milner (2019) points to the lack of supports for undiagnosed women and discusses how early diagnosis can improved quality of life as it leads to appropriate help from family, school, and professionals. With earlier diagnosis, females can better understand their sensory and behavioural profiles, and reduce misjudgments about their lack of skills in certain areas that directly impact self-esteem (Milner, 2019). Most importantly, earlier diagnosis allows females to access services and interventions (Rotholz et al., 2017).

Research has shown that when individuals with ASD receive early intervention (prior to four years old), this increases positive outcomes including cognitive, behavioural and speech improvements (Elder et al., 2017; Paynter et al., 2018; Vivanti et al., 2016). Parents of children diagnosed with ASD benefit from early intervention as well, resulting in decreased stress levels (Kuravackel et al., 2018; Mueller & Moskowitz, 2020; Rollins et al., 2019). Early diagnosis of ASD benefits parents and supports the child to develop coping strategies. Rabba et al. (2019) interviewed thirteen parents of young children (< 36 months) who received an early diagnosis. Although these parents initially had a range of emotions following the diagnosis, parents and children were able to develop coping strategies including acceptance, managing the unknown, learning about the diagnosis, tracing an action plan, increasing awareness, and becoming proactive (Rabba et al., 2019). In addition, parents with an understanding of their child's diagnosis learn to implement child-responsive strategies to support the child's development through parenting-coaching early intervention programs (Landa, 2018). Landa (2018) also describes the importance of training professionals and teachers in child development to increase the benefits of early intervention for children diagnosed with ASD.

Earlier diagnosis improves the quality of life of females with ASD who are undergoing pregnancy. The diagnosis provides knowledge of their sensory, behavioural, and emotional profile and needs so that these can be shared with the medical community (Hampton et al., 2022). With a diagnosis, accommodations can take place during prenatal appointments, invasive procedures that cause social anxiety can be reduced, and labour can be experienced with proper care and pain medication regardless of the need to read facial expression as an indicator. After birth, new mothers with ASD can access social support (Hampton et al., 2022; Talcier, 2021).

### **Implications for Counselling Psychology**

High-functioning females with ASD can mask or camouflage their behaviours and develop strategies to cope with life and social functioning (Hull et al., 2020; Russel et al., 2011). As a result, current diagnostic practices can lead to reduced likelihood of identifying females with ASD compared to males, or identification particularly late in life (Begeer et al., 2013; Hull et al., 2020; Kirkovski et al., 2013; Rutherford et al., 2016). Females with ASD who do not receive a diagnosis can go on in life masking their symptoms and developing strategies to cope with their ASD features (Hull et al., 2020); however, qualitative studies have shown that those females undergo many challenges in life including difficulties in maintaining friendships, mental exhaustion from trying to fit in to a neurotypical world without knowing their limitations, and comorbidities such as depression and anxiety (Milner et al., 2019).

### **Late diagnosis**

A common issue for females with ASD is the consequences of receiving a diagnosis later in life (Green et al., 2019; Mcvey et al., 2017). Females with ASD without intellectual impairment can mask their symptoms by mimicking their peers, thus drawing less attention to their odd behaviours compared to males with ASD (Hiller et al., 2016; Mcvey et al., 2017). It can

take a while for parents and teachers to recognize specific features of ASD in females, which contributes to the likelihood of late diagnosis (Hiller et al., 2016; Mcvey et al., 2017). Dean et al. (2017) studied children with ASD and compared their interactions at a playground with neurotypical children. From a considerable distance, girls with ASD showed no significant difference compared to neurotypical females; they spent time interacting with other groups, waving, and talking (Dean et al., 2017). The difference between neuro-typical girls and girls with ASD is that girls with ASD tend to fluctuate between engaging with peers and being alone, whereas neuro-typical girls stay engaged most of the time. Close observation showed that the quality of interactions was compromised, as girls with ASD lack social skills to successfully interact with peers (Dean et al., 2017). Girls with ASD use compensatory behaviours to join other groups, such as observing peers before playing and copying behaviours that seems socially appropriate (Dean et al., 2017). This further supports the hypothesis that girls mask their ASD symptoms, which contributes to under-identification and under-referral for assessment in early childhood (Dean et al., 2017; Estrin et al., 2021).

Females with ASD tend to show fewer social impairments during their first years of life, blending in with other children (Rivet & Matson, 2011; Tierney & Burns, 2017). As they grow, the challenge of keeping friendships in adolescence becomes more apparent as a result of increased communication and social demands (Mandy et al., 2018; Tierney & Burns, 2017). Mandy et al. (2018) studied and compared the developmental journeys of males and females with ASD. Their findings suggest that gender discrepancies in autistic traits tend to disappear as females reach adolescence. Teenage females with ASD have a higher risk of developing depression than neurotypical teenaged girls (Oswald et al., 2016; Solomon et al., 2012; Tierney & Burns, 2017). This could be a consequence of individuals with ASD internalizing feelings,

having lower self-worth, and experiencing lower perception of self-competence (Solomon et al., 2012; Tierney & Burns, 2017).

It is usually later in life when females lack time and resources to continue to implement coping strategies and thus their social, behavioural, and sensorial issues get noticed (Tierney & Burns, 2017). Zener (2018) interviewed females diagnosed later in life with ASD following pregnancy. Some of the participants reported struggling with extreme sensory issues including the smell of their newborn, or their pitched crying noises. Others mentioned that the struggles became evident as they were busy with a newborn and forgot about themselves; without their coping strategies in place, social functioning became overwhelming (Zener, 2018). Improved diagnostic practices may reduce late diagnosis in females, therefore providing these individuals with the appropriate supports and the tools they need to cope with the challenges of being autistic much earlier on in life.

Females with ASD also describe challenges dealing with health professionals when pursuing a formal diagnosis due to a lack of understanding of the female phenotype of ASD (Bargiela et al., 2016). In Bargiela et al.'s study, many participants discussed the impacts of the stigma on their mental health, being discredited or ignored by professionals and not being offered different treatment options. Another issue stemming from late diagnosis is misdiagnosis. Because females with ASD present different symptoms than males with ASD, many clinicians miss the ASD diagnosis and give another diagnosis. Bargiela et al. (2016) interviewed females diagnosed with ASD to understand their journey to pursue an ASD diagnosis. Many participants reported they had gone through many different medications, treatments, and diagnostic assessments prior to the identification of ASD. Concurrent disorders (or those that are falsely diagnosed) include multiple personality disorder, depression, and anxiety (Bargiela et al., 2016).



## **A Misfit Issue**

Milner et al. (2019) interviewed autistic females and mothers with autism regarding their experiences with ASD to understand their experiences with the diagnostic process, the impacts of autism on their lives, and the coping strategies they have developed. Results highlight the difficulties females usually encounter fitting into with a world with neurotypical expectations (Milner et al., 2019). Some participants mention the desire to maintain friendships but a lack of social skills to appropriately interact with others of the same age (Milner et al., 2019). The challenges of making and keeping friendships led many participants to feel rejected, lonely, and depressed (Milner et al., 2019).

Individuals with ASD usually suffer from lower self-esteem, depression, and anxiety (Cooper et al., 2017). This is related to negative social identities which develop due to their experiences over time being autistic (Cooper et al., 2017). Females un-diagnosed with ASD can experience confusion and shame as they try to fit in with friends without knowing the reasons behind their lagging social skills (Milner et al., 2019; Zener, 2018). It is relevant for professionals such as counsellors to facilitate treatment plans to support autistic females to develop positive self-identities (Cooper et al., 2017). Improved self esteem may reduce the chances of these individuals developing co-morbid disorders such as depression and anxiety.

## **Safety risks**

Individuals with ASD may camouflage their autistic traits to cope with the world's social rules and expectations (Atwood et al., 2019; Hull et al., 2017). The camouflage process has three different stages: motivations, camouflage, and consequences (Atwood et al., 2019; Hull et al., 2017). In the first stage, females with ASD are motivated to thrive socially and to make friends. The second stage occurs when females with ASD feel the need to camouflage their social

confusion and cognitive delays by learning compensation strategies (Atwood et al., 2019). In the last stage, females with ASD experience short- and long- term consequences of camouflage, including delays in the diagnostic process, access to services, and ensuing psychological comorbid disorders (Atwood et al., 2017). Autistic individuals camouflage their ASD traits, usually moved by their desire to fit into society and establish social relationships (Hull et al., 2017). They tend to mask odd behaviours and compensate for their needs with diverse techniques, which can have negative consequences on their lives and self-identities (Atwood et al., 2019; Hull et al., 2017). Hull et al. (2017) describe the experiences of study participants using camouflage to cope with social situations as follows:

Camouflaging was partly performed through suppressing, hiding, or otherwise controlling behaviours associated with ASD that were seen as inappropriate in the situation. The extent to which this happened could vary depending on who the person was with; camouflaging tended to occur less often with close friends and family members, although some respondents described camouflaging at all times. (p. 2525)

Some autistic females describe masking their behaviours by trying to reduce stimming behaviours in public, controlling their reactions to sensory overload, and forcing themselves to socially engage with others (Hull et al., 2017). The consequences of camouflaging may include negative impacts on quality of life triggered by mental exhaustion. Individuals with ASD who camouflage must be constantly aware of their social interactions; this hypervigilance negatively impacts mental health (Hull et al., 2017).

It is known that females with ASD tend to camouflage their autistic behaviours much more than males with ASD (Dean et al., 2017; Hull et al., 2019; Lai et al., 2017; Lehnhardt et al., 2016). These individuals are at a high risk for mental exhaustion (Hull et al., 2017), and thus may be more likely to experience mental health issues than males with ASD and neurotypical females. These individuals may require extra mental health support throughout their lives (Atwood et al., 2019; Oswald et al., 2016; Solomon et al., 2012; Tierney & Burns, 2017). Counsellors and other health-related professionals working with autistic individuals in both clinical and educational environments should be aware of the camouflage process and its impact on mental health, facilitating interventions to reduce mental health problems in this population.

In addition to mental health problems, individuals with ASD are at greater risk of being impacted by interpersonal violence due to their lack of understanding of social rules and safety; violence can include child abuse, domestic violence, and bullying (Weiss & Fardella, 2018). For instance, autistic females have a higher likelihood of experiencing sexual abuse compared to neurotypical females (Green et al., 2019; Pecora et al., 2020; Willey, 2012).

### **Social Support**

Living with ASD can be challenging due to impairments in social, behavioural and cognitive functioning (APA, 2013). Early diagnosis can be helpful as it allows families to access interventions and programs to support children with ASD (Green et al., 2019). In particular, early intervention focused on behavioural challenges has shown positive results in reducing ASD core symptom severity and provides long-term benefits in terms of improvements in social skills, language and cognitive abilities (Estes et al., 2015; Guler et al., 2017). Females who receive a late diagnosis of ASD most often do not have access to early interventions to support their development (Green et al., 2019).

Another area of life where children with ASD usually require support is in the education system. Individuals with ASD often need extra support to function in the school environment (Blankson et al., 2017; Levinson et al., 2020; Welchons & McIntyre, 2017). Individuals with autism may need supports from trained teachers such as classroom adaptations, individualized plans and strategies to accommodate special needs. Females with ASD may face extra challenges when entering high school as social demands increase (Tierney & Burns, 2017). Challenges associated with high school include understanding social rules, managing friendships, and increased sensory stimulation (Tierney & Burns, 2017).

Tierney and Burns (2017) describe ten teenaged girls with a formal diagnosis of Autism Spectrum Conditions who share their experiences managing social interactions. The social environment is often described as a source of stress, requiring individuals to deal with uncomfortable feelings such as rejection, sensory overload, and lack of safety (Tierney & Burns, 2017). In addition, participants comment on gender expectations and stigmatization. For instance, as females they describe more difficulties fitting in with peers and “feeling ‘ungirly’ in relation to female peers in terms of appearance, interests, and communicative styles” (Tierney & Burns, 2017, p. 77). The desire to fit in and develop friendships led participants to develop communication strategies to successfully interact with peers and overcome obstacles (Tierney & Burns, 2017). The extra effort participants put into social interactions impacted their mental health. Tierney and Burns (2017) suggest that participants experienced loneliness and mental health difficulties.

Baldwin and Costley (2016) studied the experiences of 82 autistic women with high functioning autism; their main challenges included lack of educational and occupational support throughout their lives. Many women with ASD struggle with executive functioning skills

essential for learning and daily tasks, including sustained attention, time management, and task initiation (Baldwin & Costley, 2016). More than 50% of the participants in Baldwin & Costley's study reported receiving a diagnosis of ASD later in life (18 years old or older), meaning that many of their struggles were given little or non-attention from teachers and professionals. Some participants mentioned that their teachers would often notice a few odd behaviours but ignore them because they were not extreme or impacting the environment (Baldwin & Costley, 2016)

Should women with high functioning ASD have a formal or earlier-known diagnosis, the school and teachers can make appropriate changes to accommodate for the needs of autistic students. For instance, providing quiet spaces for regulation, role-playing social situations for rules assimilation, and making academic adjustments according to individual needs (Tierney & Burns, 2017). Many females with ASD get to high school without a formal diagnosis and struggle to achieve success in school (Tierney & Burns, 2017).

High-functioning autistic women also struggle with lack of support in employment settings (Baldwin & Costley, 2016). In Baldwin & Costley's (2016) research, participants described feeling undervalued in their workplace, and these feelings affecting their self-worth and career development. Some participants felt stuck in their careers as the main path to progress and promotion is through job interviews, which they were not mentally ready for (Baldwin & Costley, 2016). Some strategies that could be supportive when interviewing autistic individuals include sending the interview questions beforehand to allow time for preparation and adopting verbal and visual prompts to support factual memory in recalling the company's policies (Norris et al., 2020). Health professionals could facilitate training to educate and prepare companies to welcome autistic individuals.

Counsellors must be aware of the lack of social supports that females with ASD experience daily, and can provide appropriate direct or indirect support as needed. According to the Canadian Code of Ethics for Psychologists, professionals should promote and protect the well-being of their clients, avoiding harm and gaining constant knowledge to increase competency (Canadian Psychological Association [CPA], 2017). At the same time, psychologists can promote positive changes in society through the science of psychology, including researching human behaviours and developing evidence-based treatments (CPA, 2017). Understanding the female phenotype, diagnostic practices, and psychological implications is essential for future research and treatments targeting this population.

### **Improving Diagnostic Practices for Females with ASD**

There is strong evidence that highlights gender differences in the assessment process for ASD (Atwood et al., 2019; Lai et al., 2011; Langmann et al., 2017; Rivet & Matson, 2011). For instance, one of the gold standards tools for assessing ASD, the Autism Diagnostic Observation Schedule (ADOS), has lower diagnostic accuracy for females, and higher accuracy for males (Langmann et al., 2017). To improve diagnostic practices, it is necessary to update current screening tools with female participants in the norming studies, and to ensure clinicians have proficient experience and knowledge about the female phenotype of ASD (Langmann et al., 2017).

To capture the female phenotype and improve diagnostic practices, researchers have developed new instruments such as the Girls' Questionnaire for Autism Spectrum Condition (GQ-ASC; Atwood et al., 2011) and the Camouflaging Autistic Traits Questionnaire (CAT-Q; Hull et al., 2019). The GQ-ASC is a screening tool created to identify female traits that could relate to ASD (Ormond et al., 2018). This tool was developed with the intention to optimize the

diagnostic process of ASD for females, reduce gender bias, and improve future interventions for this population (Ormond et al., 2018). The CAT-Q tool was developed to screen camouflaging behaviours in autistic adults (Hull et al., 2019). It is a self-report measure developed recently, and is in the process of validation and reliability.

According to Hull et al. (2019), the CAT-Q has potential, and gives valid and reliable information regarding camouflaging behaviours, especially for individuals who may go undiagnosed. Although there is a big effort to understand the female autistic phenotype and improve the diagnostic process, further studies need to happen, providing scientific evidence for the female phenotype, and refining current diagnostic practices.

### **Fundamental Next Steps for Research**

It is relevant that researchers work to further understand the female phenotype and clarify differences on the female spectrum. It is known that females tend to camouflage their features to fit in with others (Atwood et al., 2019; Hull et al., 2017), and thus researchers could further explore the camouflage phenomenon. This could happen by analyzing ASD females in future studies, not only in social situations, but also when they do not have to be social and mask their traits. This would allow a deeper understanding of their phenotype and the mental health consequences of camouflage.

### **The Need for More Scientific Data**

There are many qualitative studies that aim to understand the female experience of ASD (Baldwin & Costley, 2016; Bargiela et al., 2016; Hull et al., 2020; Milner et al., 2019; Zener, 2018) but few quantitative studies on this population. Quantitative research is relevant to the scientific world as it provides predictions, patterns, and generalization of results (Watson, 2015). Conducting more quantitative studies exploring the female phenotype of ASD would be useful to

support development of constructs and to update screening tools for ASD. Specifically, females with undiagnosed ASD would benefit from the development of tools to assess camouflage behaviour (Hull et al., 2017). Although we have the CAT-Q questionnaire, more studies are required to expand its use as it was validated with an adult population (Hull et al., 2019). Another suggestion would be to develop the Q-ASC tool further to expand its demographic use (Ormond et al., 2018). There is growing evidence supporting the assertion that females are being underdiagnosed with ASD; therefore, the diagnostic process may be biased (Beggiato et al., 2017; Lai et al., 2015; Lonergan, 2021). A fundamental next step for research in this field should be to include a new validation process for current golden standard screening tools for ASD, with more female representation.

Once we better understand the female phenotype and develop more accurate screening tools to identify females with ASD earlier, it is essential to provide the community with appropriate evidence-based interventions for this population. It is possible that treatments and interventions for ASD have also been based on and validated using mainly the ASD male population. It is known that females with ASD may have different needs than males with ASD, as their challenges are also different (Mandy et al., 2018).

### **A Responsibility to Society**

Parents and elementary teachers may lack exposure and training to understand and respond effectively to gender discrepancies in ASD populations, which contributes to the under-identification of females with ASD. Although it may be the responsibility of individuals to seek knowledge, a privilege of working in a system is that supports are accessible. It is important to facilitate access to and sharing of information regarding ASD traits in females to reduce stigma and bias in our community.



As helping professionals, psychologists are responsible to provide the community with valid and accurate information, using culturally appropriate language (CPA, 2017). Special attention should be given in culturally diverse countries such as Canada. Canada is a country with many immigrants, therefore a vast cultural diversity (Banting & Soroka, 2020). Professionals working in Canada, must be aware of different worldviews regarding understandings of ASD that they can effectively support all individuals and families.

Canada provides support for children with ASD and ensures their rights through laws and acts; this support looks different in each province. In Alberta there is a government program called Family Support for Children with Disabilities (FSCD). The FSCD program provides access to services for families of children with disabilities based on the needs of individuals and their families (Alberta Government, 2016). Gordillo et al. (2020) and Manor-Binyamini (2018). suggest that there are cultural discrepancies in understandings of ASD, which may limit access to services to some families only.

Gordillo et al. (2020) explores the adjustment of mothers to an ASD diagnosis based on their knowledge and culture. While most of the non-Latina mother participants demonstrated sufficient knowledge regarding ASD, some Latina mothers had difficulties accepting their child's diagnosis. For instance, some participants could not relate their child's behaviours to autistic traits, doubting the diagnosis. In contrast, others were able to name autistic characteristics such as rigidity, but had difficulties integrating the concept with their child's observed behaviours (Gordillo et al., 2020). The consequences of denying or doubting the diagnosis can lead many Latina mothers to downplay the severity of the diagnosis and stop accessing services and interventions (Gordillo et al., 2020). This denial could be even more

aggravated with Latina mothers of females with ASD, since they so frequently mask their symptoms (Atwood et al., 2019; Hull et al., 2017; Milner et al., 2019).

Self-blaming can be another consequence of a lack of deeper understanding of ASD. According to Gordillo et al. (2020), many South American mothers struggle with a lack of understanding of the ASD aetiology, blaming themselves for their child's diagnosis. An example would be blaming themselves for complications during labour. This may lead to further mental health issues for the entire family and community (Gordillo et al., 2020). Many Latino mothers are impacted by negative response to their child's ASD in the community, resulting in denial of the ASD diagnosis and diminishing the severity of ASD traits (Gordillo et al., 2020).

Manor-Binyamini (2018) highlights the need to develop treatments for ASD that consider non-Western singularities, including diverse values and beliefs. Western cultures were pioneers in developing ASD interventions, an indicator of the values carried through to ASD treatments and expectations in terms of outcomes (Manor-Binyamini, 2018). Expecting immigrants to understand ASD and abide by treatments and interventions through a Western cultural lens without first conceptualizing their cultural uniqueness is unfair and biased. It is essential to expand research on cultural issues and understandings of ASD. Immigrant families with autistic families require supportive interventions to cope with an ASD diagnosis.

### **Future Research**

A sufficient amount of research suggests that there is a significant difference between the autistic phenotype in boys and girls with ASD and that there continues to be under-identification of females with ASD (Angell et al., 2021; Antezana et al., 2019; Backer et al., 2017; Begeer et al., 2013; Dean et al., 2017; Duvokot et al., 2017; Gould, 2017; Hiller et al., 2014; Hull et al., 2019; Hull et al., 2020; Kreiser & White, 2014; Kreiser & White, 2018; Lai et al., 2017;

Lehnhardt et al., 2016; Loomes et al., 2017; McFayden et al., 2019; Milner et al., 2019; Ormond et al., 2018; Ratto et al., 2018; Sedgewick et al., 2018; Tierney et al., 2016; Wodka et al., 2022). The “gold standard” assessment tools used in the current diagnostic process for autism, including the ADOS-2, ADI-R, CARS, and the Social Responsiveness Scale, are heavily based on the male ASD phenotype (Rynkiewicz et al., 2016; Schopler et al., 1980). Further research is needed to better understand gender bias in ASD assessment tools and to provide suggestions for changes to address gender inclusiveness.

Females underdiagnosed with ASD face many struggles that could be avoided by an early diagnosis. Earlier interventions reduce negative consequences of living with a disorder without knowing how to better cope. It is necessary to improve the diagnostic system and include the female autistic phenotype to improve recognition of the disorder in females, even when symptoms are camouflaged.

### **Recommendations For Practice**

Once we have more sophisticated scientific knowledge of the female phenotype, psychoeducation focused on gender discrepancies in ASD presentation can be offered to parents, to primary health care professionals such as nurses and family doctors, and in schools. These individuals are usually the first to identify ASD traits and need support to understand how an autistic child behaves regardless of their gender (Mcvey et al., 2017; Hiller et al., 2016). Providing stakeholders with valuable information on the female ASD phenotype increases the chances of those females being identified earlier and referred for assessment. This will also allow health professionals, including psychologists, to become more competent in identifying females with ASD. It will also support further understanding of the camouflage phenomenon, resulting in better support for this population.

It is also necessary to improve professional training programs focused on ASD in females. For that, more studies should be conducted to develop better understandings of the uniqueness and singularities of ASD traits in females. Existing training programs could be improved to include ASD traits specific to the female phenotype; counsellors, specifically, can offer more effective treatment programs if they amplify their understanding. Counsellors need to familiarize themselves with current research on diagnostic practices and understand the validation process and the population used to develop standardized screening tools. Once they understand the process, it is important that these counsellors make a reasonable effort to reduce gender bias in their assessment process; professional judgment and experience is central during the process of conducting psychological assessments (Whiston, 2017).

Female adolescents with ASD are at risk of developing mental health challenges such as depression and anxiety (Milner et al., 2019; Oswald et al., 2016; Solomon et al., 2012; Tierney & Burns, 2017). Counsellors working with this population need to provide evidence-based interventions, basing interventions on their awareness of clients' needs and challenges. For example, prior to beginning an anxiety intervention, professionals need to first understand what is underneath their client's challenges. It is known that females with ASD mask their behaviours to fit in with peers (Atwood et al., 2019; Hull et al., 2017; Milner et al., 2019). Their difficulties maintaining long-term friendships can cause self-esteem and self-worth issues, and these issues must be understood to optimize mental health supports provided.

Counsellors provide psycho-educational interventions for female teenagers with ASD regarding their body changes, sexuality and safety awareness. Females with ASD are at high risk of experiencing abuse, including sexual abuse (Bargiela et al., 2016). It is essential to teach girls with ASD about body language, how to recognize and avoid danger, and how to ask for help or

support to mitigate potential risks. It is also necessary to support females with ASD to identify their own sensory profile and to learn coping strategies to deal with the outside world, especially when their lives get busier with employment and motherhood (Zener, 2018).

### **Reflexive Self-Statement**

I spent the last five years working with the autistic population as a developmental assistant. Throughout these years, I wondered why I had more male clients than females but chose to internalize the common sense that ASD is more prevalent in males. As I began my internship in a private school for children with ASD and realized the discrepancy and lack of female representation in the school, my mind started seeking deeper explanations. I paid attention to the female phenotype and the evident suffering of females with ASD: the few females in the school often sought psychological support as they were struggling with mental health, social interactions, and friendships.

I researched the reasons for the prevalence of males diagnosed with ASD. What I found has changed my simplistic way of conceptualizing ASD. There is considerable evidence to support the hypothesis that females are under-identified with ASD (Beggiato et al., 2017; Hull et al., 2020; Lai et al., 2015; Lonergan, 2021), and more studies need to be conducted in order to further understand ASD and its aetiology. Like me, others have accepted simplistic explanations for the prevalence of males diagnosed with ASD for a long time. Human beings reproduce knowledge - we read, believe, repeat. This automatic response to knowledge must stop so that we go back to questioning the veracity of theories about males and females with ASD, including scientific evidence.

When we question current knowledge, we are able to promote new interventions and provide greater supports to individuals with ASD in need. Females with ASD face many

challenges in life, including fitting in with peers, accessing services, mental health, and safety (Atwood et al., 2019; Cooper et al., 2017; Green et al., 2019; Hull et al., 2017; Milner et al., 2019). When they do not have a diagnosis, those challenges are increased, and so is their suffering. If the hypothesis is correct that health professionals are failing to identify females with ASD and provide appropriate services; we must change the course of our actions. We need to identify what is not working, adjust the process, and promote change.

Psychologists can work to promote the development of knowledge and help minority populations (CAP, 2017). Females with ASD struggle as a result of a lack of early identification and thus access to earlier interventions. They too deserve attention and intervention; they too deserve non-biased assessment tools and help identify and address their challenges. With a more solid understanding of the female ASD phenotype; we can adjust diagnostic practices and create more appropriate interventions.

### **Conclusion**

This research project aimed to understand the female ASD phenotype and compare it with current diagnostic practices. Although there is evidence pointing to a bias in practices to identify females with ASD (Beggiato et al., 2017; Lai et al., 2015; Lonergan, 2021; Zener, 2018), this literature review did not find significant evidence pointing to malpractice as a result of the diagnostic process. Further research it is necessary to evaluate current screening tools for ASD and to understand their validation processes. The scientific community needs keep exploring the female ASD phenotype (Lai et al., 2015; Hull et al., 2020), to provide culturally competent supports for families and females in need, and to educate the community to facilitate early identification and diagnosis of ASD in females.

Females usually get diagnosed with ASD later in life compared to males (Green et al., 2019; McVey et al., 2019). It is important to reduce ASD stigma and expectations on how symptoms are manifested by learning and teaching about the female phenotype. This change could support parents and teachers in their own learning journeys, supporting them to seek professional help to get their female children assessed. Improving diagnostic practices and providing females with accurate and early diagnoses will result in greater access to services and interventions for females with ASD. In addition, those females may begin to develop their autistic identity further, to make better sense of their social interactions and to understand their behaviours and mental health.

## References

- Aggarwal, S., & Angus, B. (2015). Misdiagnosis versus missed diagnosis: Diagnosing autism spectrum disorder in adolescents. *Australasian Psychiatry: Bulletin of the Royal Australian and New Zealand College of Psychiatrists*, 23(2), 120-123.  
<https://doi.org/10.1177/1039856214568214>
- Alberta Government. (2016). *Family support for children with disabilities policy and procedures manual*. <https://open.alberta.ca/dataset/b024bf72-6d8f-4e8d-9da8-0588c5680864/resource/ba8dec81-97f1-417b-a9c6-3bb269089eb4/download/fscd-policy-and-procedures-manual-2016-01.pdf>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Publishing.
- American Psychological Association. (2018). *APA guidelines for psychological practice with boys and men*. <https://www.apa.org/about/policy/boys-men-practice-guidelines.pdf>
- Angell, A. M., Deavenport-Saman, A., Yin, L., Zou, B., Bai, C., Varma, D., & Solomon, O. (2021). Sex differences in co-occurring conditions among autistic children and youth in Florida: A retrospective cohort study (2012–2019). *Journal of Autism and Developmental Disorders*, 51(10), 3759–3765. <https://doi.org/10.1007/s10803-020-04841-5>
- Antezana, L., Factor, R. S., Condy, E. E., Strege, M. V., Scarpa, A., & Richey, J. A. (2019). Gender differences in restricted and repetitive behaviors and interests in youth with autism. *Autism Research*, 12(2), 274–283. <https://doi.org/10.1002/aur.2049>
- Atwood, T., Grandin, T., Faherty, C., Myers, J. M., Snyder, R., Wagner, S., Wrobel., M., Iland, L., & Bolick, T. (2019). *Autism and Girls*. Future Horizons.
- Backer van Ommeren, T., Koot, H. M., Scheeren, A. M., & Begeer, S. (2017). Sex differences in



- the reciprocal behaviour of children with autism. *Autism*, 21(6), 795–803. <https://doi.org/10.1177/1362361316669622>
- Baldwin, S., & Costley, D. (2016). The experiences and needs of female adults with high-functioning autism spectrum disorder. *Autism*, 20(4), 483–495. <https://doi.org/10.1177/1362361315590805>
- Banting, K., & Soroka, S. (2020). A distinctive culture? The sources of public support for immigration in Canada, 1980–2019. *Canadian Journal of Political Science*, 53(4), 821–838. <https://doi.org/10.1017/S0008423920000530>
- 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. <https://doi.org/10.1007/s10803-016-2872-8>
- Baron-Cohen, S. (2002). The extreme male brain theory of autism. *TRENDS in Cognitive Science*, 6(6), 248–254. [https://docs.autismresearchcentre.com/papers/2004\\_BC\\_The-extreme-male-brain-theory-of-autism.pdf](https://docs.autismresearchcentre.com/papers/2004_BC_The-extreme-male-brain-theory-of-autism.pdf)
- Becerra-Culqui, Tracy A.; Lynch, Frances L.; Owen-Smith, Ashli A.; Spitzer, Joseph; Croen, Lisa A. (2018). Parental first concerns and timing of autism spectrum disorder diagnosis. *Journal of Autism and Developmental Disorders*, 48, 3367–3376. 10.1007/s10803-018-3598-6
- Beggiato, A., Peyre, H., Maruani, A., Scheid, I., Rastam, M., Amsellem, F., Gillberg, C. I., Leboyer, M., Bourgeron, T., Gillberg, C., & Delorme, R. (2017). Gender differences in autism spectrum disorders: Divergence among specific core symptoms. *Autism Research*, 10(4), 680–689. 10.1002/aur.1715

- Bettelheim, B. (1959). Feral Children and autistic children. *American Journal of Sociology*, 64(5), 455-467. <https://doi.org/10.1086/222541>
- Blankson, A. N., Weaver, J. M., Leerkes, E. M., O'Brien, M., Calkins, S. D., & Marcovitch, S. (2017). Cognitive and emotional processes as predictors of a successful transition into school. *Early Education and Development*, 28(1), 1–20. <https://doi.org/10.1080/10409289.2016.1183434>.
- Brown, R. T. (2013). Feral Children. In C. R. Reynolds, K. J. Vannest, & E. Fletcher-Janzen (Eds.), *Encyclopedia of special education: A reference for the education of children, adolescents, and adults with disabilities and other exceptional individuals* (4th ed.). Wiley.  
[https://go.openathens.net/redirector/cityu.edu?url=https%3A%2F%2Fsearch.credoreference.com%2Fcontent%2Fentry%2Fwileyse%2Fferal\\_children%2F0%3FinstitutionId%3D4966](https://go.openathens.net/redirector/cityu.edu?url=https%3A%2F%2Fsearch.credoreference.com%2Fcontent%2Fentry%2Fwileyse%2Fferal_children%2F0%3FinstitutionId%3D4966)
- Centers for Disease Control and Prevention (CDC). (2012). Prevalence of autism spectrum disorders: Autism and developmental disabilities monitoring network, 14 sites, United States, 2008. *Morbidity and Mortality Weekly Report*, 61(3).  
<https://files.eric.ed.gov/fulltext/ED530639.pdf>
- Charman, T., Baird, G., Simonoff, E., Loucas, T., Chandler, S., Meldrum, D., & Pickles, A. (2007). Efficacy of three screening instruments in the identification of autistic-spectrum disorders. *The British Journal of Psychiatry*, 191(6), 554–559.  
<https://doi.org/10.1192/bjp.bp.107.040196>
- Chen, K., Lin, C., Yu, T., Huang, C., & Chen, Y. (2018). Differences between the Childhood

- Autism Rating Scale and the Social Responsiveness Scale in assessing symptoms of children with autistic spectrum disorder. *Journal of Autism and Developmental Disorders*, 48(9), 3191-3198. <http://dx.doi.org/10.1007/s10803-018-3585-y>
- Cheung, A. S., Leemaqz, S. Y., Wong John, W. P., Chew, D., Ooi, O., Pauline, C., Silberstein, N., Locke, P., Sav, Z., Grayson, R., Zajac, J. D., & Pang, K. C. (2020). Non-binary and binary gender identity in Australian trans and gender diverse individuals. *Archives of Sexual Behavior*, 49(7), 2673-2681. <https://doi.org/10.1007/s10508-020-01689-9>
- Clegg, Joshua W. (2012). Teaching about mental health and illness through the history of the DSM. *History of Psychology*, 15(4), 364–370. [10.1037/a0027249](https://doi.org/10.1037/a0027249)
- Constantino, J. N., Davis, S. A., Todd, R. D., Schindler, M. K., Gross, M. M., Brophy, S. L., Metzger, L. M., Shoushtari, C. S., Splinter, R., & Reich, W. (2003). Validation of a brief quantitative measure of autistic traits: Comparison of the Social Responsiveness Scale with the Autism Diagnostic Interview-Revised. *Journal of Autism and Developmental Disorders*, 33(4), 427-33. <http://dx.doi.org/10.1023/A:1025014929212>
- Constantino, J., & Gruber, J. (2005). *Social Responsiveness Scale (SRS) Manual*. Western Psychological Services.
- Cooper, K., Smith, L. G. E., & Russell, A. (2017). Social identity, self-esteem, and mental health in autism. *European Journal of Social Psychology*, 47(7), 844–854. <https://doi.org/10.1002/ejsp.2297>
- Cooper, R. (2018). Understanding the DSM-5: Stasis and change. *History of Psychiatry*, 29(1), 49-65. <https://doi.org/10.1177/0957154X17741783>
- Dean, M., Harwood, R., & Kasari, C. (2017). The art of camouflage: Gender differences in the

- social behaviors of girls and boys with autism spectrum disorder. *Autism*, 21(6), 678–689. <https://doi.org/10.1177/1362361316671845>
- Duvekot, J.; van der Ende, J.; Verhulst, F. C.; Slappendel, G.; van Daalen, E.; Maras, A.; Greaves-Lord, K. (2016). Factors influencing the probability of a diagnosis of autism spectrum disorder in girls versus boys. *Autism*, 21(6), 645-658. 10.1177/1362361316672178
- Edwards, T. L., Watkins, E. E., Lotfizadeh, A. D., & Poling, A. (2012). Intervention research to benefit people with autism: How old are the participants?. *Research in Autism Spectrum Disorders*, 6, 996–999. 10.1016/j.rasd.2011.11.002
- Elder, J., Kreider, C., Brasher, S., & Ansell, M. (2017). Clinical impact of early diagnosis of autism on the prognosis and parent-child relationships. *Psychology Research and Behavior Management*, 10, 283–292. 10.2147/PRBM.S117499
- Estes, A., Munson, J., Rogers, S. J., Greenson, J., Winter, J., & Dawson, G. (2015). Long-term outcomes of early intervention in 6-year-old children with autism spectrum disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, 54(7), 580–587. 10.1016/j.jaac.2015.04.005
- Estrin, G. L., Milner, V., Spain, D., Happé, F., & Colvert, E. (2021). Barriers to autism spectrum disorder diagnosis for young women and girls: A systematic review. *Review Journal of Autism Developmental Disorders*, 8(4), 454–470. <https://doi.org/10.1007/s40489-020-00225-8>
- Evans, S. C., Boan, A. D., Bradley, C., & Carpenter, L. A. (2019). Sex/gender differences in

screening for autism spectrum disorder: Implications for evidence-based assesment.  
*Journal of Clinical Child & Adolescent Psychology*, 48(6), 840-854.

10.1080/15374416.2018.1437734

Ferri, S. L., Abel, T., & Brodtkin, E. S. (2018). Sex differences in autism spectrum disorder: A review. *Current Psychiatry Reports*, 20(2). <http://dx.doi.org/10.1007/s11920-018-0874-2>

Fitzgerald, M. M. (2019). The history of autism in the first half century of the 20<sup>th</sup> century: New and revised. *Journal for ReAttach Therapy and Developmental Diversities*, 1(2), 70-77.  
<https://doi.org/10.26407/2018jrtd.1.13>

Frazier, T.W., Ratliff, K.R., Gruber, C., Zhang, Y., Law, P.A., & Constantino, J.N. (2013). Confirmatory factor analytic structure and measurement invariance of quantitative autistic traits measured by the Social Responsiveness Scale-2. *Autism*, 18, 31–44.

10.1177/1362361313500382

French, L., & Kennedy, E. M. M. (2018). Annual research review: Early intervention for infants and young children with, or at-risk of, autism spectrum disorder: A systematic review. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 59(4).  
<https://doi.org/10.1111/jcpp.12828>

Fuentes, J., Hervás, A., & Howlin, P. (2021). ESCAP practice guidance for autism: A summary of evidence-based recommendations for diagnosis and treatment. *European child & adolescent psychiatry*, 30(6), 961-984.

Gialloreti, L. E., Mazzone, L., Benvenuto, A., Fasano, A., Alcon, A. G., Kraneveld, A., Moavero, R., Raz, R., Riccio, M. P., Siracusano, M., Zachor, D. A., Marini, M., & Curatolo, P. (2019). Risk and protective environmental factors associated with autism

- spectrum disorder: evidence-based principles and recommendations. *Journal of clinical medicine*, 8(2), 217. <https://doi.org/10.3390/jcm8020217>
- Gordillo, M. L., Chu, A., & Long, K. (2020). Mothers' adjustment to autism: Exploring the roles of autism knowledge and culture. *Journal of Pediatric Psychology*, 45(8), 877–886. <https://doi.org/10.1093/jpepsy/jsaa044>
- Gould, J. (2017). Towards understanding the under-recognition of girls and women on the autism spectrum. *Sage*, 21(6), 703-705. <https://doi.org/10.1177/1362361317706174>
- Green, R. M., Travers, A. M., Yamini, H., & McDougale, C. J. (2019). Women and autism spectrum disorder: Diagnosis and implications for treatment of adolescents and adults. *Current Psychiatry Reports*, 21(4), 2-8. <http://dx.doi.org/10.1007/s11920-019-1006-3>
- Guler, J., de Vries, P. J., Seris, N., Shabalala, N., & Franz, L. (2018). The importance of context in early autism intervention: A qualitative South African study. *Autism*, 22(8), 1005–1017. <https://doi.org/10.1177/1362361317716604>
- Hampton, S., Man, J., Allison, C., Aydin, E., Baron-Cohen, S., & Hold, R. (2022). A qualitative exploration of autistic mothers' experiences II: Childbirth and postnatal experiences. *Autism*, 26(5), 1165-1175. [10.1177/13623613211043701](https://doi.org/10.1177/13623613211043701)
- Haroon, M. (2019a). An introduction to autism. In M. Haroon (Ed.), *ABC of Autism* (pp. 1-3). John Wiley & Sons.
- Haroon, M. (2019b). The assessment and diagnosis of autism in children. In M. Haroon (Ed.), *ABC of Autism* (pp. 1-3). John Wiley & Sons.
- Harris, J. (2018). Leo Kanner and autism: A 75-year perspective. *International Review of Psychiatry*, 30(1), 1-15. [10.1080/09540261.2018.1455646](https://doi.org/10.1080/09540261.2018.1455646)

- Harrison, A. J., Long, K. A., Tommet, D. C., & Jones, R. N. (2017). Examining the role of race, ethnicity, and gender on social and behavioral ratings within the autism diagnostic observation schedule. *Journal of Autism and Developmental Disorders*, 47(9), 2770-2782. <http://dx.doi.org/10.1007/s10803-017-3176-3>
- Hiller, R. M., Young, R. L., Weber, N. (2014). Sex differences in autism spectrum disorder based on DSM-5 criteria: Evidence from clinician and teacher reporting. *Journal of Abnormal Child Psychology*, 42(8), 1381-1393. [10.1007/s10802-014-9881-x](https://doi.org/10.1007/s10802-014-9881-x)
- Hull, L., Mandy, W., Lai, M., Baron-Cohen, S., Allison, C., Smith, P., & Petrides, K. V. (2019). Development and validation of the Camouflaging Autistic Traits Questionnaire (CAT-Q). *Journal of Autism and Developmental Disorders*, 49(3), 819–833 (2019). <https://doi.org/10.1007/s10803-018-3792-6>
- Hull, L., Petrides, K. V., Allison, C., Smith, P., Baron-cohen, S., Lai, M., & Mandy, W. (2017). "Putting on my best normal": Social camouflaging in adults with autism spectrum conditions. *Journal of Autism and Developmental Disorders*, 47(8), 2519-2534. <http://dx.doi.org/10.1007/s10803-017-3166-5>
- Hull, L., Petrides, K.V. & Mandy, W. (2020). The female autism phenotype and camouflaging: A narrative review. *Journal of Autism and Developmental Disorders*, 7(4), 306–317. <https://doi.org/10.1007/s40489-020-00197-9>
- Jacquemont, S., Coe, B. C., Hersch, M., Duyzend, M. H., Krumm, N., Bergmann, S., Beckmann, J. S., Rosenfeld, J. S., & Eichler, E. E. (2014). A higher mutational burden in females supports a “female protective model” in neurodevelopmental disorders. *The American Journal of Human Genetics*, 94(3), 415-425. <http://dx.doi.org/10.1016/j.ajhg.2014.02.001>
- Kalb, L. G., Singh, V., Hong, J. S., Hologue, C., Ludwig, N. N., Pfeiffer, D., Reetzke, R., Gross,

- A. L., & Landa, R. (2022). Analysis of race and sex bias in the Autism Diagnostic Observation Schedule (ADOS-2). *JAMA Network Open*, 5(4), 1-13.  
10.1001/jamanetworkopen.2022.9498
- Kendler, K. S. (2013). A history of the DSM-5 scientific review committee. *Psychological Medicine*, 43(9), 1793-800. <http://dx.doi.org/10.1017/S0033291713001578>
- Kirkovski, M., Enticott, P. G., & Fitzgerald, P. B. (2013). A review of the role of female gender in autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 43(11), 2584–2603. <https://doi.org/10.1007/s10803-013-1811-1>.
- Klusek, J., Martin, G. E., Losh, M. (2014). Consistency between research and clinical diagnoses of autism among boys and girls with fragile X syndrome. *Journal of Intellectual Disability Research*, 58(10), 940-952. <https://doi.org/10.1111/jir.12121>
- Kreiser, N. L., & White, S. W. (2014). ASD in females: Are we overrating the gender differences in diagnosis? *Clinical Child and Family Psychology Review*, 17(1), 67-84.  
10.1007/s10567-013-0148-9
- Kung K. (2020). Autistic traits, systemising, empathising, and theory of mind in transgender and non-binary adults. *Molecular autism*, 11(1), 73. <https://doi.org/10.1186/s13229-020-00378-7>
- Kuravackel, G. M., Ruble, L. A., Reese, R. J., Ables, A. P., Rodgers, A. D., & Toland, M. D. (2018). COMPASS for Hope: Evaluating the effectiveness of a parent training and support program for children with ASD. *Journal of Autism and Developmental Disorders*, 48(2), 404-416. <http://dx.doi.org/10.1007/s10803-017-3333-8>
- Lai, M. C., Baron-Cohen, S., & Buxbaum, J. D. (2015). Understanding autism in the light of sex/gender. *Molecular Autism* 6(1), 24-24. <https://doi.org/10.1186/s13229-015-0021-4>



- Lai, M. C., Lombardo, M. V., Auyeung, B., Cgakrabarti, B., & Baron-Cohen, S. (2015). Sex/gender differences and autism: Setting the scene for future research. *Journal of the American Academy of Child & Adolescent Psychiatry*, *54*(1), 11-24.  
<https://doi.org/10.1016/j.jaac.2014.10.003>
- Lai, M., Lombardo, M. V., Pasco, G., Ruigrok, A. N. V., Wheelwright, S. J., Sadek, S. A., Chakrabarti, B., Baron-Cohen, S., & MRC AIMS Consortium. (2011). A behavioral comparison of male and female adults with high functioning autism spectrum conditions. *Plos One*, *6*(6), e20835-e20835. <https://doi.org/10.1371/journal.pone.0020835>
- Lai, M. C., Lombardo, M. V., Ruigrok, A. N., Chakrabarti, B., Auyeung, B., Szatmari, P., Happé, F., & Baron-Cohen, S. (2017). Quantifying and exploring camouflaging in men and women with autism. *Autism*, *21*(6), 690–702.  
<https://doi.org/10.1177/1362361316671012>
- La Roche, M. J., Bush, H. H., & D'Angelo, E. (2018). The assessment and treatment of autism spectrum disorder: A cultural examination. *Practice Innovations*, *3*(2), 107-122.  
<http://dx.doi.org/10.1037/pri0000067>
- Landa, R. J. (2018). Efficacy of early interventions for infants and young children with, and at risk for, autism spectrum disorders. *International Review of Psychiatry*, *30*(1), 25-39.  
<https://doi.org/10.1080/09540261.2018.1432574>
- Langmann, A., Becker, J., Poustka, L., Becker, K., & Kamp-Becker, I. (2017). Diagnostic utility of the autism diagnostic observation schedule in a clinical sample of adolescents and adults. *Research in Autism Spectrum Disorders*, *34*, 34–43.  
[10.1016/j.rasd.2016.11.012](https://doi.org/10.1016/j.rasd.2016.11.012)
- Lefort-Besnard, J., Vogeley, K., Schibach, L., Varoquaux, G., Thirion, B., Dumas, G., & Bzdok,

- D. (2020). Patterns of autism symptoms: Hidden structure in the ADOS and ADI-R instruments. *Translational Psychiatry*, 10(1), 257-257. <https://doi.org/10.1038/s41398-020-00946-8>
- Lehnhardt, F., Falter, C. M., Gawronski, A., Pfeiffer, K., Tepest, R., Franklin, J., & Vogeley, K. (2016). Sex-related cognitive profile in autism spectrum disorders diagnosed late in life: Implications for the female autistic phenotype. *Journal of Autism and Developmental Disorders*, 46(1), 139-154. <http://dx.doi.org/10.1007/s10803-015-2558-7>
- Levinson, S., Neuspiel, J., Eisenhower, A., & Blacher, J. (2020). Parent–teacher disagreement on ratings of behavior problems in children with ASD: Associations with parental school involvement over time. *Journal of Autism and Developmental Disorders*, 51(6), 1966-1982. <https://doi.org/10.1007/s10803-020-04675-1>
- Lodge, K. (2019). The aetiology of autism. In M. Haroon (Ed.), *ABC of Autism* (pp. 9-11). John Wiley & Sons.
- Lonergan, R. M. (2021). Gender balance in the validation of diagnostic tools for autism: A systematic review. *European Psychiatry*, 64(S1), 599–S599. <https://doi.org/10.1192/j.eurpsy.2021.1598>
- Loomes, R., Hull L., & Mandy, W. P. L. (2017). What is the male-to-female ratio in autism spectrum disorder? A systematic review and meta-analysis. *Journal of the American Academy of Child and Adolescent Psychiatry*, 56(6), 466-474. 0.1016/j.jaac.2017.03.013
- Lord, C., Risi, S., Lambrecht, L., Cook Jr., E. H., Leventhal, B. L., DiLavore, P. C., Pickles, A., & Rutter, M. (2000). The Autism Diagnostic Observation Schedule–Generic: A standard measure of social and communication deficits associated with the spectrum of

- autism. *Journal of Autism and Developmental Disorders*, 30(3), 205-223.  
<https://doi.org/10.1023/A:1005592401947>
- Lord, C., Rutter, M., & Couteur, A. (1994). Autism Diagnostic Interview-Revised: A revised version of a diagnostic interview for caregivers of individuals with possible pervasive developmental disorders. *Journal of Autism and Developmental Disorders*, 24(5), 659–685. 10.1007/bf02172145
- Mademtzi, M., Singh, P., Shic, F., & Koenig, K. (2018). Challenges of females with autism: A parental perspective. *Journal of Autism and Developmental Disorders*, 48(4), 1301-1310.  
<http://dx.doi.org/10.1007/s10803-017-3341-8>
- Mandy, W., Clarke, K., McKenner, M., Strydom, A., Crabtree, J., Meng-Chuan Lai, Allison, C., Baron-Cohen, S., & Skuse, D. (2018). Assessing autism in adults: An evaluation of the Developmental, Dimensional and Diagnostic Interview—Adult Version (3Di-Adult). *Journal of Autism and Developmental Disorders*, 48(2), 549-560.  
<http://dx.doi.org/10.1007/s10803-017-3321-z>
- Manor-Binyamini, I. (2018). Culture-based intervention strategies for Bedouin parents of children with ASD: Identification and conceptualization. *International Journal of Special Education*, 33(2), 448-464. <https://files.eric.ed.gov/fulltext/EJ1185619.pdf>
- Manouilenko, I., & Bejerot, S. (2015). Sukhareva-prior to Asperger and Kanner. *Nordic Journal of Psychiatry*, 69(6), 479-482. <https://doi.org/10.3109/08039488.2015.1005022>
- McCarthy, M., & Wright, C. L. (2017). Convergence of sex differences and the neuroimmune system in autism spectrum disorders. *Biology Psychiatry*, 81(5), 402-410.  
<https://doi.org/10.1016%2Fj.biopsych.2016.10.004>
- McCrimmon, A.; Rostad, K. (2014). Test review: Autism Diagnostic Observation Schedule,

Second Edition (ADOS-2) manual (part II): Toddler Module. *Journal of Psychoeducational Assessment*, 32(1), 88–92. 10.1177/0734282913490916

McFayden, T. C., Albright, J., Muskett, A. E., & Scarpa, A. (2019). Brief report: Sex differences in ASD diagnosis: A brief report on restricted interests and repetitive behaviors. *Journal of Autism and Developmental Disorders*, 49(4), 1693-1699.  
<http://dx.doi.org/10.1007/s10803-018-3838-9>

Mcvey, A. J., Schiltz, H., Haendel, A., Dolan, B. K., Willar, K. S., Pleiss, S., Karst, J. S., Carson, A. M., Caiozzo, C., Vogt, E., & Van Hecke, A. V. (2017). Brief report: Does gender matter in intervention for ASD? Examining the impact of the PEERS social skills intervention on social behavior among females with ASD. *Journal of Autism and Developmental Disorders*, 47(7), 2282-2289. <http://dx.doi.org/10.1007/s10803-017-3121-5>

Milner, V., McIntosh, H., Colvert, E., & Happé, F. (2019). A qualitative exploration of the female experience of autism spectrum disorder (ASD). *Journal of Autism and Developmental Disorders*, 49(6), 2389–2402. <https://doi.org/10.1007/s10803-019-03906-4>

Moon, S. J., Hwang, J. S., Shin, A. L., Kim, J. Y., Bae, S. M., Sheehy-Knight, J., & Kim, J. W. (2019). Accuracy of the Childhood Autism Rating Scale: A systematic review and meta-analysis. *Developmental Medicine & Child Neurology*, 61(9), 1030-1038.  
<https://doi.org/10.1111/dmcn.14246>

Moulton, E., Bradbury, K., Barton, M., & Fein, D. (2019). Factor analysis of the Childhood

- Autism Rating Scale in a sample of two year olds with an autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 49(7), 2733-2746.  
<http://dx.doi.org/10.1007/s10803-016-2936-9>
- Mueller, R., & Moskowitz, L. J. (2020). Positive family intervention for children with ASD: Impact on parents' cognitions and stress. *Journal of Child and Family Studies*, 29(12), 3536-3551. <http://dx.doi.org/10.1007/s10826-020-01830-1>
- Murray, A. L., Booth, T., McKenzie, K., & Kuenssberg, R. (2016). What range of trait levels can the Autism-Spectrum Quotient (AQ) measure reliably? An item response theory analysis. *Psychological Assessment*, 28(6), 673–683. <https://doi.org/10.1037/pas0000215>
- Navarro-Pardo, E., López-Ramón, M. F., Alonso-Esteban, Y., & Alcantud-Marín, F. (2021). Diagnostic tools for autism spectrum disorders by gender: Analysis of current status and future lines. *Children*, 8(4), 262. <https://doi.org/10.3390/children8040262>
- Norris, J. E., Crane, L., & Maras, K. (2020). Interviewing autistic adults: Adaptations to support recall in police, employment, and healthcare interviews. *Autism*, 24(6), 1506-1520. <https://doi.org/10.1177/1362361320909174>
- Oh, M., Song, D. Y., Bong, G., Yoon, N. H., Kim, S. Y., Kim, J. H., Kim, J., & Yoo, H. J. (2021). Validating the Autism Diagnostic Interview-Revised in the Korean population. *Psychiatry investigation*, 18(3), 196–204.  
<https://doi.org/10.30773/pi.2020.0337>
- Ormond, S., Brownlow, C., Garnett, M. S., Rynkiewicz, A., & Attwood, T. (2018). Profiling autism symptomatology: An exploration of the Q-ASC parental report scale in capturing sex differences in autism. *Journal of Autism and Developmental Disorders*, 48(2), 389-403. <http://dx.doi.org/10.1007/s10803-017-3324-9>

- Oswald, T. M., Winter-Messiers, M. A., Gibson, B., Schmidt, A. M., Herr, C. M., & Solomon, M. (2016). Sex differences in internalizing problems during adolescence in autism spectrum disorder. *Journal of Autism and Developmental Disorders, 46*(2), 624-636. [10.1007/s10803-015-2608-1](https://doi.org/10.1007/s10803-015-2608-1)
- Park, H. S., Yi, S. Y., Yoon, S. A., & Hong, S. B. (2018). Comparison of the Autism Diagnostic Observation Schedule and Childhood Autism Rating Scale in the diagnosis of autism spectrum disorder: A preliminary study. *Journal of Child & Adolescent Psychiatry, 29*(4), 172–177. <https://doi.org/10.5765/jkacap.180015>
- Paynter, J., Trembath, D., & Lane, A. (2018). Differential outcome subgroups in children with autism spectrum disorder attending early intervention. *Journal of Intellectual Disability Research., 62*(7), 650–659. <https://doi.org/10.1111/jir.12504>
- Pecora, L. A., Hancock, G. I., Hooley, M., Demmer, D. H., Attwood, T., Mesibov, G. B., & Stokes, M. A. (2020). Gender identity, sexual orientation and adverse sexual experiences in autistic females. *Molecular Autism, 11*(1), 57. <https://doi.org/10.1186/s13229-020-00363-0>
- Pomerantz, A. (2017). Diagnostic and statistical manual of mental disorders (dsm), history of. In A. Wenzel (Ed.), *The sage encyclopedia of abnormal and clinical psychology* (Vol. 1, pp. 1089-1091). SAGE Publications, Inc. <https://www.doi.org/10.4135/9781483365817.n432>
- Posar, A., & Visconti, P. (2017). Tribute to Grunya Efimovna Sukhareva, the woman who first described infantile autism. *Journal of Pediatric Neurosciences, 12*(3), 300-301. [http://dx.doi.org/10.4103/jpn.JPN\\_46\\_17](http://dx.doi.org/10.4103/jpn.JPN_46_17)
- Public Health Agency of Canada. (2018). *Autism spectrum disorder among children and*

- youth in Canada 2018: A report of the National Autism Spectrum Disorder Surveillance System.* <https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/autism-spectrum-disorder-children-youth-canada-2018/autism-spectrum-disorder-children-youth-canada-2018.pdf>
- Rabba, A. S., Dissanayake, C., & Barbaro, J. (2019). Parents' experiences of an early autism diagnosis: Insights into their needs. *Research in Autism Spectrum Disorders, 66*, 1-11. 10.1016/j.rasd.2019.101415
- Ratto, A. B., Kenworthy, L., Yerys, B. E., Bascom, J., Wieckowski, A. T., White, S. W., Wallace, G. L., Pugliese, C., Schultz, R. T., Ollendick, T. H., Scarpa, A., Seese, S., Register-Brown, K., Martin, A., & Anthony, L. G. (2018). What about the girls? Sex-based differences in autistic traits and adaptive skills. *Journal of Autism and Developmental Disorders, 48*(5), 1698–1711. <https://doi.org/10.1007/s10803-017-3413-9>
- Rivet, T. T., & Matson, J. L. (2011). Review of gender differences in core symptomatology in autism spectrum disorders. *Research in Autism Spectrum Disorders, 5*(3), 957-976. 10.1016/j.rasd.2010.12.003
- Robinson, E. B., Lichtenstein, P., Anckarsäter, H., Happé, F., & Ronald, A. (2013). Examining and interpreting the female protective effect against autistic behavior. *Proceedings of the National Academy of Sciences of the United States of America, 110*(13), 5258–5262. <https://doi.org/10.1073/pnas.1211070110>
- Rollins, P. R., John, S., Jones, A., & De Froy, A. (2019). Pathways Early ASD Intervention as a moderator of parenting stress on parenting behaviors: A randomized control trial. *Journal of Autism and Developmental Disorders, 49*(10), 4280-4293. <http://dx.doi.org/10.1007/s10803-019-04144-4>

- Rosen, N. E., Lord, C., & Volkmar, F. R. (2021). The diagnosis of autism: from Kanner to DSM-III to DSM-5 and beyond. *Journal of Autism and Developmental Disorders*, *51*(12), 4253-4270. <https://doi.org/10.1007/s10803-021-04904-1>
- Rotholz, D. A., Kinsman, A. M., Lacy, K. K., & Charles, J. (2017). Improving early identification and intervention for children at risk for autism spectrum disorder. *Pediatrics*, *139*(2). 10.1542/peds.2016-1061
- Russell, G., Steer, C., & Golding, J. (2011). Social and demographic factors that influence the diagnosis of autistic spectrum disorders. *Social Psychiatry and Psychiatric Epidemiology*, *46*(12), 1283–1293. <https://doi.org/10.1007/s00127-010-0294-z>.
- Rutherford, M., McKenzie, K., Johnson, T., Catchpole, C., O’Hare, A., McClure, I., Forsyth, K., McCartney, D., & Murray, A. (2016). Gender ratio in a clinical population sample, age of diagnosis and duration of assessment in children and adults with autism spectrum disorder. *Autism: The International Journal of Research and Practice*, *20*(5), 628-634. <https://doi.org/10.1177/1362361315617879>.
- Rutter, M., & Lord, C. (2003). *Autism diagnostic interview revised manual*. Western Psychological Services.
- Rynkiewicz, A., Schuller, B., Marchi, E., Piana, S., Camurri, A., Lassalle, A., & Baron-Cohen, S. (2016). An investigation of the ‘female camouflage effect’ in autism using a computerized ADOS-2 and a test of sex/gender differences. *Molecular Autism* *7*(10), 1-8. <https://doi.org/10.1186/s13229-016-0073-0>
- Schopler, E., Reichler, R. J., DeVellis, R. F., & Daly, K. (1980). Toward objective classification of childhood autism: Childhood Autism Rating Scale (CARS). *Journal of Autism and Developmental Disorders*, *10*(1), 91–103. 10.1007/bf02408436



- Schuch J., Mariath L., Roman T., Schuler-Faccini L. (2015). The Genetic Basis of Autism Spectrum Disorder. In: M. Robinson-Agramonte (Ed.), *Translational approaches to autism spectrum disorder*. Springer.
- Schudson, Z. C., Beischel, W. J., & van Anders, S. M. (2019). Individual variation in gender/sex category definitions. *Psychology of Sexual Orientation and Gender Diversity*, 6(4), 448-460. <https://doi.org/10.1037/sgd0000346>
- Sedgewick, F., Hill, V., & Pellicano, E. (2018). “It’s different for girls: Gender differences in the friendships and conflict of autistic and neurotypical adolescents. *Autism*, 23(5), 1119-1132. [10.1177/1362361318794930](https://doi.org/10.1177/1362361318794930)
- Shuffrey, L., Guter, S., Delaney, S., Jacob, S., Anderson, G., Sutcliffe, J., et al. (2017). Is there sexual dimorphism of hyperserotonemia in autism spectrum disorder? *Autism Research*, 10(8), 1417–1423. <https://doi.org/10.1002/aur.1791>.
- Solomon, M., Miller, M., Taylor, S.L., Hinshaw, S. P., & Carter, C. S. (2012). Autism symptoms and internalizing psychopathology in girls and boys with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 42(1), 48–59. <https://doi.org/10.1007/s10803-011-1215-z>
- Statistics Canada. (2022). *Canada is the first country to provide census data on transgender and non-binary people*. <https://www150.statcan.gc.ca/n1/en/daily-quotidien/220427/dq220427b-eng.pdf?st=CgjeOryJ>
- Sturm, Alexandra; Kuhfeld, Megan; Kasari, Connie; McCracken, James T. (2017). Development and validation of an item response theory-based Social Responsiveness Scale short form. *Journal of Child Psychology and Psychiatry*, 58(9), 1053-1061. [10.1111/jcpp.12731](https://doi.org/10.1111/jcpp.12731)
- Sultana, Z., Uddin, S. N., & Ahmed, A. (2017). Role of environmental and genetic factors in

- autism spectrum disorder. *Bangabandhu Sheikh Mujib Medical University Journal.*, 10(2), 76-83. <https://doi.org/10.3329/bsmmuj.v10i2.32385>
- Talcer, M.C., Duffy, O. & Pedlow, K. A qualitative exploration into the sensory experiences of autistic mothers. (2021). *Journal of Autism and Developmental Disorders.* <https://doi.org/10.1007/s10803-021-05188-1>
- Tick, B., Bolton, P., Happé, F., Rutter, M., & Rijdsdijk, F. (2016). Heritability of autism spectrum disorders: A meta-analysis of twin studies. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 57(5), 585–595. <https://doi.org/10.1111/jcpp.12499>
- Tierney, S., & Burns, J. (2017). Behind the mask: The experience of assessment, diagnosis, and living with autism for girls and young women. In M. J. Legato (Ed.), *Principles of gender-specific medicine* (3rd Ed., pp. 203-217). Elsevier Academic Press.
- Tierney, S., Burns, J., & Kilbey, E. (2016). Looking behind the mask: Social coping strategies of girls on the autistic spectrum. *Research in Autism Spectrum Disorders*, 23, 73–83. <https://doi.org/10.1016/j.rasd.2015.11.013>
- Tsou, J. Y. (2016). Natural kinds, psychiatric classification and the history of the DSM. *History of Psychiatry*, 27(4), 406–424. <https://doi.org/10.1177/0957154X16656580>
- Van Rosmalen, L., Van der Veer, R., & C. P. van der Horst, F. (2020). The nature of love: Harlow, Bowlby and Bettelheim on affectionless mothers. *History of Psychiatry*, 31(2), 227-231. <https://doi.org/10.1177/0957154X19898997>
- Vivanti, G., & Dissanayake, C. (2016). Outcome for children receiving the Early Start Denver Model before and after 48 months. *Journal of Autism and Developmental Disorders*, 46(7), 2441–2449. [10.1007/s10803-016-2777-6](https://doi.org/10.1007/s10803-016-2777-6)
- Vivanti, G., Kasari, C., Green, J., Mandell, D., Maye, M., & Hudry, K. (2017). Implementing

and evaluating early intervention for children with autism: Where are the gaps and what should we do? *International Society for Autism Research*, 11(1), 17-23.

10.1002/aur.1900

Watkins, E. E., Zimmermann, Z. J., & Poling, A. (2014). The gender of participants in published research involving people with autism spectrum disorders. *Research in Autism Spectrum Disorders*, 8(2), 143–146. 10.1016/j.rasd.2013.10.010

Watson, R. (2015). Quantitative research. *Nursing Standard*, 29(31), 44.

<http://dx.doi.org/10.7748/ns.29.31.44.e8681>

Weiss, J. A., & Fardella, M. A. (2018). Victimization and perpetration experiences of adults with autism. *Frontiers in Psychiatry*, 9, 203. <https://doi.org/10.3389/fpsy.2018.00203>

Welchons, L. W., & McIntyre, L. L. (2017). The transition to kindergarten: Predicting socio-behavioral outcomes for children with and without disabilities. *Early Childhood Education Journal*, 45(1), 83–93. <https://doi.org/10.1007/s10643-015-0757-7>.

Werling D., Parikshak N., Geschwind D. (2016). Gene expression in human brain implicates sexually dimorphic pathways in autism spectrum disorders. *Nature Communications*, 7(1), 10717-10717. <https://doi.org/10.1038/ncomms10717>

Whiston, S. C. (2017). *Principles and applications of assessment in counseling* (5th Ed.).

Cengage.

Willey, L. H. (2012). *Safety skills for Asperger women*. Jessica Kingsley Publishers

Woodbury-Smith, M., & Scherer, S. W. (2018) Progress in the genetics of autism spectrum disorder. *Developmental Medicine & Child Neurology*, 60(5), 445-451.

10.1111/dmcn.13717

Wodka, E. L., Parish-Morris, J., Annett, R. D., Carpenter, L., Dillon, E., Michaelson, J., Kim,

- S.H., Landa, R.J., the Spark Consortium & Kanne, S. (2022). Co-occurring attention-deficit/hyperactivity disorder and anxiety disorders differentially affect males and females with autism. *The Clinical Neuropsychologist*, 36(5), 1069-1093. 1-25. <https://doi.org/10.1080/13854046.2021.1942554>
- World Health Organization. (2010). *International statistical classification of diseases and related health problems*, 10<sup>th</sup> Revision (vol. 2).  
[https://icd.who.int/browse10/Content/statichtml/ICD10Volume2\\_en\\_2010.pdf](https://icd.who.int/browse10/Content/statichtml/ICD10Volume2_en_2010.pdf)
- Wright, B., Phillips, H., Allgar, V., Sweetman, J., Hodkinson, R., Hayward, E., Ralph-Lewis, A., Teige, C., Bland, M., & Le Couteur, A. (2022). Adapting and validating the Autism Diagnostic Interview - Revised for use with deaf children and young people. *Autism*, 26(2), 446-459. <https://doi.org/10.1177/13623613211029116>
- Yoon, S. H., Choi, J., Lee, W. J., & Do, J. T. (2020). Genetic and epigenetic etiology underlying autism spectrum disorder. *Journal of Clinical Medicine*, 9(4), 966.  
<https://doi.org/10.3390/jcm9040966>
- Young H., Oreve, M.J., & Speranza, M. (2018). Clinical characteristics and problems diagnosing autism spectrum disorder in girls. *Archives de Pediatrie*, 25(6), 399-403.  
10.1016/j.arcped.2018.06.008.
- Zener, D. (2019). Journey to diagnosis for women with autism. *Advances in Autism*, 5(1), 2-13.  
10.1108/AIA-10-2018-0041
- Zhang, Y., Li, N., Li, C., Zhang, Z., Teng, H., Wang, Y., Zhao, T., Shi, L., Zhang, K., Xia, K., Li, J., & Sun, Z. (2020). Genetic evidence of gender difference in autism spectrum disorder supports the female-protective effect. *Translational Psychiatry*, 10(4), 1-10.  
<https://dx.doi.org/10.1038%2Fs41398-020-0699-8>