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Gender Differences in Autism Spectrum Disorder

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GENDER DIFFERENCES IN AUTISM SPECTRUM DISORDER

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GENDER DIFFERENCES IN AUTISM SPECTRUM DISORDER

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Abstract

Autism spectrum disorder (ASD) is characterized by a developmental disorder with multiple variations of severity which are characterized by the difficulties in communication, social interactions, and restricted or repetitive patterns of behavior. In the United States 1 in every 36 (2.3%) children over eight years has an autism spectrum disorder (ASD). Male students are diagnosed more frequently than their female counterparts. Evidence suggests that 1 in 27 males were identified with autism whereas 1 in 116 females were identified with autism. Males are four times more likely to be diagnosed with autism than females. Recent diagnostic criteria indicated that genetics were involved in almost all of the reported cases of autism spectrum disorder (ASD). ASD affects all ethic and socioeconomic groups. This literature review explores gender differences in ASD along with, indicators of autism, diagnosis, camouflaging, social and emotional behaviors, and communication.

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Chapter 1: Introduction

The Center of Disease Control (CDC), 2022 defines autism spectrum disorder as a developmental disability caused by differences in the brain (CDC, 2022). The CDC reported that one and every 36 children have been diagnosed on the autism spectrum (ASD). The CDC also reported that males are four times more likely than females to receive an ASD diagnosis. ASD refers to a broad range of conditions characterized by social skill challenges, restrictive and repetitive behaviors, and communication differences. According to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-V), 2019) criteria, males and females with autism have deficits in communication and restricted and repetitive behaviors. A diagnosis of ASD includes several conditions that used to be considered separately including autistic disorder, pervasive developmental disorder- not otherwise specified (PDD-NOS), and Asperger's syndrome (CDC. gov., 2020). Affected individuals range from high-functioning to being non-verbal. Severely cognitively and behaviorally challenged individuals are also included. Autism occurs among people of all races and socioeconomic status. Autism is a significant health concern in society. The cause in unknown but environmental and genetic factors have been stated in the research. While genetic links have been documented, environmental factors need to be further studied and carefully considered. It is important and essential that researchers determine the etiology to protect all children. Many autism subtypes are influenced by a combination of genetic and environmental factors. Everyone diagnosed with ASD has a unique set of strengths and challenges. People diagnosed with ASD demonstrate learning and thinking skills and abilities which range from highly skilled to severely challenged (Autism Speaks, 2021).

Both male and females diagnosed with ASD show social communication and interaction impairment, behavior repetition, or intellectual disability ranging from high to severely low. Along with these symptoms psychiatric and neurological disorders are often comorbid conditions for people with ASD. Psychiatric disorders include attention deficit hyperactivity disorder (ADHD), anxiety, depression, and epilepsy. Researchers believe early intervention for children with autism can help to ease some of the more common problems including communication difficulties and behavior repetition (Lord et al., 2018).

Many studies reported the impact of anxiety symptoms. Anxiety has been cited as a comorbid diagnosis of ASD. The Anxiety and Depression Association of America concluded that 40% of individuals with diagnosed ASD have clinically elevated levels of anxiety and one other diagnosed anxiety disorder. This varies significantly with the worldwide reported average at 3.8% considering that the 40% of reported individuals with ASD in the US are included in the worldwide average (Lord et al., 2018).

Loomes et al. (2017) noted a rise in children, particularly females, diagnosed with autism. Loomes et al. (2017) also stated that one possibility for the increased rates was because the DSM-V was updated in 2013 with new ASD diagnostic criteria that may not have accounted for females in the past. Some researchers have suggested that there could be a genetic component within the female brain that protects them. Researchers have also suggested that there may be a diagnostic bias and a variation in presentation for females that resulted in not receiving a diagnosis (Loomes et al., 2017). Loomes et al. (2017) wanted to determine the most accurate ratio of ASD found in females because little research had been done determining the most accurate ratio. The most current research suggested that there was a diagnostic bias against females with ASD because females were likely to camouflage, or mask their autism symptoms. Researchers found that females were also less likely to exhibit restrictive and repetitive behaviors which decreased the likelihood that they received an early autism diagnosis. Researchers have also found these characteristics contributed to diagnostic bias among professionals including doctors, psychologist, and therapists. The bias held the belief that stereotypical autism was a disorder found in males which led to decreased sensitivity in diagnosing females, even if females presented more severe symptoms. (Loomes et al., 2017).

The Individuals with Disabilities Educational Act (IDEA, 2004) defined special education as the segment of a student population who received specialized services within a school day. The main purpose of special education was to provide all students with equal educational experiences. IDEA also enacted that all students regardless of their disability were entitled to a free and appropriate public-school education (FAPE). This meant that all students would receive services needed to make education equal to peers. Students who received special education services did so under a wide range of disability categories.

I have worked in a federal setting three high school special education program for the past three years; however, this is my first year working in an autism classroom. I work with students who have moderate to severe autism. This experience has allowed me to gain a better understanding of a of the daily challenges experienced by children with ASD. I consider myself new to the world of autism, but I have been a para- professional in the room for eight years prior, so I have experience working in all the special education disability areas. During my years working in a public high school, I have interacted with several challenging students. I have witnessed some of the overwhelming impacts these challenges have on teachers and support staff. The staff at my school have also experienced tremendous amounts of stress due to staffing shortages, the intense needs required of our students including communication barriers, emotional behaviors, and physically aggressive behaviors that accompany their autism. This year the autism program has 11 students, but is expected to grow to 19 next year. Each year the number of students continues to climb. The numbers are growing larger than expected throughout the district. Currently, I have of class 11 of which eight of the are three are females. The males in the class range in abilities while females are primarily low-functioning. The females are more violent and all require 1:1 support staff. The majority of the males are nonverbal and use a lot of repetitive behaviors. There is also a lot of self-stimming from both males and females in the class. Self-stimming is unique to each learner. Stimming is a calming technique used by autistic people when they are feeling anxious. It may be rocking, hand flapping or pacing. I have found the females in my class tended to stim more frequently than their male counterparts.

I have never imagined that I was going to be a teacher, let alone a special education teacher in an autism classroom. Working with special ed students has been challenging, but yet one of the most satisfying things I have ever done. Previous to teaching I was a para-professional, but mainly worked in a classroom with cognitively disabled students. I have been exposed to autistic students but it was limited some years due to class sizes. Autism is a new area of interest for me considering I have just started working with this population. I am fascinated regarding the huge differences presented by males and females. I knew that males were diagnosed at higher rates than females, however, I didn’t know why until I started to work closely with autistic students. Working with autistic students always challenges me. I have learned to “go with the flow” with the students. Some days are all about challenges while others are so smooth with no incidents. Every day presents its own set of rewards and challenges with the students. When the students are “off” the days are hard, but then they are “on”, the days are easy. The biggest challenge is learning the quirks of each student, learning how much processing time it takes for each student, their sensory perceptions, and social deficits. However, the rewards outweigh the challenges.

Autism and understanding gender differences is something that I would like to explore through research. Learning about gender differences highlighting females is the focus of this research. I plan to take a deeper look into other related to topics of ASD such as social/emotional functioning, communication, parent reports of behavior and camouflaging.

How Gender Differences impact the functioning of people with Autism Spectrum Disorder; the female experience is the guiding question for this thesis literature review.

Chapter II: Literature Review

Literature Search Procedures

To find the most current relevant information about Autism Spectrum Disorder (ASD) for this thesis, searches were conducted that included education journals such as Academic Search Premiere, EBSCO Host MegaFILE and ERIC. Research gate conducted for such studies included published and studies relevant to the topic from 1998-2022. The keywords used to obtain information from the searches included “diagnosis of autism spectrum disorder”, “communication”, “gender differences between males and females”, “camouflaging”, “behavior”, and “social emotional for ASD”. This thesis will review the literature about the differences between males and females diagnosed with autism spectrum disorder with an emphasis on the female role.

Gender Differences Between Male and Female

Tubío-Fungueiriño et al. (2021) sought to find a more accurate measure of the differences among male and female students with autism spectrum disorder (ASD). Their findings indicated that a number of relevant considerations were important when evaluating gender differences using ASD assessments. According to the Autism Diagnostic Observation Schedule (ADOS) (Lord et al., 2018), standardization samples for ASD instruments consist predominately of males, with a sex ratio of approximately 3:1. Autism disorder rates with profound pronounced gender differences, suggested that there may have been a lapse in the current research when addressing the validity of the diagnostic criteria by gender. Bell, Foster,

& Mash, 2005; Rutter et al. (2003) noted that symptom criteria or assessment items may result in bias and more typically favor one gender over the other, thus, raising the issue of whether separate criteria, content, or requirements, different norms, or cutoff scores based on gender were appropriate for the study (as cited in Tubío-Fungueiriño et al. 2021). Koenig & Tsatsanis, 2005; Matson & Minshawi, (2007) noted that the results of the ASD assessment should be taken into careful consideration and should address gender, age, and cognitive/adaptive level, as opposed to only comparing females to typically developing males or males with ASD.

According to the most recent data from the Center of Disease Control and Prevention 1:38 boys as opposed to 1:152 girls were diagnosed with ASD by the age of eight. Baio et al., (2018). The same data also revealed that the average prevalence of males to females with a an ASD diagnosis is 4:1, indicating there is a higher proportion of males with an average to above average IQ as compared to females counterparts. Given the gender imbalance there is a distinct possibility that the stereotypical presentation of ASD may biased toward males. Low et al. (2020) stated that females with diagnosed ASD may need to exhibit a greater number of intense symptoms to receive a diagnosis given that many diagnostic tools were originally tested with male participants. Females with ASD have been noted to engage in “camouflaging” (i.e., masking their autistic symptoms more than males.

VeryWell Health researched the differences among boys and girls with diagnosed ASD. Girls with ASD most often exhibited acceptable behavior, if not ideal behavior. Behavior in boys was not ideal. The boys exhibited behavior that was sporadic and impulsive. Girls with ASD appeared to be more passive and dependent on others, whereas boys appeared to be more withdrawn, uninvolved and depressed. Boys with diagnosed ASD exhibited more repetitive behavior and tended to limit the area of play most preferred. Whereas, females were the opposite. Females presented with fewer repetitive behaviors and had broader areas of preferred play. Another major difference among boys and girls with ASD was that girls were more likely than boys to suffer higher rates of anxiety and depression. Participants for this study included 150 children (106 male, 44 female). The children were divided into three groups by the age they received an initial ASD assessment 11 years, 2 years, and 3 years. Only some of the 150 participants received a follow-up assessment at the age four. The average age of the mothers was 34 years and 38 years for fathers. The subjects were assessed using the following: Social Attention and Communication Surveillance-Revised (SACS-R), Autism Diagnostic Observation Schedule–Second edition, Toddler module (ADOS-2 Toddler), a parent interview. A norm-referenced developmental assessment tool was used to screen for developmental and/or language delays. The results of the diagnostic assessments indicated that there were no notable differences in social attention and communication behaviors, as measured by the SACS-R when comparing ASD-diagnosed males and females between one and three years old (Cage et al., 2019).

The studies unveiled an emergence of cross-sectional research focused on gender differences in people diagnosed with ASD. Mandy et al. (2011); Rivet and Matson (2011); and Solomon et al. (2011) noted historic findings that males were diagnosed more frequently than females with average gender ratios of 4.3 males to one female (as cited in Mandy et al. 2011; Rivet and Matson 2011; Solomon et al., 2011).

Most recent gender studies into ASD investigated differences considering the most common autistic symptoms. ASD diagnosis rely on observable behaviors in three common areas which include: communication differences such as stereotyped speech; social deficits including a lack of emotional reciprocity; and patterns of rigid and repetitive behaviors such as stereotyped motor mannerisms (APA, 2000). Studies have also shown that these symptoms may be more severe when combined with intellectual disability (Matson et al., 2009) and may change across areas of development (Seltzer et al., 2003). However, these factors require much consideration when examining the gender differences. Solomon et al. (2011) found an increase in the type and number of studies examining females diagnosed with ASD. Few longitudinal studies tackled gender differences, more specifically in those who had a diagnosis of high-functioning ASD. Two studies examined elementary school-aged high-functioning females and males with ASD from a standard baseline and again one year later to compare the gender differences in symptom trajectories and behavior problems. The data concluded that males and females with ASD were similar after one year of development. The report included parent-reported autistic symptoms, inattention, aggression/defiant behavior, learning problems, peer relationships, executive functioning, and overall levels of anxiety. It was also noted that males were reported to have greater levels of hyperactivity while females had more symptoms of social phobia (Matson et al., 2009). Earlier studies completed were limited to high-functioning children; both male and female, and found few differences. An early cross-sectional study showed females had fewer social difficulties during prepuberty, but had poorer social functioning post puberty (McLennan et al., 1998).

The most current clinical research observations have suggested that autistic females, compared to males, outwardly exhibited milder social-communication impairment (Schuck et al., 2019). At the same time, females diagnosed with ASD self-reported higher level of ASD symptoms (Schuck et al., 2019). A discrepancy was noted between outward social performance and internal perception. Multiple studies suggested that females with ASD were more likely to engage in social camouflaging strategies as a means to mask ASD, which may be seen to cause stress during social performance and contribute to a heightened internal awareness of self-other social discrepancies. While examining the sex/gender differences in people with ASD, and more importantly the female presentation, it has appeared crucial to use a combination of measures to evaluate the internal and external social experiences and performance of females versus males (Schuck et al., 2019, Hull et al., 2017, 2020; Lai et al., 2017). It has also been documented that females with ASD exhibited greater interest and enjoyment from friendships with their peers (Schuck et al., 2019).

Females with a current clinical diagnosis of autism spectrum disorder were more likely than males to be underrepresented at the higher ends of the IQ scale (Schuck et al., 2019). Females with an ASD diagnosis and with a documented IQ score within the average range showed increased functional social behavior as compared to males of the same age also diagnosed with ASD. Females with ASD exhibited fewer repetitive behaviors compared to males (Schuck et al., 2019). One of many researchers pointed out that the current quality of repetitive behaviors may be different from repetitive behaviors displayed when the child was younger. Other interactions considered repetitive behaviors were undetected (Schuck et al., 2019). Several researchers found that females demonstrated lifelong sensory symptoms with fewer socio-communication difficulties than their male counterparts. Furthermore, researchers have suggested that autistic females compared to males were more capable of demonstrating special interests that appeared to be less unusual, thus undetected, while focusing on topics similar to those of their neurotypical peers such as repeating a question back to the presenter before answering the question (Schuck et al., 2019).

Diagnosis

The Journal of Child Psychology stated that “Autism Spectrum Disorder (ASD) is an early onset neurodevelopmental disorder in which the first signs generally emerge at approximately 12 months of age but its diagnosis is feasible only from the age of 18 months”. According to the literature, the average age of diagnosis ranges from 2.7 to 7.2 years, which raised the question about which factors were associated with early diagnosis as a condition for early intervention (Fombonne et al., 2018).

Diagnosing a person with an autism spectrum disorder is a challenging and time-consuming task that includes a high level of clinical expertise and experience with people who have an autism spectrum disorder. To diagnose someone with ASD, the examiner must collect information from a combination of behavioral observations and interviews from the parents, the patient, and other caregivers (May et al., 2012). According to researchers' additional clinical information is needed to obtain a correct ASD diagnosis including any co-occurring disorders or other differential diagnoses, cognitive ability scores, and neuropsychological information. Lord et al. (2020) noted that evidence- based formal observations are needed for an accurate diagnosis. The Autism Diagnostic Observation Schedule (ADOS) is considered the "gold standard". The ADOS is an observation scale typically used to assess the behaviors of subjects who have signs of an ASD. The scale uses appropriate age-adapted modules that address all areas of autism and can reliably evaluate children from young toddlers to young adults. The scale provides a cutoff score for subjects who likely have an ASD diagnosis. Direct observations are structured with social interactive encounters that are important not only to discover ASD-specific symptomatology, but also to consider co-occurring disorders, as a part of a differential diagnosis for ASD (Lord et al., 2012).

Fombonne et al. (2018) discussed assessing a child for ASD by outlining a two-step process. The first step is conducted by a pediatrician. According to researchers, the pediatrician is the first examiner of ASD for the child. Children are generally evaluated by pediatricians between the ages of 18- 24 months to ensure the child are meeting milestones. It is recommended that children a see their pediatrician at two weeks, one month and every three months until twenty- four months, three years, and then every year until age five. These well-child visits are done even if there is no suspicion that anything is wrong. Pediatricians are responsible for screening children for ASD during well-child visits beginning at six months. During the visit, the pediatrician will talk to the child and make observations. The doctor will also obtain family history by interviewing the parent. i.e., Is there anyone in the family with diagnosed ASD? Lastly, they ask questions about the child's development and behavior. ASD questions focus on unusual or repetitive behaviors, trouble making eye contact with others when spoken to or talking to someone else, social interactions including family members and strangers, responding to bids for attention, having a "flat" tone of voice when speaking, ability to read the actions of others, sleeping concerns, frequency of becoming upset quickly. Fombonne et al. 2018 noted that the second step in an ASD diagnosis was to have the child evaluated by specialists including a child psychologist, occupational therapist, speech language pathologist and neurologist, in some cases. The evaluators collect information including cognitive levels, language ability, and adaptive skills like eating, dressing, and using the bathroom (Fombonne et al., 2018). To receive an official ASD diagnosis, the child must meet criteria stated in the standards of the Diagnostic and Statistical Manual of Mental Health Disorders (DSM-5). According to the DSM-5 diagnostic criteria for ASD, a child must have persistent deficits in three areas of social communication and interaction plus at least two of four types of restricted, repetitive behaviors. The three social communication categories are social interactions, developing and maintaining relationships, and communication. The restrictive and repetitive behaviors needed to meet the DSM-5 criteria for autism include nonverbal communicative behaviors used for social interaction, ranging from poorly integrated verbal and nonverbal communication to abnormalities with eye contact and body language, or deficits in understanding and use of gestures, or a total lack of facial expressions and nonverbal communication. The second is stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases). Next, highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests). Lastly, hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of the environment are observed (e.g., apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement) (Klin et al., 2000).

Different factors play a role in diagnosing an individual with an autism spectrum disorder including genetic, environmental, and biological. Researchers are unaware of the causes of ASD. It is believed that having a sibling who has been diagnosed with ASD increases a child's risk. Certain chromosomal condition such as Fragile X or other genetic factors may also be a contributor (CDC, 2022). Being born to older parents or experiencing problems while giving birth to a child is believed by some to contribute to developing ASD (CDC, 2022).

The CDC is in the process of conducting the largest study to date in the United States targeting the cause and potential cures for ASD. The focus of this study is to look for risk factors and known behaviors in individuals diagnosed with ASD. The CDC concluded in a follow- up study of older children enrolled in the Study to Explore Early Development (SEED) study that developmental disabilities were present. The follow- up was one of the largest U.S. studies to date on ASD (CDC, 2022). The purpose of the study was to determine the health and functional needs of individuals diagnosed with ASD to determine if there were other developmental disabilities that emerged as the individual matured (CDC, 2022). SEED actively looked for children with ASD and compared them to children in two other groups. These groups included children with other developmental delays or disabilities who received special education or health services, and children from the general population. All children were between two–five years old when they enrolled in SEED. The children with other developmental delays or disabilities and those from the general population were compared to children with ASD to see how they differed from one another. During the study, parents answered questions family medical history, including the health of mothers before, during, and after pregnancy. They completed questionnaires about their child's behavior and development. Families were also asked to let SEED summarize information from mother and child medical records, including past diagnoses and medications prescribed by a doctor. Children underwent physical and developmental examinations by trained study clinicians. Finally, each parent and child was asked to give a small sample of saliva or blood. The study has not been concluded, so the results are pending.

Historically males have been diagnosed with ASD more frequently than females. With current research and the realization that diagnostic tools and clinical assessment protocols are focused on male behavior, females continue to be diagnosed at lower rates than their male counterparts (as cited in Cheslack-Postava et al., 2012; Jordan-Young et al., 2012). One of the most consistent findings in the literature that related to investigating autism and its observed occurrences noted that autism occurred four and a half times more often in males than in females (Cheslack-Postava et al. 2012). There is now an emerging awareness and documentation that autism manifests in females and it is believed to do so more subtly (Cheslack-Postava et al., 2012). Researchers continue to question the epidemiology, prevalence, and presentation of autism among the sexes (Anderson et al., 2013). There is a growing clinical recognition that the ASD may be more common among females than previously accepted or expected by researchers. International researchers have begun to investigate emerging ideas about the female presentation of autism (Zwaigenbaum et al., 2012). The clinical perspectives found sex differences in patterns of people with diagnosed autism behavior; more broadly identifying the perceived socially acceptable presentation in females compared to males. It is believed that acceptable behavior contributes to females being overlooked in diagnostic settings (Lai et al., 2015). Zwaigenbaum et al. (2012) identified differences in behavioral characteristics. However, the research conducted to date did not to define or provide a systematic understanding of the female presentation and diagnosis of ASD.

Anderson et al. (2013) sought to identify gender differences in associated features of young children diagnosed with ASD. This was done through investigating the parent concerns of the child’s development. The research specifically aimed to gather parent perspective on the following: whether females used social strategies and how it affected their social presentation with peers, how pre-diagnosis concerns for the child were responded to by professionals, and comparing the types of circumscribed interests observed in male and female children. For this study, participants were required to have an ASD diagnosis with no documented intellectual disability. They must have had been diagnosed with ASD by age five. Of 150 participants in the study, 60 were female (39.5%) and 92 were males (60.5%). Parents completed a survey addressing pre-diagnostic concerns targeting early development. The survey included severity rating characteristics based on the Diagnostic and Statistical Manual (DSM-5). Parents also completed a questionnaire to gather demographic information, development, and diagnosis history. The survey questions asked were based on standardized ASD diagnostic instruments used to identify the early signs of ASD. This included sensory issues, difficulty with changes in routine, and lack of emotional recognition (Anderson et al., 2013). Results from the data indicated gender differences existed regarding the early parent concerns, social behaviors, interests, and social strategies. The data results suggested that females with an ASD diagnosis presented differently compared to males.

Camouflaging

Camouflaging is behavioral trait in females diagnosed with ASD in which the individual with autism masks or hides the ASD symptoms during social situations with others. Hull et al. (2020) wanted to determine the effect camouflaging had on gender difference related to autism. The researcher collected observational data along with IQ testing using the Wechsler Abbreviated Scale of Intelligence (WAIS) and applied a discrepancy analysis. Social reciprocity was measured using the Interactive Drawing Test (Wood-Downie et al., 2021). According to this experiment the subjects IQ scored were reported to be above 80 and social reciprocity was more prevalent in females with autism compared to males with autism. The data indicated that females with autism tended to show more camouflaging behaviors than males (Wood-Downie et al., 2020). Based on the results of the Autistic Traits Questionnaire, females diagnosed with ASD used greater camouflaging than males diagnosed with autism (Hull et al., 2020).

It was believed that for females, increased camouflaging may be due to social expectations placed on them by society. Hull et al. (2019) noted that females were believed to face more social pressure but tended to hide their autistic traits to satisfy social expectations based on their gender role. Females with autism reported feelings of loneliness and isolation which was believed to be a direct result of bullying (Cook et al., 2018). Females may also have developed camouflaging to fit into social environments with their peers (Schuck et al., 2019). Females had a greater tendency to camouflage their symptoms (Tubío-Fungueiriño et al., 2021).

Females diagnosed with high- functioning ASD are known to be better at camouflaging compared to their male counterparts. To date there is not enough published information about camouflaging to understand why it is used more often by females. Lehhardt et al. (2015) hypothesized that females with ASD exhibited very different cognitive abilities and strategies that were believed to put socio-communication above intellectual functioning (Lenhhardt et al., 2015).

Tubío-Fungueiriño et al. (2021) systematically reviewed known evidence about the camouflaging effects for females with diagnosed ASD and the most productive ways to inform parents, other health providers, and professionals about the way autism currently manifested in females. Tubío-Fungueiriño et al. (2021) first defined camouflaging as a “complex copying behavior or masking some type of personality trait that may be an adaptive function in which it would promote some adjustments to the persons environment demands”.

Camouflaging was defined aa a coping mechanism used when trying to meet social expectations with others. This coping mechanism was primarily used by females with and without ASD when they experienced increased social pressure. When autistics felt pressured socially, they tended to increase camouflaging behaviors as a way to mask their true feelings of anxiety and stress related to social rejection by their peers in social settings.

High-functioning females who camouflaged were diagnosed with autism later in life. Late diagnoses may cause feelings of depression, anxiety, low self-esteem, self-harm, loss of self-identity causing self-harm. People who learned to camouflage autism symptoms were also adept at camouflaging their emotional feelings (Tubío-Fungueiriño et al., 2021). Camouflaging studies in the last decade found that females were more likely than males to camouflage because of their desire for peer friendships. Hull et al. (2020) found that females with ASD had a hard time recognizing social friendship rules and complying with gender expectations. Camouflaging helped them incorporate non-verbal communication signals.

Research has shown that long-term camouflaging symptoms may have lasting consequences related to self-esteem for females (Hull at el., 2020). Studies found that the majority of females with ASD who camouflaged their symptoms tended to see themselves as impostors instead of someone who used adaptive mechanisms to respond to social contexts (Hull et al., 2017). Researchers suggested that camouflaging tended to be related to high anxiety and depressive symptoms (as cited in Tierney et al. 2016; Cook et al. 2018; Hull et al. 2017; Lai et al. 2017; Cage and Troxell-Whitman 2019; Schuck et al. 2019). Even though the negative camouflaging symptoms occurred for both males and females, evidence suggested that males with diagnosed autism reported depressive symptoms, in contrast with females (Schuck et al., 2019). Researchers believed this may have been to the fact that females with ASD tended to feel more negative emotions than males. Females were also able to camouflage their negative mood and did not report the presence of depressive symptoms (Schuck et al., 2019). The majority of studies reviewed found positive correlation between anxiety and camouflaging (Tierney et al. 2016; Cook et al. 2018; Hull et al. 2017; Lai et al. 2017; Cage and Troxell-Whitman 2019), whereas one study connected did not find any relationships (Schuck et al. 2019). Camouflaging tended to be connected with increased negative internal consequences in individuals who camouflaged their symptoms in several situations. Some subjects identified were known as “switchers”. Switchers were individuals who used greater camouflaging behaviors in specific situations compared to low camouflagers. Low camouflagers were considered individuals who camouflaged their symptoms only in a few situations (Cage and Troxell-Whitman, 2019). Females with ASD who presented without typical ASD symptoms were confronted with more difficulties as compared to males with ASD (Cage and Troxell-Whitman, 2019). Studies indicated that female camouflaging behaviors may come with significant problems related to care and related health services (Cage and Troxell-Whitman, 2019), and/or employment (Baldwin and Costley 2016), given that all of these problems required intervention that was not provided because females did not manifest the typical ASD phenotype.

Researchers believed that females with ASD showed distinctive differences in other core areas indicating language or executive functions and they may present distinct ASD patterns of brain activation in the prefrontal cortex and in brain morphology (Leblanc et al., 2016). Regarding the cognitive phenotype, Leblanc et al. (2016) noted that males with ASD scored higher in tasks which included assessing verbal expression. Females outperformed males in executive tasks that required speed in processing information, visual-constructive tasks, verbal fluency, and cognitive flexibility abilities.

Females generally received a later ASD diagnosis. Researchers theorized that people with diagnosed ASD who camouflaged as a means to hide their condition could be the main reason females received a later diagnosis (Leblanc et al., 2016). This was also believed to be true for individuals without a co-occurring intellectual disability. Research primarily focused on individuals designated female sex at birth (Leblanc et al., 2016). Very limited research exists that examined how gender identity impacted camouflaging as camouflaging was observed in both males and females (Schuck et al., 2019). There were no known studies completed that compared how gender groups differed in diagnostic timing or that directly investigated camouflaging and the role it played among the different genders (Schuck et al. 2019), or if individuals who received a later ASD diagnoses demonstrated elevated camouflaging symptoms resembling those who received an earlier diagnosis. Leblanc et al. (2016); Rynkiewicz et al. (2016); Lai et al, (2017, 2019); Parish-Morris et al. (2017) used the Camouflaging Autistic Traits Questionnaire subscales (compensation, assimilation, and masking) to investigate the roles of sex, gender identity (gender diverse vs cisgender), diagnostic timing (childhood/adolescent-diagnosed vs adult-diagnosed), and the interactions of these factors in autistic adults aged 18–49 years and of whom studies have reported the multiple effects of sex, gender identity, and diagnostic timing. Leblanc et al. (2016) noted that autistic females used more camouflaging across the Camouflaging Autistic Traits Questionnaire subscales as compared to their male counterparts. According to the studies conducted, gender diverse adults reported elevated camouflaging on the compensation subscale compared to cisgender adults. It is important to note that researchers concluded that adult-diagnosed individuals reported “elevated assimilation and compensation compared to adolescence diagnosed individuals” (Leblanc et al., 2016). Also, discussed in the research was how “aspects of camouflaging may have particular implications for later diagnostic timing and for the intersection of neurodiversity and gender diversity” (Leblanc et al., 2016).

Hull et al. (2017) explored the female protective effect, female autism phenotype, and camouflaging behaviors to find that for every one female diagnosed with ASD three males were diagnosed. Hull et al. (2020) theorized that females were more protected from an ASD diagnosis because there was something within them protecting them preventing an ASD diagnosis. Hull et al. (2020) found that females were as likely to have autism as males, but due to diagnostic bias and the way autism manifests in females, female autism remains unnoticed until later in life.

Behavior and Parent Reporting

Kanne et al. (2011) defined adaptive behavior for individuals with diagnosed ASD was generally defined as "the skills an individual performs independently, in daily activities and routines". Kanne et al. (2011) found that adaptive behavior skills were a more significant deficit than cognitive ability among individuals with diagnosed ASD. Kanne et al. (2011) noted that autistics frequently experienced difficulty pertaining to daily activities of living, especially with expectations for their age range. Collective data supports the idea a gap exists between cognitive ability and adaptive functioning in subjects between ages 10-18 years (Kanne et al., (2011).

Kanne et al. (2011) believed that assessing adaptive behavioral functioning was essential because of the connection to a diagnosis and also for planning and implementing individual interventions for individuals diagnosed with ASD. Improving adaptive behavior skills was discovered to vastly improve the quality of life for individuals with ASD.

Kanne et al. (2011) emphasized the importance of improving current adaptive behavior skills which researchers believed should be prioritized as intervention goals. Data supports the idea that adaptive functioning intervention was affective for individuals diagnosed with ASD. It is important to know and understand individual strengths and needs before making decisions to prioritize intervention goals. Adaptive functioning for individuals with diagnosed ASD varies based individual severity, age, IQ level, symptoms, and the current presence of behavioral problems.

Investigations sought to determine the differences in behaviors among males and females with ASD in five core areas of autistic symptoms. The five observable symptoms areas included: stereotyped speech; social deficits- including a lack of emotional reciprocity; observable behaviors, communication abnormalities, and patterns of rigid and repetitive behaviors such as stereotyped motor mannerisms. Some ASD characteristics were believed to increase in severity when the individual had a documented comorbid intellectual disability (Brereton et al. 2006). It should also be noted that one cross-sectional study found that anxiety was greater for high-functioning females with ASD. However, the anxiety was found to be true during adolescence but not in childhood (Brereton et al. 2006). Researchers now believe that typical gender developmental anxiety symptoms may be present during adolescence (Brereton et al. 2006).

Children with diagnosed ASD exhibit problem behaviors believed to be secondary to the core symptoms of ASD (CDC, 2012). Several studies found that the severity of ASD behaviors was directly correlated to parental stress levels and other depressive symptoms (as cited in Beck et al., 2004; Davis and Carter 2008; Higgins et al. 2005; Ingersoll and Hambrick 2011; Ingersoll et al. 2011). Research noted that alcohol use in parents elicited coping mechanism in children who exhibited challenging behaviors. The research also connected that first- and second-degree blood relatives of children with diagnosed ASD generally tended to exhibit greater rates of alcohol use. Researchers found that parents of children with diagnosed ASD reported higher stress and more negative views of their children's emotional and behavioral functioning. Study results also indicated that the presence of negative traits such as: rigidity and pragmatic language difficulties may increase vulnerability to stress and internalizing mood symptoms in parents of children with diagnosed ASD (Beck et al., 2004).

Beck et al. (2004) indicated that the purpose of the study was to examine mechanisms that underlined the relationship between child behavior problems and parental anxiety and potential depression. It was predicted that parenting stress would determine a relationship between child behavior and parenting self-efficacy. The participants in this study included 140 mothers of children between the ages of three and 16, of which 70 were mothers of females and 70 were mothers of males. All children were diagnosed with ASD, specifically autistic disorder. Four mothers were excluded from analyses because of their lack of timely or incomplete responses to over half of the questions in the questionnaire. Two more of the participating mothers were excluded because their child was younger than 36 months. A total of 134 mothers were counted in the final analyses. Some parents had multiple children with diagnosed ASD. These parents only completed the questionnaires for the oldest child diagnosed with ASD and other depressive symptoms. There were no known inclusion or exclusion criteria for this study. The reported average age of the participating mothers completing the study was 39.01 years. The majority of the parents self-reported as Caucasian (94.2%), followed by African-American (2.2%), Latino (1.4%), Native American (1.4%), and Asian/Island pacifier (.7%). The average age of participating children with ASD was reported to be 9 years, 2 months. However, ages ranged from 3 years to 16 years, and 10 months. The majority of the children studied were boys (79.9%) with 36.4% were females. Of all the children 56.9% only reported an autism diagnosis. Researchers concluded that the primary findings of the study supported the research theories indicating that "parenting stress mediated the relationship of child behavior problems and parenting self-efficacy, such that child behavior problems were associated with increased parenting stress that in turn accounted for decreased parenting self-efficacy". Additionally, the finding of Beck et al. (2004) concluded that parenting self-efficacy partially mediated the relationship between parenting stress and parental depression/anxiety. The concluding results surmised that decreased parent self-efficacy accounted for increased maternal anxiety/depression scores. The findings remained unchanged after controlling for child's diagnosis, reflecting severity of functioning and other depressive symptoms (as cited in Benson 2006; Benson and Karlof 2009; Davis and Carter 2008; Ingersoll and Hambrick 2011; Ingersoll et al. 2011).

Social- Emotional

Beck et al. (2004) completed a meta-analysis about the social emotional difficulties in children with diagnosed ASD. The research sources noted the most prevalent difficulties in social cognition were related to higher cognitive and language abilities. Social cognitive impairment deficits were found in social awareness, perspective-taking, and implicit Theory of Mind (ToM). Social communication gaps for children who had functional language and were without intellectual disability involved lack of integration with typical, complementary, nonverbal cues, and related difficulties in meta communication and understanding social cues. The current review of studies examined predictors of ASD and the effect on social- emotional development in toddlers and small children as they started to age. Social- emotional engagement study results indicated that pretend play, and empathic concerns starting at the age of 22 months contributed uniquely to predicting a later ASD diagnosis with highly specific and moderate sensitivity. Social- emotional engagement was the most important predictor of an early diagnosis for young children with presumed ASD. It is also important to point out that emotional regulation was the key to developmental capacity. Effective emotional regulation was associated with social success, academic readiness, and prosocial behaviors.

Beck et al. (2004) noted that emotional dysregulation predicted increased social and behavioral difficulties over time. Children with diagnosed autism spectrum had documented emotional regulatory challenges, especially children previously described with a diagnostic label of Asperger’s syndrome and more generally, children with mild language and motor delays. The same children may not have documented cognitive disabilities or other depressive symptoms.

Beck et al. (2004) investigated the associations between early social-emotional development and ASD symptom presentations as they believed that social-emotional atypicalities often co-occurred in individuals with diagnosed ASD. The researchers theorized that the cited literature accurately identified ASD in children using a social-emotional development questionnaire. The literature sources only included typically developing children previously diagnosed with ASD and compared them to a cohort of non-diagnosed ASD developing children of the same age. Hiller et al. (2016) found that younger siblings were at an increased risk of being diagnosed with ASD as the number of older siblings with ASD in their family increased. The rates were 16% for families with one child and 36% for families with multiple children. Beck et al. (2004) examined social-emotional difficulties in siblings of children with diagnosed ASD and found that it was important to examine all siblings because they were at heightened risk for attention deficit hyperactivity disorder (ADHA), conduct problems, anxiety disorders, and other neurodevelopmental and mental health conditions. The researchers considered the importance of parent endorsement of social-emotional behavioral problems and competencies. More importantly they studied the difference in trajectory of high-risk toddlers who later received an ASD diagnosis compared with toddlers who did not receive an ASD diagnosis, some of whom were discovered to have low-functioning controls. Beck et al. (2004) also examined the data to determine if there were red flags in social-emotional development for children starting at 36 months. Researchers predicted that parents of children diagnosed with ASD as young as three years would have reported a greater number of social emotional atypicalities when the child was 18 months compared to parents of children who were not diagnosed with ASD. The data concluded that for the high- risk group the older siblings ASD diagnosis had been confirmed through a complete review of their diagnostic records or clinical assessment using the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) criteria. The high- risk infant siblings and had no known or identifiable neurological conditions, genetic conditions, severe sensory or motor impairments. The low- risk children were recruited from local communities, provided they had no relatives with an ASD diagnosis. The study included infant participants born between 36 to 42 weeks gestation with a birth weight greater than 5lbs. As expected by the researchers, the individuals labeled low- risk were better able to deal with the social emotional factors of daily routines and living.

Impairments in social recognition and processing predicted greater symptom severity in individuals with diagnosed ASD. Cheslack-Postava et al. (2012), suggested that females with diagnosed ASD displayed more emotional interaction skills as compared to their male counterparts. Females with an ASD diagnoses who attended mainstream schools were better able to emotionally interact with their peers. Cheslack-Postava et al. (2012) believed this to be true because females were better at camouflaging so they tried harder to blend in with their peers. By nature, females are considered to be more social than males, however; males are diagnosed with ASD at higher rates one in four as opposed to females who are diagnosed with ASD at rates of one in every 65 students making females more likely to adapt socially and emotionally than males. Females were more likely to have lasting relationships with their peers than males. Cheslack-Postava et al. (2012) stated this to be true because females felt the need to have lasting relationships with others. It is typical for females to seek social relationships in some capacity, whereas, males are less likely to seek social relationships. Males with an ASD diagnosis tended to speak less and often times remained “mute” resulting in having fewer social and emotional skills needed to seek relationships with others.

Communication

According to the American Psychiatric Association (APA, 2013), communication and interaction impairments comprise a core feature of autism spectrum disorder. Researchers believed communication impairments generally emerged beginning when a child was two years old. Communication deficits are difficult to identify in children with early ASD symptomology during the pre-linguistic period of development, prior to the emergence of an explicate and robust social-communicative impairment. Researchers found that a reliable ASD diagnoses was possible in children as young as 14 months (Kanne et al., 2011). The American Psychological Association, 2013 noted that observable behavioral features associated with ASD in the first year of life remained elusive. The APA documented stable and persistent social communication challenges for children that manifested as early as 12–14 months of age (Kanne et al., 2011). The most important study of pre-linguistic skills for children with ASD, prior to this data suggested that communication trajectories for infants with diagnosed ASD may have persisted earlier than originally thought. This means ASD could possibly be diagnosed in children young as 9 months of age (Kanne et al., 2011). Researchers believed that the developmental passage to socially- directed communication may begin in ones the first year of life which primarily focuses on specific social attention, vocalizations, and gestures (Kanne et al., 2011). The American Psychological Association (2013), expected that the development of early social and communication skills would be disrupted in individuals with diagnosed ASD, with a divergence occurring well before the toddler years began in individuals with ASD (American Psychological Association, A. P. (2013).

A great number of children and young people with diagnosed autism spectrum disorder have documented language and communication problems (Hull et al., 2016). Many in the medical field believe that communication skills are crucial in gaining and sustaining peer relationships specifically in the areas that include education and employment (Hull et al., 2016). Language deficits may also be associated with a developing anxiety disorder or other mental health conditions (Kanne et al., 2011). Timely identification of autism in children may entail complete access to information and support for developmental needs. Hull et al. (2016) found that females who met the current ASD criteria were generally more likely than males to remain undiagnosed. The diagnostic rates for autism in females with an IQ of 85 and above are especially poor. Elevated social and emotional vulnerabilities were identified in females with an IQ of 85 or more. Hull et al. also suggested that differences in presentation of ASD among females and males included such things as: structural language and pragmatic abilities. Researchers believed that stronger language skills in females may obscure underlying difficulties indicating that females were less likely to be referred for diagnostic services to address ASD. Hull et al. (2016) believed that a thorough understanding of the differences in female/male language and pragmatic profiles in ASD were of high importance to better understand the specific needs of both males and females. Current ASD diagnosis relies heavily on clinical observations and reports of behavior by a doctor. Observational data documents the current challenges in the core areas of ASD: social interaction, communication, and restricted, stereotyped, the repetitive behaviors. The research concluded that females with an ASD diagnosis had a different social skills profile than their neurotypical counterparts (Hull et al., 2016).

The Individuals with Disabilities Education Act (IDEA, 2019) stated that individuals with diagnosed ASD communicate in a way that depends on their intellectual and social development. Hull et al. (2016) stated that some individuals with diagnosed ASD would not be able to communicate using verbal speech and language, while others may be considered minimally- verbal along with those who have a more defined vocabulary. Verbal students speak in great detail about topics of interest to them. Another communication deficit is an inability to read the body language of others. According to IDEA, 2019, some autistics have difficulty understanding and comprehending the meaning and rhythm of spoken words. This presents challenges in expressing and understanding information. These challenges make it difficult for individuals with ASD to interact with others and specifically with their neurotypical peers (Hull el al., 2016).

Research defines different categories of communication and patterns of language typical for individuals with diagnosed ASD. The categories include repetitive or ridged language. Repetitive means the repeating the language of another, whereas rigid is difficulty understanding that words can mean more than one thing (e.g., bark= dog sound or bark on the tree or shut up! be quiet or shut up! you’re kidding me). Repetitive and rigid language, combined with narrow interests and exceptional abilities leads to a pattern of uneven language development and poor conversational skills. Individuals with diagnosed ASD exhibit different language profiles based on the language categories. Individuals with repetitive or rigid language are known to say things that do not appear to be meaningful and maybe unrelated to the current topic. Following the conversational flow is challenging. ASD individuals frequently don’t maintain the topic of conversation, talk out of turn, or not in the right context. Continuously repeating words that have been spoken by another is called echolalia. Echolalia generally occurs when an individual with ASD repeats what another person has just said, or repeats the same phrase over and over (Hull et al., 2016).

Repetitive and rigid language are included in the four categories under the disability criteria of IDEA, 2019. Individuals with diagnosed ASD who are able and can speak are prone to say things with no real meaning which does not directly relate to conversations they are having with their peers or others. According to IDEA 2019, an individual could count from one to five repeatedly in conversation that would not likely to be related to numbers. Echolalia is a very real and meaningful language. Students are trying to communicate when they echo. An example of echolalia includes continuously repeating words immediately after hearing another person speak. The individual may also respond to questions by repeating the question back to the speaker. This may be because people with autism don't understand the questions or are processing more slowly and repeating the words so they don't forget. Delayed echolalia is defined as an individual repeats words heard at an earlier time. An example of delayed echolalia would be when an ASD individual asks "Do you want something to drink?" at a time when they want a drink. Instead of saying "I want a drink", they repeat what they have heard others say to them. Some individuals with diagnosed ASD may speak in a higher-pitched voice or use singing or a sing- songy or robotic tone, while others use simple conversational phrases to start a conversation with others. Some students use echolalia as a calming tool because familiar words comfort them when they are upset (Hull et al., 2016).

Hull et al. (2016) noted that under the references of IDEA 2019, having narrow interests and exceptional abilities form another core area of communication for individuals with diagnosed ASD. Some diagnosed individuals deliver an in-depth monologue about a specific topic either of interest or in general, but most likely the topic is of interest to the individual. According to IDEA 2019, the individual may not be able to carry on a two-way conversation about the same topics as their audience. Other diagnosed individuals may have unique talents including a musical talent or an advanced ability to count or complete math calculations simultaneously. Approximately 10 percent of children with diagnosed ASD displayed savant skills, or extremely high abilities in specific areas, such as memorization, calendar calculation, music, or math (Hull et al., 2016).

Uneven language development is another common pattern for ASD individuals. Autism theories indicated that individuals with ASD may have developed some speech and language skills at an early age, but may not mature typically resulting in a pattern of uneven skills. An example of would be that the development of a strong vocabulary in a special area that grows very quickly. Many children have good memories for information immediately heard or seen. Some individuals may be able to read words before the age five, however, they generally are not able to comprehend what they have read. This phenomena is referred to as hyperlexia. (IDEA, 2019). It should also be noted that often the diagnosed individual may not respond to the speech of others, even their own names. As a result, children are sometimes mistakenly thought to have a hearing problem rather than communication problems related to ASD (Hull et al., 2016).

IDEA (2019), listed poor nonverbal communication skills as the last area of communication in individuals with diagnosed ASD. Individuals with diagnosed ASD are often unable to respond to or use gestures which include: pointing to an object to give identification and meaning to their speech, eye contact is frequently avoided, which can be interpreted as rude, uninterested, or inattentive (IDEA, 2019). Without meaningful gestures and other nonverbal skills to enhance oral communication skills, many individuals with ASD become seemingly frustrated with their attempts to make their feelings, thoughts, and needs known (IDEA, 2019). Individuals are prone to act out their frustrations through vocal outbursts or other inappropriate behaviors and actions (Hull et al., 2016).

Zwaigenbaum et al. (2012) sought to find different linguistic developments in children from 12 months– 6 years who had an ASD diagnosis. The study included 22 children, half of them had a typical development and half of them had a previous ASD diagnosis. Families were contacted through several day care facilities and speech-therapy centers. Eleven children (6 girls, 5 boys) had an ASD diagnostic evaluation provided by an expert clinician. All eleven children reached DSM-5 criteria for ASD. The children in the ASD group ranged in ages 28 to 79 months. The children in the typical developing group (8 girls, 3 boys) were aged from 12 to 30 months. All participants were raised in monolingual Spanish-speaking families. The Spanish version of the Battelle Developmental Inventory was administered to all the participants and asked the parents completed the Spanish version of the MacArthur Communicative Development Inventory (CDI). The CDI is an inventory aimed at children between 9 and 30 months. The raw score for productive vocabulary offers a measure of the number of words that a child is capable of producing at a specific moment. The productive vocabulary score gives a measure of the children's word vocabulary size. This measure was used because none of the participants in the study had a linguistic development above 30 months and this allowed the researchers to compare the productive vocabulary development of the participants. The study included an observation session which consisted of a semi structured play situation that was designed to elicit communicative behaviors. The session duration ranged from a minimum of 7 minutes to a maximum of 13 minutes for the group of children with ASD, and from 5 minutes to 13 minutes for the group with typical development. The observation sessions were conducted at the child's home or in an isolated room of their day care center. For the typically developing children, a primary caregiver (mother or father) was present during the session and sat to right next to the child while the researcher sat in front of the child. The researcher offered the child four sets of toys, one at a time, in a previously fixed order: bubbles, a spinning top, and symbolic set with plates, spoons and cups, and a pop-up picture book with animals. The sequence was similar for every set. First, the researcher showed the toy to the child trying to get their attention (e.g., blowing a few bubbles or spinning the spinning top). After that, the researcher offered a toy to the child and allowed the child time play with it if interested. The researcher interacted with the child and responded to the communicative attempts. Zwaigenbaum et al., (2012) found the results suggested that children with ASD did not incorporate the gaze in their multimodal communicative behaviors as typically- developing children did. It was also noted that communicative assessment and differential diagnosis, especially at the early stages of development, pointed out the need to account for different patterns of isolated communicative elements. Children with ASD relied more on vocalizations and gestures, and less on the use of gaze. Multimodal communicative patterns can provide additional important cues, considering the reduced use of gaze in these multimodal attempts by children with ASD even when their productive vocabulary level increased. Researchers believed that therapists could take advantage of the children's ability to combine gestures and speech to promote communicative strategies, and also when determining the focus of intervention objectives. The starting point of the intervention in language and communication should be based on the knowledge of the strengths the child with ASD had in relation to the use and coordination of communication elements. These strengths are believed to serve as an anchor for the development of increasingly complex communication skills in children with ASD (Zwaigenbaum et al., 2012).

Chapter III: Literature Review

Discussion and Conclusion

Summary of Literature

While the current research review provided information that supported gender differences in autism, most notably relative to masking behaviors in girls, there is more to learn about how autism manifests differently among male and females. At this time more retrievable information and studies have been published about males with diagnosed ASD versus females. This may be due to the fact that females are better able to camouflage their symptoms than their male counterparts. Camouflaging generally results in females receiving a later autism diagnosis. More research is needed specifically targeting females and ASD.

Limitations of the Research

Brereton et al. (2006) noted that one of the limitations throughout the research was the small number of participants studied. Many researchers noted that the small sample sizes didn't provide the most accurate conclusions or findings. It was noted that these studies could not be generalized to the entire female ASD population. Bitsika et al. (2018) noted in their study that it was difficult to find participants who fit parameters required of the study, which included family history of ASD and the age of formal ASD diagnosis.

Another common limitation throughout the research was regarding the true validity of the information obtained by the researcher. Parent reporting was used and may not have been accurately reported by the parent. Several subjects were disqualified due to the age of the participant, lack of responses by the parent, or demographic information (Hernández-González et al., 2022). There was also no way to guarantee that parental influence did not skew the data collected. Lastly, the vast amount of research studied did not consider implications for students with autism in a classroom setting. As an educator it would have been helpful if the research about how gender differences presented in ASD included examples in a classroom setting.

Implications for future Research

One of the most profound limitations throughout the research conducted included the participant groups. Many of the researchers relied heavily on parent participation versus participant observation. It should be noted that the sample sizes were generally small and the findings of the research were not generally specific to females diagnosed with ASD. Hull et al. (2020) indicated that it was somewhat difficult to find qualified participants for their study. The qualifications necessary for the research included having been diagnosed with an autism spectrum disorder and exhibiting some of the most common symptoms of ASD. Hull et al. (2020) noted that having a larger sample size would have made the research more defined and accurate.

Another common limitation for this research topic pertained to females and how females were able to fly under the ASD radar for so long. According to research studies, females were more likely than their male counterparts to remain undiagnosed with ASD. Most of the research found that females were very good at camouflaging the ASD symptoms because girls generally tried to “fit in” with their peers. In fact, the research showed that females were more adaptable to having ASD, so they were better able to function more like their neurotypical peers.

The research tended to have limited data about females with diagnosed ASD and lower cognitive abilities. The studies indicated that a significant number of individuals diagnosed with ASD had another documented disability. Intellectual functionality was noted as an important consideration when diagnosing an individual with ASD. Further research could be completed not only about early identification of girls with autism, but also to focus on why the symptoms presented differently between the genders. A better diagnostic tool needs to be designed to provide a more solid understanding of the ASD diagnosis based on the female brain. Zhang et al. (2020) agreed that much research is needed to better understand camouflaging and why females are more prone to use it than males. He also stated that camouflaging should be included in the phenotype. Loomes et al. (2017) stated that increasing the knowledge of females with autism could decrease the bias towards males. This understanding would help to identify intervention strategies for girls targeting social emotional skills and also address camouflaging and mental health issues.

Implications for Professional Application

Throughout my research I felt like I gained a new perspective of autism and how it presented differently in males and females. Having gained this full view of autism will be beneficial in my career as a center-based high school teacher. One of the main gains from the research was about ways females used camouflaging as a means to “fit in” with their peers. Many females received a late ASD diagnosis due to their ability to cope by using camouflaging skills and behaviors. It has been shown through research that camouflaging behaviors can result in a dual diagnosis such as anxiety, and depression. As a center-based teacher, it is imperative to recognize when a student may be camouflaging to fit in with peers, adapting to the social emotional boundaries of others, and understanding gender differences in behaviors among students. Center-based teachers have a keen eye in the early identification and intervention of ASD. This is key to learning how to work with students with autism. Evidence further suggests that family history plays a key role in ASD diagnosis. Other considerations noted included mental health concerns and that parent participation was an essential component in ASD interventions!

Educators need to be aware of how completely autism impacts all aspects of a child's life including, behavior, communication, emotions, social skills, and mental health. Females with ASD perceive the world differently than males, so it is important to be aware of the significant differences in perception among the genders. Information from this thesis can help educators better support the many needs of students with ASD as they make the transition into adulthood. Research had shown that females who struggle with anxiety and depression could be overwhelmed by social interactions. The information about how girls present with autism should be considered when evaluating a student for special education services.

After all the research I reviewed, I found it most interesting to discover the significantly large gap between males and females with ASD. The autism program in the school where I am employed grows larger every year. The district autism program has gained more students than originally planned. The class size grew from 11 to 19 in the course of a year and is expected to increase over the next year. As a center-based teacher I see the need for more research to better understand students with ASD. I also see the need for more ASD awareness among general education teachers. If general education teachers knew more about autism, more students could in in mainstream classes more often. Researchers have stated that the range people diagnosed with ASD is growing wider and wider with symptoms prevailing much differently among diagnosed people. In my experience as a center-based teacher, I have noticed an increase in the number of high- functioning people with ASD living and working in the community.

Conclusion

The rationale for this research was to gain a better understanding of the challenges people with autism face on a daily basis. More clearly understanding what a day in the life of a female with autism might be like. The findings in the literature review reflected significant differences between genders. The research also indicated that more information is needed about the challenges faced by males vs females. The literature review covered the most common topics found in literature searches related to autism and compared the gender differences between males and females with diagnosed autism.

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