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Undergraduate

# Diagnostic Issues and Gender Differences of Attention Deficit Hyperactivity Disorder

By Cecilia Valdovinos

## **Abstract**

This literature review looks at different studies on attention deficit hyperactivity disorder (ADHD) and the findings on gender differences. Many studies have analyzed male and female ADHD behaviors, cognitive functioning, IQ, task performance, and parent/teacher and self-reported ratings. Most studies have found that the results for gender differences vary due to the varying sample selection methods that they use, which include clinical and community samples, sample size, culture, and age. Results have been compared, and most studies have shown that simply using one sample type limits the generalization of the results. Also, some studies focused on different behaviors exhibited by and reported for children and adults with ADHD, and used those behaviors as a criteria for diagnosing and comparing and contrasting gender differences. Some of the main findings reported by most studies were that males externalize their ADHD behaviors while females internalize theirs. Other studies have reported that females and males with ADHD show no impairment differences, but that they are significantly more impaired than males and females without ADHD. The discrepancies in these study findings are compared and evaluated on the significance that they have to the higher prevalence of ADHD in males, and

suggestions on how to make future studies and diagnosis better are given.

## **Attention Deficit Hyperactivity Disorder**

There are currently 3% to 7% of school-age children diagnosed with attention deficit hyperactivity disorder (ADHD; Centers for Disease Control and Prevention [CDC], 2011), and about 30% to 50% of the childhood cases of ADHD persist into adulthood (Balint, Meszaros, Bitter, Czobor, Komlosi, & Simon, 2009; Rucklidge, Kaplan, Brown, & Crawford, 2007). Attention deficit hyperactivity disorder is commonly characterized as a childhood disorder that involves inattention, hyperactivity-impulsivity, or both, which can persist into adulthood (National Institute of Mental Health [NIMH], 2008). The criteria for diagnosis is that referred patients either meet inattention symptoms (e.g. often has trouble keeping focus) or hyperactivity-impulsivity symptoms (e.g. often fidgeting or running around unexpectedly) for at least six months before the age of seven, and display the symptoms in more than two settings (American Psychiatric Association [APA], 2000). Some study findings that have brought attention to ADHD are that young boys are twice more likely to be diagnosed than young girls (Balint et al., 2009), and that more adult women than men typically search for psychological help for their symptoms (Arcia & Conners, 1998) or are affected with more internal struggles because of the disorder (Rucklidge et al., 2007). This raises the idea that gender differences may be accountable for the differences in ADHD prevalence. Addressing this concern about ADHD is important because it may influence future diagnoses of the disorder among children and adults. That is, diagnosis can become more effective at distinguishing ADHD behaviors in females and males.

By integrating different study findings, the objective of this literature review is to present a collection of studies that have compared the symptoms of males and females with ADHD to determine if there are significant gender differences in ADHD, and to highlight some

inconsistencies in reported behaviors. The information is integrated in a way that strengths and limitations can be identified in the literature of ADHD and gender differences so that I can propose how those limitations affect the diagnostic outcomes of children and adults.

## **Clinical and Community Samples of Participants**

Clinical samples include people who have been diagnosed clinically, and community samples include people who are selected randomly from the community and assessed during a study. The type of samples used can influence the generalizability of the results of studies so it is important to keep in mind what type of samples were chosen for a study when interpreting the findings. A five-year longitudinal study that recruited clinically and community referred patients found that boys and girls with ADHD were equally at risk for developing comorbid disorders, such as anxiety, depression, and disruptive behaviors (Biederman et al., 2006). The results of this study were generalizable to a broader population because they measured the behaviors and symptoms of children with and without ADHD who were clinically and community referred for the study. On the other hand, a couple of studies (Rucklidge & Tannock, 2001; Yang, Chen, Chung, & Jong, 2004) used only clinical samples, which limited their results to a single group in a population. Furthermore, an issue with using only one type of sample is that the statistics may not accurately reflect the actual prevalence of a disorder. It has been reported that girls with ADHD are less likely to be clinically referred for their symptoms because they tend to internalize their behaviors, whereas boys externalize theirs (DuPaul, Jitendra, Lutz, Tresco, Volpe, & Junod, 2006; Papageorgiou, Kalyva, Vostanis, & Dafoulis, 2008); these results can reflect the male to female clinical diagnostic ratio of 6:1 and a non-referral ratio of 3:1 (Rucklidge et al., 2007). There are also limitations to using only community samples: Many children with ADHD may attend inclusion schools—which may not be part of the public school system,—or some parents

may choose not to have their children recruited into studies (Papageorgiou et al., 2008). These limitations all affect the reported prevalence of ADHD, and make it difficult to distinguish any gender differences in patients because one group may over-represent one gender or the other.

## **Self and Parent/Teacher ADHD Behavior Reports**

Adults with ADHD have the advantage of being able to recognize and report their own abnormal behaviors, which gives them a better chance of being more accurately diagnosed. A study that compared the behaviors of 515 adult males and females with ADHD using Conners' Adult ADHD Rating Scale—Investigator Format and the Wender-Reimherr Adult Attention Deficit Disorder Scale found that adult females had more unstable emotions than adult males (Robinson, Marchant, Reimerr, Adler, West, & Faraone, 2008). Robinson et al. (2008) also found that adult females were more likely to be diagnosed with combined type (hyperactive/impulsive) ADHD than males, and that this result was a reversed finding when compared to some childhood cases. The participants of this study were first assessed for ADHD as adults, so no previous diagnosis existed. This means that previous assessment was probably not influencing their reported symptoms and behaviors.

On the other hand, there have been multiple studies that rely on parent/teacher ratings for the children's ADHD behaviors and symptoms, but this can present bias in the research because parents and teachers may rate behaviors with expectations in mind (Arcia & Conners, 1998; DuPaul et al., 2006). A study with Malaysian and American children compared ADHD and oppositional defiant disorder (ODD) behaviors, and had parents rate their child's behavior using the Child and Adolescent Disruptive Behavior Inventory and the Disruptive Behavior Questionnaire (Burns, Walsh, Hafetz, & Gomez, 2006). The results showed that boys in the Malaysian and American samples had greater scores in inattentive and hyperactive type ADHD

than girls in both ethnic samples, which was believed to be due to parental bias and because the children were only clinical referrals (Burns et al., 2006). Another study that observed the effects of parent and teacher ratings was one that found that boys received more medication and counseling than girls, and that it may be due to teachers reporting more disruptive and inattentive behaviors in boys (Derks, Boomsma, & Hudziak, 2007). Oftentimes, studies rely on parent and teacher reports to represent the ADHD behaviors of children and the reports are used as the main criteria for diagnosis. This can be a problem because there are behavior discrepancies found in parent and teacher reports, and thus incorrect diagnoses can be given.

Given that parents and teachers may report different behaviors for children with ADHD, it is important to compare and contrast the behaviors they do report. Papegeorgiou et al. (2008) conducted a study that collected parent and teacher reports of ADHD behaviors of children, and measured the agreement of the parent and teacher reports. The two questionnaires that the parents and teachers completed were the Strengths and Difficulties Questionnaire (SDQ)—which measures social, emotional, and behavioral functioning—and the Child Attention Profile (CAP)—a rating scale for inattention and hyperactivity. The results showed that parents rated boys higher on the hyperactivity scale than girls, but no higher on emotional problems, conduct problems, and peer problems. On the other hand, teachers rated boys higher on hyperactivity and conduct problems. Teachers also rated boys higher as “inattentive” on the attention-deficit with hyperactivity scale than girls, while parents disagreed by reporting that there seemed to be no gender difference between the two. Disagreements between teacher and parent reports may occur because parent may not accurately know how their child behaves in the classroom, because teachers witness the children’s behaviors all year long, or because children behave differently in different settings (Papegeorgiou et al., 2008). The agreement of parent and teacher reports is an important variable to keep in mind when evaluating a child in order to carefully avoid bias and to

make the most accurate diagnosis. If inconsistent male and female behaviors are being reported for ADHD and researchers are not asking “why?” statistics for the disorder may go on to reflect those inconsistencies and make it seem as if one gender is more likely to have ADHD.

A way that parent and teacher bias can be controlled is by interviewing the child and by giving them tasks that require their focus and attention. One study that required adolescents with ADHD to do such tasks was one that measured the differences in naming speed, information processing, inhibition, working memory, set-shifting, and interference (Rucklidge, 2006). The results showed that the males with ADHD showed more difficulties with inhibition than the females with ADHD, but that both males and females with ADHD showed more difficulties with working memory, inhibition, information processing, and naming speed (Rucklidge, 2006).

Other studies that measured attention in children with ADHD found that males and females did not differ in their memory and delayed response (Breen, 1989), or in their verbal IQ and attention (Yang et al., 2004) when they were given tasks from assessment tools such as the Kauffman Assessment Battery for Children (KABC) and the Continuous Performance Task. Furthermore, observing a child directly and measuring their behaviors is one way that can yield a diagnosis that is truly reflective on their behavior. Although, the psychiatrist diagnosing the patient needs to keep in mind that children behave differently in different environments (Papageorgiou et al., 2008).

## **Factors of Gender Differences of ADHD**

### *I. Culture*

Culture can influence the way ADHD may be perceived in a community, and thus affect the diagnosis or treatment an individual receives. Reid et al. (2000) did a study that observed two ethnic groups (Caucasian and African American), and compared the severity of their symptoms

to see if they were a function of gender or ethnicity. The results showed that African American males showed greater severity in symptoms of ADHD than the African American females and Caucasian males and females, and that the Caucasian females showed the least severity of symptoms of ADHD compared to the other three groups (Reid et al., 2000). Reid et al. (2000) concluded that gender accounted for more difference in the severity of ADHD behaviors than ethnicity because of gender behavior expectations in different ethnic groups. This means that some ADHD symptoms may be more acceptable for males to display than females. There have been more studies that compared the gender differences of children with ADHD in countries outside of the United States (Burns et al., 2006; Graetz et al., 2005; Papageorgiou et al., 2008; Yang et al., 2004) and of different ethnic groups within the United States (Reid et al., 2000). They found that Malaysian and Greek boys with ADHD were typically more hyperactive than girls with ADHD (Burns et al., 2006; Papageorgiou et al., 2008), that Australian boys and girls with ADHD had a lower quality of life (Graetz et al., 2005), and that Taiwanese and American boys and girls with ADHD did not differ in performance IQ, verbal IQ, and attention (Yang et al., 2004). Gender differences are important to look at through different cultural perspectives because they can offer an insight to the reason for the current prevalence of ADHD. Different cultures can have different views on what is normal and acceptable behavior and what is not, which can determine whether resources should be sought out to receive an evaluation and diagnosis for ADHD.

## *II. Misdiagnosis*

It is important to consider the age at which the symptoms began when assessing adults and children for ADHD. As mentioned earlier, the symptoms of ADHD must be present for six months before the age of seven in anyone getting diagnosed (APA, 2000). If the age in which symptoms began is not considered during diagnosis, a misdiagnosis can be given. Also,



symptoms have to be carefully reviewed and assessed according to other symptoms and settings because many symptoms of ADHD can exist in other disorders, such as depression. Specifically, the symptoms of the inattentive subtype of ADHD are similar to those of depression and anxiety (Rucklidge et al., 2007; Graetz et al., 2005) and are thus often misdiagnosed with either depression or anxiety (Robinson et al., 2008; Graetz et al., 2005). It has been reported that females are more likely to internalize their symptoms while males externalize theirs (Levy, Hay, Bennett, & McStephen, 2004; Papageorgiou et al. 2008; Rucklidge et al., 2007), which could be that more females are being diagnosed with depression when they should be diagnosed with ADHD. This can have an impact on the known lower prevalence of ADHD in females.

### *III. Children and Adults with ADHD*

Attention deficit hyperactivity disorder is now being studied in children and adults because it has shown to be twice as prevalent in boys in children populations and overrepresented in females in adult populations (Biederman, Mick, Lapey, Faraone, Spencer, & Wilens, 1994). A study was done to determine if there were any gender differences in intelligence, neuropsychological functioning, or symptoms in children and adults with ADHD (Arcia & Conners, 1998). They found that there were no significant differences in verbal IQ or neurological performance in neither the children nor adult group, but they did find that more boys than girls are referred for ADHD during their early childhood years and more adult women seek help for ADHD than adult men (Arcia & Conners, 1998). This change in referral over time may occur because women may have poor self-perception, and may pay more attention to their symptoms (Arcia & Conners, 1998). A study that was done to measure the reported feelings of low self-esteem, depression, and greater dissatisfaction with childhood found that adult males with and without ADHD actually reported lower self-esteem, poor locus of control, and greater dissatisfaction with childhood than adult females (Rucklidge et al., 2007). On the other hand, a

study by Biederman et al. (1994) compared the impairments of adult males and females with ADHD and found that they were equally impaired when it came to depression, anxiety, substance abuse, and oppositional disorders. These results need to be analyzed closely because earlier findings suggest that adult females and males with ADHD are equally likely to be depressed, and later findings suggest that males with and without ADHD are more depressed than females with ADHD. Perhaps, a change in time has caused an increase in stress for adult males, and an increase in access to psychological resources for adult females.

## Discussion

It appears to be that ADHD impairs the everyday functioning of females and males, and yet no clear gender differences have been delineated. Attention deficit hyperactivity disorder (ADHD) has become a controversial topic in psychology because of the varying findings on gender differences. The differences that are reported are generally that females internalize their behaviors and males externalize theirs in childhood and adolescence (DuPaul et al., 2006; Papageorgiou et al., 2008), and that females tend to be more internally affected by ADHD than males during adulthood (Arcia & Conners, 1998; Robinson et al., 2006). Although, others show that men are more internally affected than females (Rucklidge et al., 2007).

It is important to note that the symptoms of the internalizing symptoms can be easily mistaken for signs of depression—especially in females,—and that perhaps it is easier to diagnose males with ADHD because it is more common for them to be more disruptive than females. That is why conducting studies that involve parent and teacher reports should also involve behavior observation on children working on tasks that test their attention, focus, inhibition, and motor skills to eliminate some parent/teacher bias. Also, teachers and parents need to be mindful of the behaviors that children and adolescents normally display, and how they

deviate from those normal behaviors. Not every child should be expected to behave the same way, so frequent observations should be made while the child is not knowingly being observed so that natural behaviors can be recorded. For example, observing a child on the playground or at birthday parties versus observing them in the classroom and at home could be a possibility. What is more, researchers should keep in mind the samples, age groups, and cultures they include in future studies for gender differences of ADHD because they can all affect the validity of the results. Large and randomized groups of participants that represent patients with and without ADHD who are both clinically and community referred would be the ideal selection criteria for a study on gender differences of ADHD. Also, more neurobiological studies should be considered because there may be differences in the brain activity of males and females with ADHD that have not been yet identified. There has to be an answer to the difference in prevalence of ADHD in males and females, and whatever it is it will help make diagnoses more accurate.

## References

- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). doi:10.1176/appi.books.9780890423349
- Arcia, E., & Conners, C. K. (1998). Gender differences in ADHD? *Journal of Developmental and Behavioral Pediatrics*, 19(2), 77-83. doi:10.1097/00004703-199804000-00002
- Balint, S., Meszaros, A., Bitter, I., Czobor, P., Komlosi, S., & Simon, V. (2009). Attention deficit hyperactivity disorder (ADHD): Gender- and age- related differences in neurocognition. *Psychological Medicine*, 39, 1337-1345.  
doi:10.1017/S0033291708004236
- Biederman, J., Mick, E., Price, J. E., Klein, K. L., Monuteaux, M. C., Faraone, S. V., ..., Wilens, T. E. (2006). Psychopathology in females with attention-deficit/hyperactivity disorder: A controlled, five-year prospective study. *Biological Psychiatry*, 60, 1098-1105.  
doi:10.1016/j.biopsych.2006.02.031
- Biederman, J., Mick, E., Lapey, K.A., Faraone, S.V., Spencer, T., Wilens, T. (1994). Gender differences in a sample of adults with attention deficit hyperactivity disorder. *Psychiatry Research*, 53, 13-29. Retrieved from <http://search.proquest.com/docview/618609253?accountid=14515>
- Breen, M. J. (1989). Cognitive and behavioral differences in ADHD boys and girls. *Journal of Child Psychology and Psychiatry*, 30(5), 711-716. doi:10.1111/j.1469-7610.1989.tb00783.x doi:10.4088/JCP.v69n0207
- Burns, G.L., Walsh, J.A., Hafetz, N., & Gomez, R. (2006). Measurement and structural invariance of parent ratings of ADHD and ODD symptoms across gender for American

and Malaysian children. *Psychological Assessment*, 18(4), 452-457. doi:10.1037/1040-3590.18.4.452

Centers for Disease Control and Prevention (2011). Attention-deficit/hyperactivity disorder (ADHD): Data & statistics. Retrieved from <http://www.cdc.gov/ncbddd/adhd/data.html>

Derks, E. M., Boomsma, D. I., Hudziak, J. J. (2007). Why more boys than girls with ADHD receive treatment: A study of Dutch twins. *Twin Research and Human Genetics*, 10(5), 765-770. doi:10.1375/twin.10.5.765

DuPaul, G. J., Jitendra, A. K., Lutz, J. G., Tresco, K. E., Volpe, R. J., & Junod, R. E. V. (2006). Children with attention deficit hyperactivity disorder: Are there gender differences in school functioning? *School Psychology Review*, 35(2), 292-308. Retrieved from <http://search.proquest.com/docview/621620501?accountid=14515>

Graetz, B. W., Sawyer, M. G., & Baghurst, P. (2005). Gender differences among children with DSM-IV ADHD in Australia. *Journal of the American Academy of Child & Adolescent Psychiatry*, 44(2), 159-168. doi:10.1097/00004583-200502000-00008

Hermens, D. F., Gordon, E., William, L. M., Kohn, M. R., & Clarke, S. D. (2005). Sex differences in adolescent ADHD: Findings from concurrent EEG and EDA. *Clinical Neurophysiology*, 116, 1455-1463. doi:10.1016/j.clinph.2005.02.012

Levy, F., Hay, D. A., Bennett, K. S., McStephen, M. (2004). Gender differences in ADHD subtype comorbidity. *Journal of American Academy of Child and Adolescent Psychiatry*, 44(4), 368-376. doi:10.1097/01.chi.0000153232.64968.c1

National Institute of Mental Health (2008). Attention deficit hyperactivity disorder (ADHD). Retrieved from [http://www.nimh.nih.gov/health/publications/attention-deficit-hyperactivity-disorder/adhd\\_booklet.pdf](http://www.nimh.nih.gov/health/publications/attention-deficit-hyperactivity-disorder/adhd_booklet.pdf)

- Papageorgiou, V., Kalyva, E., Vostanis, P., & Dafoulis, V. (2008). Differences in parents' and teachers' ratings of ADHD symptoms and other mental health problems. *The European Journal of Psychiatry*, 22(4), 200-210. doi:10.4321/S0213-61632008000400003
- Reid, R., Anastopoulos, A. D., Riccio, C. A., Rogers-Adkinson, D., DuPaul, G. J., Noll, M., . . . & Power, T.J. (2000). Gender and ethnic differences in ADHD as assessed by behavior ratings. *Journal of Emotional and Behavioral Disorders*, 8(1), 38-48.  
doi:10.1177/106342660000800105
- Robison, R. J., Marchant, B. K., Reimherr, F. W., Adler, L. A., West, S. A., & Faraone, S. V. (2008). Gender differences in 2 clinical trials of adults with attention-deficit/hyperactivity disorder: A retrospective data analysis. *Journal of Clinical Psychiatry*, 69(2), 213-221.  
doi:10.4088/JCP.v69n0207
- Rucklidge, J. J. (2006). Gender differences in neuropsychological functioning of new Zealand adolescents with and without attention deficit hyperactivity disorder. *International Journal of Disability, Development and Education*, 53(1).  
doi:10.1080/10349120600577402
- Rucklidge, J. J., & Tannock, R. (2001). Psychiatry, psychosocial, and cognitive functioning of female adolescents with ADHD. *Journal of American Academy of Child and Adolescent Psychiatry*, 40(5), 530-540. doi:10.1097/00004583-200105000-00012
- Rucklidge, J., Kaplan, B., Brown, D., & Crawford, S. (2007). Attributional styles and psychosocial functioning of adults with ADHD: Practice issues and gender differences. *Journal of Attention Disorders*, 10(3), 288-298. doi:10.1177/1087054706289942
- Yang, P., Chen, C., Chung, L., & Jong, Y. (2004). Gender differences in a clinic-referred sample of taiwanese attention-deficit/hyperactivity disorder children. *Psychiatry and Clinical Neurosciences*, 58(6), 619-623. doi:10.1111/j.1440-1819.2004.01312.x

Cecilia Valdovino



Cecilia Valdovinos is a fourth year undergraduate student who is expected to graduate in Fall 2014. She has a major in Psychology with a minor in Cognitive Science, and has a deep interest in speech and learning disorders. She is particularly interested in Attention Deficit Hyperactivity Disorder and Autism Spectrum Disorder and how their behaviors can influence the behaviors of others around them. She is interested in finding new interventions that can help children diagnosed with such disorders adapt to different environments, and in helping those children's families adjust their behaviors with the child as well. It is often reported that literacy rates in children with learning disorders are lower than in normal populations, so, naturally, language development in children with learning disorders is something that Cecilia is interested in finding more about. After graduation, Cecilia will be working as a behavior technician for children who have Autism Spectrum Disorder, and she is also planning on attending graduate school to receive a PhD in School Psychology to make her intervention program plans come to life!