

## Gender Differences in ADHD and Impulsivity: A Literature Review

Meryem Demirhan\*

Submitted: 08 June 2026 Accepted: 01 July 2026 Publication date: 21 August 2026

DOI: 10.70671/5zd7gd85

**Abstract:** Attention-deficit/hyperactivity disorder (ADHD) is a common neurodevelopmental disorder that affects 5–7% of all adolescents and children. Because it affects so many people, symptoms must be well documented to diagnose patients. This literature review aimed to find differences in ADHD symptoms and impulsivity across genders. Research specifically focused on the gender differences in ADHD, impulsivity in ADHD, and gender differences in impulsivity in ADHD. Studies consistently found males to be more frequently diagnosed with ADHD than females, attributing this to either the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) criteria not being built on female symptoms or females internalizing their symptoms, making them harder to notice and diagnose. As a symptom of ADHD, impulsivity was also consistently found to present differently across genders. Males were found to have higher negative emotionality (more susceptible to anger and frustration) and lower levels of emotional constraint compared to females. Females with ADHD were more likely to show symptoms of anxiety and depression when compared to males with ADHD. However, the reviewed studies did not include a consistent way to measure impulsivity, making it difficult to compare research. There was also a lack of research on specifically female symptoms. These findings are important in diagnosing and treating ADHD. Future research should focus on updating the DSM-5 criteria to include female symptoms and to find a consistent measure of impulsivity.

**Author keywords:** ADHD; gender; impulsivity; gender differences; impulsivity in ADHD

### Introduction

Attention-deficit/hyperactivity disorder (ADHD) is one of the most prevalent neurodevelopmental disorders, with rates in childhood and adolescence on the rise.<sup>1,2,3</sup> From 2003 to 2011, the number of children ever diagnosed with ADHD in the United States increased by 42%.<sup>1</sup> ADHD can contribute to academic difficulties, emotional dysregulation, and increased risk-taking behaviors in childhood and adolescence.<sup>4,5</sup> Further, compared to those without ADHD, children with ADHD are five times more at risk to die of suicide in adulthood and have one or more psychiatric disorders in adulthood.<sup>6</sup> Thus, improving scientific understanding of ADHD presentation in childhood and adolescence is crucial for effective diagnosis and treatment.

Despite a large body of research on ADHD in childhood and adolescence, significant challenges remain in both diagnosis and treatment related to gender differences. Specifically, girls are often underdiagnosed or diagnosed later in life. According to the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5), ADHD consists of two core symptom domains: hyperactivity/impulsivity and inattention. Impulsivity can present differently in boys and girls. Research suggests that males with ADHD are

more likely to demonstrate externalizing symptoms, such as aggression, while females tend to experience internalizing symptoms, such as anxiety-related emotional reactivity.<sup>7,8</sup> Given the male-centric diagnostic criteria and inconsistencies in how impulsivity is measured in research, important gaps persist in understanding, diagnosing, and treating ADHD across genders in childhood and adolescence.

This literature review explores how ADHD symptoms, specifically impulsivity, differ between boys and girls, with a focus on children and adolescents. Additionally, it provides a critical analysis of impulsivity domains and instruments and how these may contribute to the underdiagnosis and late diagnosis of ADHD among females. This literature review includes meta-analyses and clinical studies. Overall, this literature review highlights the need for updated ADHD diagnostic criteria and more comprehensive assessment tools that account for female-specific presentations of ADHD.

### Literature Review

#### *ADHD in adolescence*

ADHD is a common neurodevelopmental disorder, with rates in childhood and adolescence increasing from 6.1% in 1997 to 10.2% in 2016 in the United States.<sup>9</sup> Further, overall survival for childhood is slightly lower for children with ADHD than for those without ADHD.<sup>6</sup> ADHD can

\*Corresponding Author: Meryem Demirhan.  
Email: smeryemdemirhan@gmail.com  
High School, Ankara

also persist into adulthood, having a detrimental impact on quality of life, including higher rates of unemployment and suicide.<sup>8</sup>

Common symptoms of ADHD include inattention, impulsivity, and hyperactivity.<sup>11-13</sup> Specifically, ADHD can significantly impair essential executive functions such as planning for the future, separating emotions and facts, working memory, and sense of time.<sup>14</sup> Therefore, adolescents with ADHD could face difficulties in school due to the inability to focus on tasks and difficulty managing emotions and dealing with anger/frustration (National Institute of Mental Health MedlinePlus).

Children with ADHD have been found to have frontal dysfunction. Executive functions are controlled by the frontal lobes of the brain, prefrontal cortex, basal ganglia, and thalamus. These areas of the brain are the last to develop, which may explain why some children outgrow ADHD. One study assessing executive control in boys with ADHD concluded that the symptoms of ADHD can change situationally, which demonstrates that ADHD is a disorder of impaired executive functions.<sup>14</sup> This would mean that children with ADHD have a disturbance or dysfunction in their frontal lobes. Some studies have theorized that common symptoms of ADHD, such as hyperactivity, impulsivity, and inattention, may be due to a deficit of attention components such as alerting, orienting, and executive control.<sup>15-17</sup>

Because individuals with ADHD cannot suppress/inhibit their behavior long enough, they cannot develop some executive functions like self-talk and working memory.<sup>14</sup> Therefore, impulsivity, often defined as behaving without thinking,<sup>11</sup> is a core DSM-5 symptom of ADHD. In order to improve the diagnosis and treatment of ADHD in childhood and adolescence, it is critical to improve scientific understanding of the role of impulsivity.

### ***Impulsivity in ADHD***

ADHD consists of three presentations: predominantly inattentive (ADHD-I), hyperactive-impulsive (ADHD-H), and combined (ADHD-C). Individuals with predominantly inattentive presentation (ADHD-I) must show six or more symptoms of inattention and less than six symptoms of hyperactivity-impulsivity. Individuals with hyperactive-impulsive presentation must show six or more symptoms of hyperactivity-impulsivity and less than six symptoms of inattention. Individuals with combined presentation (ADHD-C) must have six or more symptoms for both hyperactivity-impulsivity and inattention.<sup>18</sup>

Impulsivity is often defined as swift action without thinking, behaving without thinking, and taking action with less forethought than most people with a similar level of knowledge and ability.<sup>4,11</sup> A large body of research suggests that levels of impulsivity may be impacted by deficits in cognitive and motor skills.<sup>19,20,21,22</sup> Therefore, given that people with ADHD tend to struggle more with higher-level cognitive skills (i.e., executive functions) than neurotypical individuals, this may help to explain the prevalence of impulsivity as a core symptom in ADHD. Similarly, research also shows that children who fall behind their peers developmentally may

show more impulsivity.<sup>21</sup> To illustrate both the attentional and impulse control deficits of ADHD patients, one study conducted a continuous performance task. Compared to subjects without ADHD, subjects with ADHD had much slower and more variable reaction times, and they made more errors, which indicates poor attentional ability.<sup>23</sup> ADHD patients also show higher levels of impulsivity.<sup>24,25</sup> Many researchers have classified impulsivity into different subtypes. In one meta-analytic review, impulsivity is divided into two subconstructs: reward delay impulsivity and rapid response impulsivity.<sup>5</sup> Some researchers separate impulsivity into three subtypes: motor impulsivity, non-planning impulsivity, and attentional impulsivity.<sup>8,26</sup>

There are many instruments used to measure impulsivity. One of the more common instruments used to measure impulsivity is the UPPS-P model of impulsivity, which consists of five subscales: negative urgency, lack of premeditation, lack of perseverance, sensation seeking, and positive urgency.<sup>27,28</sup> Negative urgency refers to acting impulsively in response to something negative. Lack of premeditation refers to acting without considering future consequences. Lack of perseverance refers to the inability to focus on tasks. Sensation seeking refers to pursuing exciting activities and being open to new experiences. Positive urgency refers to acting impulsively in response to something positive.<sup>27,28</sup>

Another instrument commonly used to measure impulsivity is the Barratt Impulsivity Scale-11 (BIS-11), which separates impulsivity into three subtypes: motor impulsivity, non-planning impulsivity, and attentional impulsivity.

Beyond these commonly used and reported impulsivity measures described above, other researchers use other instruments to measure impulsivity. For example, Auerbach et al.<sup>29</sup> separated impulsivity into three subdomains: pervasive influence of feelings, which refers to the tendency for thoughts about self and the future to be shaped by emotions; feelings trigger action, which refers to impulsive behavioral reactions to emotions; and lack of follow-through, which refers to the inability to follow through with plans. Therefore, inconsistent findings around impulsivity may be related to different researchers operationalizing the construct differently.

Researchers examining impulsivity as a trait have separated impulsivity into three subtypes: motor impulsivity, non-planning impulsivity, and attentional impulsivity.<sup>8,26</sup> This is based on the widely used and validated BIS-11. Motor impulsivity is characterized by restlessness and acting without thinking. Non-planning impulsivity is characterized by a lack of future-oriented problem-solving strategies. Attentional impulsivity is assessed by a lack of ability to focus on tasks and by cognitive speed in decision-making. All three of these types of impulsivity may be seen in ADHD, as hyperactivity (one of the core symptoms of ADHD) can cause restlessness (relating to motor impulsivity), impulsivity (another core symptom of ADHD) can cause a lack of future-oriented thinking/acting without thinking (relating to motor and non-planning impulsivity), and inattention (also a core symptom of ADHD) can cause a lack of ability to focus on tasks (relating to attentional impulsivity).

When examining impulsivity in ADHD specifically, according to a meta-analysis, there are two subdomains: rapid response impulsivity and reward delay impulsivity.<sup>5</sup> Rapid response impulsivity can be characterized by speaking/responding quickly, often sacrificing accuracy for speed.<sup>30</sup> Measures created to test rapid response impulsivity are often used on individuals with ADHD to test their impulsivity. Almost any task with a dependent variable that measures response time and/or accuracy could be used to measure rapid response impulsivity. Measures like the matching familiar figures test are frequently used to test individuals with ADHD for impulsivity by examining mistakes made in the context of response delays. Reward delay impulsivity or choice impulsivity can be characterized as being unable to delay gratification. A person who struggles with reward delay impulsivity/choice impulsivity may choose to be given a small reward immediately rather than wait and receive a larger reward.<sup>31–33</sup> Reward delay impulsivity or choice impulsivity is associated with several psychological disorders including ADHD.<sup>5</sup> More papers tend to focus on rapid response impulsivity.<sup>34–36</sup> However, both reward delay and rapid response impulsivity can be seen in children diagnosed with ADHD. Patros et al.<sup>5</sup> state that reward delay impulsivity needs to be researched more.

Both of these subtypes are valid ways to measure impulsivity. Reward delay impulsivity is similar to non-planning impulsivity, since not being able to plan for the future and focusing on the present rather than future consequences could be what causes people with ADHD, and those who struggle with reward delay impulsivity, to lack the ability to delay gratification. Rapid response impulsivity could also be tied to motor impulsivity, since those who struggle with motor impulsivity tend to have difficulty thinking before acting, which could lead to speaking/responding quickly and sacrificing accuracy for speed. However, attentional impulsivity does not quite relate to rapid response or reward delay impulsivity, as it is characterized as struggling with focusing on tasks.

Further, in a study examining five different measures of impulsivity using a principal components analysis in a sample of both ADHD and non-ADHD participants, the three domains of impulsivity that emerged were attentional, reward, and behavioral/motor.<sup>37</sup> Specifically, attentional impulsiveness was distinguished between individuals with and without ADHD. Therefore, this seems to be a particularly relevant type of impulsivity among people with ADHD. However, this was conducted with a small sample of only 29 participants, and therefore a larger sample is required to replicate these findings in order to be confident in them.

### **Gender differences in ADHD**

The prevalence of ADHD may be different for different genders. A study done by Willcutt<sup>18</sup> found that, in a population-based sample of children and adolescents, males were more likely than females to meet the criteria for an ADHD diagnosis. Males were more likely to meet the DSM-IV criteria for all types of ADHD than females. For every female diagnosed with ADHD, 3.2 males were diagnosed

with ADHD. Males are especially diagnosed more likely than females for ADHD-H (hyperactive and impulsive type), with 3.5 males for every female.<sup>18</sup> However, this may be because the DSM-IV criteria for ADHD were constructed based mostly on observations of males.<sup>38</sup> Additionally, in DSM-5 field studies, there is a higher percentage of males than females included as participants.<sup>39</sup> This gender bias in ADHD diagnostic criteria may make it more difficult for females to receive an ADHD diagnosis than males.

Additionally, females are often diagnosed with ADHD later in life, such as in adolescence and adulthood.<sup>40–42</sup> Some research suggests that this is related to gender differences in symptoms. Specifically, girls with ADHD show lower levels of hyperactivity, fewer conduct disorder diagnoses, and lower rates of other externalizing behavior compared to boys with ADHD;<sup>43</sup> meanwhile, boys with ADHD demonstrate more disruptive and externalizing behavior than females.<sup>10,43</sup> This may help to explain the delay in diagnosis for females.<sup>10,43</sup> For example, Klefsjö et al.<sup>41</sup> found that females required more visits to Child and Adolescent Psychiatric outpatient care units before receiving their diagnosis. This research also found that girls were more often referred to Child and Adolescent Psychiatric outpatient care units for suspected emotional problems, while boys were more often referred for symptoms of neurodevelopmental disorders.<sup>41</sup> Therefore, girls with ADHD tend to receive a diagnosis later in life, and this appears to be related to presenting with different symptoms than boys with ADHD.

A possible explanation for these differences in diagnosis may be due to girls' symptoms being perceived as less serious, or boys with higher levels of impulsivity and hyperactivity often show behavioral symptoms that may disrupt their surroundings, creating a more urgent need for assessment. Another reason for a potential underdiagnosis of girls with ADHD may be because more girls present with inattentive-type ADHD compared to boys, making their behavior perceived as less disruptive.<sup>18</sup> Girls' inattentiveness may come off as being disorganized, overwhelmed, easily distracted, or lacking effort and motivation.<sup>44</sup> Girls with ADHD more often internalize their symptoms and are more likely to struggle with conditions like depression and anxiety,<sup>45</sup> which may also contribute to why they are harder to diagnose. Girls with ADHD may also find ways to mask their symptoms, such as displaying adaptive or compliant behavior or finding coping mechanisms.<sup>46,47</sup> Ragnarsdottir et al.<sup>48</sup> found that girls with ADHD seem to struggle socially more compared to boys with ADHD. According to this research, older girls with ADHD experience more issues with their peers, while younger girls with ADHD experience less prosocial behavior.<sup>48</sup> This study also showed that older boys with ADHD had fewer issues with their peers compared to younger boys with ADHD, while older girls with ADHD and younger girls with ADHD experienced similar problems.<sup>48</sup>

### **Gender differences in impulsivity in ADHD**

Impulsivity seems to also vary based on gender. A study conducted on adolescent boys and girls with ADHD found that adolescent girls with ADHD were found to have higher levels

of attentional/cognitive impulsivity and motor impulsivity compared to adolescent boys with ADHD.<sup>8</sup> The children all had similar levels of severity when it came to ADHD. This indicates that the severity of ADHD does not affect differences in impulsivity.<sup>8</sup> The study suggests that a possible reason for higher impulsivity in adolescent females with ADHD than adolescent males with ADHD may be because males with higher impulsivity scores may have been treated earlier in life, while females might not be treated until adolescence.<sup>8</sup> One study that used the BIS-11 found that adolescent females with ADHD were more impulsive than adolescent males with ADHD. The study found that adolescent girls with ADHD struggled specifically with attentional/cognitive impulsivity and motor impulsivity more than adolescent boys with ADHD.

Emotional impulsivity and impulsive behaviors have been defined by researchers as reacting to emotions. Impulsivity has been linked to emotional instability in both ADHD and bipolar disorder and has been related to problem behaviors and suicidality.<sup>49,50</sup> Issues with emotional regulation and impulsivity are most strongly related to problems with attention and were linked to attentional impulsivity measured by the BIS-11 instrument.<sup>51</sup> Adolescent females with ADHD were found to have higher levels of attentional/cognitive impulsivity compared to adolescent males with ADHD.<sup>8</sup> Because attentional impulsivity is linked to emotional regulation and impulsivity, this could prove that adolescent females with ADHD have more difficulties with emotional regulation and impulsivity compared to adolescent males with ADHD. One study found that adolescent females with ADHD struggled more with anxiety, distress, and depression than adolescent males with ADHD in both self-reports and parent-teacher reports.<sup>7</sup> Females have also been shown to be more vulnerable to emotional and psychological problems than males with ADHD.<sup>7</sup> In fact, one study found that females were more often referred to Child and Adolescent Psychiatric outpatient care units for suspected emotional problems, while males were more often referred because they showed symptoms of neurodevelopmental disorders.<sup>41</sup> Females with ADHD have been found to internalize their symptoms and often struggle with conditions like depression and anxiety.<sup>45</sup>

However, when focusing on criminal behavior, a study found that boys, specifically those who were “life course persistent offending boys,” had much lower levels of emotional constraint and much higher levels of negative emotionality, like anger and frustration, compared to girls.<sup>52</sup> Research investigating criminal behavior has also shown that girls exhibit higher levels of self-control across all ages and types of data being collected.<sup>53–57</sup> Therefore, while evidence generally suggests higher negative emotionality and emotional impulsivity in girls compared to boys, research focusing on criminal behavior shows that boys demonstrate higher levels of negative emotionality and lower levels of emotional constraint compared to girls.

However, these results may be because of how self-control was measured in this study.<sup>58</sup> Parents of the children in the study were asked questions regarding whether their child lied, got along with their peers, etc., to measure the child’s

impulsivity. These questions relate more to delinquent and bullying behavior, which may explain why this study found girls to be less impulsive than boys. If this study had measured self-control by asking parents if the children in the study displayed symptoms of attentional impulsivity, then the study might have found girls to be more impulsive than boys. According to one meta-analysis, boys with ADHD have more externalizing behaviors than girls with ADHD,<sup>43</sup> which supports the finding that they are more likely to have higher levels of criminal impulsivity.

Another meta-analysis using the UPPS-P framework<sup>59</sup> to separate impulsivity into five unique aspects of impulsive behavior (lack of perseverance, lack of planning, sensation seeking, negative urgency, and positive urgency) found that males in their teens report higher levels of sensation seeking and risk taking, so they have a tendency to seek arousal and take risks, while females in their teens show higher levels of negative urgency, meaning they tend to act rashly in response to negative emotions.<sup>60</sup> One theory on why this could be the case is the power control theory,<sup>61,62</sup> which suggests that the reason girls are less likely to be impulsive compared to boys is due to residing in a “patriarchal and gender-stratified social system,” which leads to boys and girls being socialized in different ways. It is also possible that self-control is a byproduct of gendered socialization. Thus, impulsivity may have different meanings for boys and girls. For boys, impulsivity may be seen as a part of growing their masculine identity, while girls may see impulsivity as something that leads to them being victimized. If all of this is true, then boys and girls are most likely learning these behaviors at home “via socialization, punishment, and monitoring.”

A larger proportion of females present with inattentive-type ADHD compared to males,<sup>18</sup> who tend to be diagnosed with hyperactive-impulsive type ADHD.<sup>18</sup> This would be consistent with population-based studies that show males report more signs of impulsivity compared to females.<sup>63</sup> However, when focusing on gender differences in impulsivity in the ADHD population, a study comparing adolescent boys with ADHD and adolescent girls with ADHD found that adolescent girls struggled with attentional/cognitive impulsivity and motor impulsivity more than adolescent boys.<sup>8</sup>

## Discussion

The aim of this literature review was to explore how symptoms of ADHD, especially impulsivity, may vary between genders. This paper specifically focused on the gender differences in ADHD, impulsivity in ADHD, and gender differences in impulsivity in ADHD.

A common finding in many papers was that males were more likely to be diagnosed with ADHD than females. Studies also found that it took longer for females to get diagnosed, with most females being diagnosed with ADHD in their adolescence or early adulthood. Most papers attributed this to females having more internalizing symptoms, while males were found to have more externalizing symptoms,

which may explain why female symptoms are often overlooked. Internalizing symptoms may lead to depression and anxiety, while externalizing symptoms may lead to aggression and hyperactivity/impulsivity. Because internalizing symptoms are directed inward rather than outward, they may be more difficult to notice. Not to mention, because DSM criteria for ADHD were built mainly on observations made on male symptoms, female symptoms may be harder to notice and diagnose.

Another one of the core focuses of this literature review was impulsivity as a symptom of ADHD. Studies have consistently found that people with ADHD are more likely to be impulsive compared to those without ADHD. However, a consistent measure of impulsivity was not found throughout the studies, and most researchers used their own criteria and measurements for impulsivity.

The final topic this literature review focuses on is the gender differences in impulsivity in ADHD. A common finding in papers is that impulsivity varies based on gender. Studies have found females with ADHD to be more emotionally impulsive compared to their male counterparts when it comes to internalized emotions, such as anxiety and depression. Meanwhile, males with ADHD were found to be more emotionally impulsive when it comes to externalized and negative emotions like anger and frustration. Some studies have concluded that, when focusing specifically on criminal behavior, males were more likely than females to act on negative impulses and have lower levels of emotional constraint.

ADHD can have detrimental effects on a person's quality of life and ability to function when left undiagnosed. With rates of ADHD in childhood and adolescence on the rise, research on ADHD is becoming increasingly important. Additionally, the current costs for individuals with ADHD in the United States are estimated to range around 143–266 billion per year.<sup>64</sup> Most of these costs are a direct result of ADHD being left undiagnosed. Research like this literature review is an important step in ensuring all people with ADHD, regardless of gender, are properly diagnosed and receive the treatments they require.

### **Limitations and recommendations for future work**

An important consideration of impulsivity research is how researchers are operationalizing impulsivity. For example, Barnhart and Buelow<sup>37</sup> found that none of the self-report measures of impulsivity factored with behavioral measures of impulsivity. Similarly, Eysenck and Eysenck<sup>65</sup> divided impulsivity into three domains: risk taking, lack of planning, and making decisions quickly. Another study separated impulsivity into three different components: spur-of-the-moment actions (motor activation), not focusing on current tasks (attention), and not planning for the future (lack of planning).<sup>26</sup> Therefore, research using different types/dimensions of impulsivity makes it difficult to compare findings across studies, as they may not be measuring the same thing.

Due to inconsistencies in how impulsivity is operationalized in the research presented, future research would benefit

from conceptualizing and operationalizing impulsivity as a multi-dimensional construct and, therefore, including both self-report and behavioral measures to assess impulsivity more accurately. Likewise, it would be beneficial for future research to compile the main measures of impulsivity into one comprehensive measure, including all types of impulsivity.

Additionally, research specifically on the symptoms and experiences of girls with ADHD is limited. Further, there is a lack of research when it comes to gender differences in ADHD related to impulsivity. Because the DSM criteria have been largely constructed based on males with ADHD, this means that the criteria may not be generalizable to females with ADHD. Indeed, the research discussed above demonstrates that female ADHD symptoms, which tend to include more internalizing symptoms and emotionality, are not currently captured as ADHD symptoms in the DSM criteria. Therefore, to improve scientific understanding of ADHD as it presents in females, more works that focus specifically on female symptoms in ADHD and impulsivity are needed. Building on this, given the issue of delayed diagnosis among females with ADHD, and the effect this has on increased impulsivity in adolescence, research examining interventions and treatments for females with ADHD should be conducted in early childhood.

### **Conclusion**

In conclusion, this literature review was intended to examine how ADHD and impulsivity present differently based on gender. Symptoms of ADHD differ based on gender; despite this DSM criteria were built around male symptoms, making female symptoms easily overlooked. Impulsivity in ADHD can also present differently based on gender. The information concluded from this study is important because it sheds light on why females with ADHD are diagnosed later in life or left untreated. ADHD affects how a person functions in day-to-day life. Adolescents with ADHD who have not been treated may find it more difficult to focus on school, causing them to fall behind their peers. Higher impulsivity could also cause people with untreated ADHD to act and behave in ways that could put themselves and others at risk. This research is important for updating DSM criteria to include female symptoms for ADHD, allowing females with ADHD to be diagnosed and treated more easily. It is important for the criteria to be based on both genders' unique symptoms to make sure people with ADHD get the treatment they need.

### **References**

- [1] Visser SN, Danielson ML, Bitsko RH, et al. Trends in the parent-report of health care provider-diagnosed and medicated attention-deficit/hyperactivity disorder: United States, 2003–2011. *J Am Acad Child Adolesc Psychiatry*. 2014;53(1):34–46.e2. doi:10.1016/j.jaac.2013.09.001.
- [2] Merikangas KR, He JP, Burstein M, et al. Lifetime prevalence of mental disorders in U.S. adolescents: results from the National Comorbidity Survey Replication–Adolescent

- Supplement (NCS-A). *J Am Acad Child Adolesc Psychiatry*. 2010;49(10):980–989. doi:10.1016/j.jaac.2010.05.017.
- [3] National Institute of Mental Health. Attention-Deficit/Hyperactivity Disorder (ADHD). (n.d.). [https://www.nimh.nih.gov/health/statistics/attention-deficit-hyperactivity-disorder-adhd#part\\_2554](https://www.nimh.nih.gov/health/statistics/attention-deficit-hyperactivity-disorder-adhd#part_2554).
  - [4] Moeller FG, Barratt ES, Dougherty DM, Schmitz JM, Swann AC. Psychiatric aspects of impulsivity. *Am J Psychiatry*. 2001;158(11):1783–1793. doi:10.1176/appi.ajp.158.11.1783.
  - [5] Patros CH, Alderson RM, Kasper LJ, Tarle SJ, Lea SE, Hudec KL. Choice-impulsivity in children and adolescents with attention-deficit/hyperactivity disorder (ADHD): a meta-analytic review. *Clin Psychol Rev*. 2016;43:162–174. doi:10.1016/j.cpr.2015.11.001.
  - [6] Barbaresi WJ, Colligan RC, Weaver AL, Voigt RG, Killian JM, Katusic SK. Mortality, ADHD, and psychosocial adversity in adults with childhood ADHD: a prospective study. *Pediatrics*. 2013;131(4):637–644. doi:10.1542/peds.2012-2354.
  - [7] Rucklidge JJ, Tannock R. Psychiatric, psychosocial, and cognitive functioning of female adolescents with ADHD. *J Am Acad Child Adolesc Psychiatry*. 2001;40(5):530–540.
  - [8] Gökçe S, Yusufoglu C, Akın E, Ayaz M. Effect of gender differences on impulsivity in adolescents with attention-deficit/hyperactivity disorder. *Anadolu Psikiyatr Derg-Anatol J Psychiatry*. 2017;18(4):379–386.
  - [9] Li Y, Yan X, Li Q, et al. Prevalence and trends in diagnosed ADHD among US children and adolescents, 2017–2022. *JAMA Netw Open*. 2023;6(10):e2336872. doi:10.1001/jamanetworkopen.2023.36872.
  - [10] Fraticelli S, Caratelli G, De Berardis D, et al. Gender differences in attention deficit hyperactivity disorder: an update of the current evidence. *Riv Psichiatr*. 2022;57(4):159–164. doi:10.1708/3855.38380.
  - [11] American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 5th ed. Washington, DC; 2013.
  - [12] Asherson P, Buitelaar J, Faraone SV, Rohde LA. Adult attention-deficit hyperactivity disorder: key conceptual issues. *The Lancet Psychiatry*. 2016;3(6):568–578.
  - [13] Faraone SV, Banaschewski T, Coghill D, et al. The world federation of ADHD international consensus statement: 208 evidence-based conclusions about the disorder. *Neurosci Biobehav Rev*. 2021;128:789–818. doi:10.1016/j.neubiorev.2021.01.022.
  - [14] Zorcec T, Pop-Jordanova N. ADHD as an executive dysfunction. Prilozi/Makedonska akademija na naukite i umetnostite, Oddelenie za biologski i medicinski nauki= Contributions/Macedonian Academy of Sciences and Arts. *Sect Biol Med Sci*. 2010;31(2):171–181.
  - [15] Swanson JM. Role of executive function in ADHD. *J Clin Psychiatry*. 2003;64:35–39.
  - [16] Posner MI, Raichle ME. *Images of Mind*. New York: Scientific American Library/Scientific American Books; 1994.
  - [17] Barkley RA. Behavioral inhibition, sustained attention, and executive functions: constructing a unifying theory of ADHD. *Psychol Bull*. 1997;121(1):65.
  - [18] Willcutt EG. The prevalence of DSM-IV attention-deficit/hyperactivity disorder: a meta-analytic review. *Neurotherapeutics*. 2012;9(3):490–499. doi:10.1007/s13311-012-0135-8.
  - [19] Herba CM, Tranah T, Rubia K, Yule W. Conduct problems in adolescence: three domains of inhibition and effect of gender. *Dev Neuropsychol*. 2006;30(2):659–695. doi:10.1207/s15326942dn3002\_2.
  - [20] Sagvolden T, Johansen EB, Aase H, Russell VA. A dynamic developmental theory of attention-deficit/hyperactivity disorder (ADHD) predominantly hyperactive/impulsive and combined subtypes. *Behav Brain Sci*. 2005;28(3):397–418.
  - [21] Bruce B, Thernlund G, Nettelbladt U. ADHD and language impairment: A study of the parent questionnaire FTF (Five to Fifteen). *Eur Child Adolesc Psychiatry*. 2006;15(1):52–60.
  - [22] Cooper P. Understanding AD/HD: a brief critical review of literature. *Child Soc*. 2001;15(5).
  - [23] Winstanley CA, Eagle DM, Robbins TW. Behavioral models of impulsivity in relation to ADHD: translation between clinical and preclinical studies. *Clin Psychol Rev*. 2006;26(4):379–395. doi:10.1016/j.cpr.2006.01.001.
  - [24] Solanto MV. Neuropsychopharmacological mechanisms of stimulant drug action in attention-deficit hyperactivity disorder: a review and integration. *Behav Brain Res*. 1998;94(1):127–152. doi:10.1016/s0166-4328(97)00175-7.
  - [25] Solanto MV. Dopamine dysfunction in AD/HD: integrating clinical and basic neuroscience research. *Behav Brain Res*. 2002;130(1–2):65–71. doi:10.1016/s0166-4328(01)00431-4.
  - [26] Patton JH, Stanford MS, Barratt ES. Factor structure of the Barratt Impulsiveness Scale. *J Clin Psychol*. 1995;51:768–774.
  - [27] Whiteside SP, Lynam DR. The five factor model and impulsivity: using a structural model of personality to understand impulsivity. *Pers Individ Differ*. 2001;30(4):669–689. doi:10.1016/s0191-8869(00)00064-7.
  - [28] Cyders MA, Smith GT, Spillane NS, Fischer S, Annus AM, Peterson C. Integration of impulsivity and positive mood to predict risky behavior: development and validation of a measure of positive urgency. *Psychol Assess*. 2007;19(1):107. doi:10.1037/1040-3590.19.1.107.
  - [29] Auerbach RP, Mortier P, Bruffaerts R, et al. WHO world mental health surveys international college student project: prevalence and distribution of mental disorders. *J Abnorm Psychol*. 2018;127(7):623. doi:10.1016/j.jaac.2018.07.723.
  - [30] Evenden JL. Varieties of impulsivity. *Psychopharmacology*. 1999;146(4):348–361. doi:10.1007/pl00005481.
  - [31] Muraven M, Baumeister RF. Self-regulation and depletion of limited resources: does self-control resemble a muscle? *Psychol Bull*. 2000;126(2):247. doi:10.1037/0033-2909.126.2.247.
  - [32] Olson SL, Schilling EM, Bates JE. Measurement of impulsivity: construct coherence, longitudinal stability, and relationship with externalizing problems in middle childhood and adolescence. *J Abnorm Child Psychol*. 1999;27(2):151–165. doi:10.1023/a:1021915615677.
  - [33] Swann AC, Bjork JM, Moeller FG, Dougherty DM. Two models of impulsivity: relationship to personality traits and psychopathology. *Biol Psychiatry*. 2002;51(12):988–994.
  - [34] Alderson RM, Rapport MD, Kofler MJ. Attention-deficit/hyperactivity disorder and behavioral inhibition: a meta-analytic review of the stop-signal paradigm. *J Abnorm Child Psychol*. 2007;35(5):745–758. doi:10.1007/s10802-007-9131-6.
  - [35] Lijffijt M, Kenemans JL, Verbaten MN, van Engeland H. A meta-analytic review of stopping performance in attention-deficit/hyperactivity disorder: deficient inhibitory motor control? *J Abnorm Psychol*. 2005;114(2):216. doi:10.1037/0021-843X.114.2.216.
  - [36] Oosterlaan J, Logan GD, Sergeant JA. Response inhibition in AD/HD, CD, comorbid AD/HD+ CD, anxious, and control children: a meta-analysis of studies with the stop task. *J Child Psychol Psychiatry Allied Discip*. 1998;39(3):411–425.
  - [37] Barnhart WR, Buelow MT. Assessing impulsivity: relationships between behavioral and self-report measures in

- individuals with and without self-reported ADHD. *Pers Individ Differ*. 2017;106(1):41–45. doi:10.1016/j.paid.2016.10.034.
- [38] Lahey BB, Applegate B, McBurnett K, et al. DSM-IV field trials for attention deficit hyperactivity disorder in children and adolescents. *Am J Psychiatry*. 1994;151(11):1673–1685.
- [39] Clarke DE, Narrow WE, Regier DA, et al. DSM-5 field trials in the United States and Canada, part I: study design, sampling strategy, implementation, and analytic approaches. *Am J Psychiatry*. 2013;170(1):43–58. doi:10.1176/appi.ajp.2012.12070998.
- [40] Dakwar E, Levin FR, Olfson M, Wang S, Kerridge B, Blanco C. First treatment contact for ADHD: predictors of and gender differences in treatment seeking. *Psychiatr Serv*. 2014;65(12):1465–1473. doi:10.1176/appi.ps.201300298.
- [41] Klefsjö U, Kantzer AK, Gillberg C, Billstedt E. The road to diagnosis and treatment in girls and boys with ADHD-gender differences in the diagnostic process. *Nord J Psychiatry*. 2021;75(4):301–305. doi:10.1080/08039488.2020.1850859.
- [42] Martin J. Why are females less likely to be diagnosed with ADHD in childhood than males? *Lancet Psychiatry*. 2024;11(4):303–310. doi:10.1016/S2215-0366(24)00010-5.
- [43] Gaub M, Carlson CL. Gender differences in ADHD: a meta-analysis and critical review. *J Am Acad Child Adolesc Psychiatry*. 1997;36(8):1036–1045. doi:10.1097/00004583-199708000-00011.
- [44] Young S, Hollingdale J, Absoud M, et al. Guidance for identification and treatment of individuals with attention deficit/hyperactivity disorder and autism spectrum disorder based upon expert consensus. *BMC Med*. 2020;18(1):146. doi:10.1186/s12916-020-01585-y.
- [45] Gershon J, Gershon J. A meta-analytic review of gender differences in ADHD. *J Atten Disord*. 2002;5(3):143–154. doi:10.1177/108705470200500302.
- [46] Mowlem FD, Rosenqvist MA, Martin J, Lichtenstein P, Asherson P, Larsson H. Sex differences in predicting ADHD clinical diagnosis and pharmacological treatment. *Eur Child Adolesc Psychiatry*. 2019;28(4):481–489.
- [47] Quinn PO, Madhoo M. A review of attention-deficit/hyperactivity disorder in women and girls: uncovering this hidden diagnosis. *Prim Care Companion CNS Disord*. 2014;16(3):27250. doi:10.4088/PCC.13r01596.
- [48] Ragnarsdottir B, Hannesdottir DK, Halldorsson F, Njardvik U. Gender and age differences in social skills among children with ADHD: peer problems and prosocial behavior. *Child Fam Behav Ther*. 2018;40(4):263–278.
- [49] Petrovic P, Castellanos FX. Top-down dysregulation—from ADHD to emotional instability. *Front Behav Neurosci*. 2016;10:70. doi:10.3389/fnbeh.2016.00070.
- [50] Johnson SL, Carver CS. Emotion-relevant impulsivity predicts sustained anger and aggression after remission in bipolar I disorder. *J Affect Disord*. 2016;189(6):169–175. doi:10.1016/j.jad.2015.07.050.
- [51] Berg JM, Litzman RD, Bliwise NG, Lilienfeld SO. Parsing the heterogeneity of impulsivity: a meta-analytic review of the behavioral implications of the UPPS for psychopathology. *Psychol Assess*. 2015;27(4):1129. doi:10.1037/pas0000111.
- [52] Moffitt TE, Caspi A. Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females. *Dev Psychopathol*. 2001;13(2):355–375. doi:10.1017/s0954579401002097.
- [53] Burton V Jr, Cullen FT, Evans TD, Alarid LF, Dunaway RG. Gender, self-control, and crime. *J Res Crime Delinq*. 1998;35(2):123–147. doi:10.1177/0022427898035002001.
- [54] Hayslett-McCall KL, Bernard TJ. Attachment, masculinity, and self-control: a theory of male crime rates. *Theor Criminol*. 2002;6(1):5–33. doi:10.1177/136248060200600101.
- [55] Chapple CL, Hope TL, Whiteford SW. The direct and indirect effects of parental bonds, parental drug use, and self-control on adolescent substance use. *J Child Adolesc Subst Abuse*. 2005;14(3):17–38.
- [56] LaGrange TC, Silverman RA. Low self-control and opportunity: testing the general theory of crime as an explanation for gender differences in delinquency. *Criminology*. 1999;37(1):41–72. doi:10.1111/j.1745-9125.1999.tb00479.x.
- [57] Tittle CR, Ward DA, Grasmick HG. Gender, age, and crime/deviance: a challenge to self-control theory. *J Res Crime Delinq*. 2003;40(4):426–453. doi:10.1177/0022427803256074.
- [58] Chapple CL, Johnson KA. Gender differences in impulsivity. *Youth Violence Juv J*. 2007;5(3):221–234.
- [59] Lynam DR, Caspi A, Moffitt TE, Loeber R, Stouthamer-Loeber M. Longitudinal evidence that psychopathy scores in early adolescence predict adult psychopathy. *J Abnorm Psychology*. 2007;116(1):155.
- [60] Dir AL, Coskunpinar A, Cyders MA. A meta-analytic review of the relationship between adolescent risky sexual behavior and impulsivity across gender, age, and race. *Clin Psychol Rev*. 2014;34(7):551–562.
- [61] Hagan J, Simpson J, Gillis AR. Class in the household: a power-control theory of gender and delinquency. *Am J Sociol*. 1987;92(4):788–816.
- [62] Hagan J, Simpson J, Gillis AR. Feminist scholarship, relational and instrumental control, and a power-control theory of gender and delinquency. *Br J Sociol*. 1988;39(3):301–336.
- [63] Lejuez CW, Aklin W, Daughters S, Zvolensky M, Kahler C, Gwadz M. Reliability and validity of the youth version of the Balloon Analogue Risk Task (BART-Y) in the assessment of risk-taking behavior among inner-city adolescents. *J Clin Child Adolesc Psychology*. 2007;36(1):106–111. doi:10.1207/s15374424jccp3601\_11.
- [64] Doshi JA, Hodgkins P, Kahle J, et al. Economic impact of childhood and adult attention-deficit/hyperactivity disorder in the United States. *J Am Acad Child Adolesc Psychiatry*. 2012;51(10):990–1002.e2. doi:10.1016/j.jaac.2012.07.008.
- [65] Eysenck SB, Eysenck HJ. The place of impulsiveness in a dimensional system of personality description. *Br J Soc Clin Psychol*. 1977;16:57–68.

## About the Author



**Meryem Demirhan** is an 11th grader at Buyuk Kolej in Ankara, Türkiye. Her research interests include psychology and medicine.