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## Questioning the Legitimacy of the Attention-Deficit/Hyperactivity Disorder Construct

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### **Abstract**

This literature review examines 45 journal articles from a variety of disciplines, including genetics, neuropsychology, child and school psychology, evolutionary psychology, clinical psychology, and psychopharmacology. The review features a popular article published in the *New York Times*; though not a peer-reviewed journal article, it provides evidence of the pervasive social impact of the Attention-deficit/hyperactivity disorder (ADHD) debate. This review covers articles published between the years 1971 to 2021, with a greater emphasis on articles published after 2013 (over 50% of the review, given that the ADHD construct was reconceptualized in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5). Overall, this literature review found that ADHD is a dimensional disorder with uncertain etiology. There is evidence to suggest ADHD is over diagnosed and this overdiagnosis is gendered. This review suggests the medicalization of ADHD may be harmful and inaccurate and ADHD may not be an example of a disordered behavior.

*Keywords:* ADHD, overdiagnosis, dimensional disorder, medicalization

## QUESTIONING THE ADHD CONSTRUCT

### **Questioning the Legitimacy of the Attention-Deficit/Hyperactivity Disorder Construct**

Attention-deficit/hyperactivity disorder (ADHD) has been considered an impairing disorder that can result in lifelong difficulty. However, current conceptualizations of this disorder have been criticized due to the dimensional nature of its symptoms, its non-specific etiology, and its possible overmedicalization. Our current understanding of ADHD is unclear in many aspects, spanning from symptom presentation to diagnosis to treatment and must be evaluated critically. This paper seeks to outline the current literature in support of, and against, the current ADHD construct.

Relevant keywords related to the legitimacy of ADHD were used in the University of Waterloo library online portal, PsycInfo, and Google Scholar. Some examples of keywords used were “ADHD criticisms,” “legitimacy of ADHD construct,” “ADHD continuum,” and “ADHD controversy.” Relevant articles were selected based upon the title and criterion related to conceptualizing the ADHD construct, rather than an unrelated component of ADHD symptomatology. “ADHD criticisms” returned results related to self-criticism in people with ADHD, however these articles were discarded. There was no restriction on ADHD subtype, gender, age group, IQ, or socioeconomic status. Abstracts were skimmed for relevance based on criterion of the article, whether it was challenging a part or parts of the ADHD construct. Articles included were reviewed in full text and incorporated into the literature review. Additional articles were found by reviewing the references and by using the Cited By function on Google Scholar. Initial searches were done through June- July of 2021 and additional searches were conducted in August 2022. A top-down approach was used to extract the main ideas and themes of the literature review. Review articles were examined for broad themes, then grouped based on whether they provided evidence for or against the theme.

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### **Attention-Deficit/Hyperactivity Disorder**

ADHD is an increasingly common disorder, characterized by inattention, hyperactivity, and impulsivity, making it difficult for children to function (American Psychiatric Association, 2013). It has typically been conceptualized as a developmental disorder and symptoms can continue into adulthood (American Psychiatric Association, 2013; Tarver & Sayal, 2014). Globally, ADHD is estimated to have a 5% prevalence rate and is diagnosed more often in males than females (American Psychiatric Association, 2013; Tarver & Sayal, 2014). In the DSM-5, ADHD is a categorical construct with symptom clusters of hyperactivity-impulsivity and inattentiveness (American Psychiatric Association, 2013; McLennan, 2016). Given its recently increasing diagnosis rate, ADHD as a construct has been examined in the scientific literature and the popular media alike, and thus, has given rise to some controversy (Hinshaw, 2018).

There has been debate about the legitimacy of the ADHD construct in the DSM-5. This paper will explore whether ADHD can be considered a valid and categorically defined disorder, or if it is the medicalization of typical behavior. More specifically, this paper will investigate the unclear etiology of ADHD and possible overdiagnosis of this disorder. Furthermore, it will explore the impact of the gender bias in diagnosis, as well as a possible evolutionary basis for ADHD. These factors will contribute to a comprehensive exploration of the construct validity of ADHD diagnoses. Finally, this paper will suggest future research needed to further support or undermine the conceptualization of ADHD by the DSM-5.

A literature review is the most useful research method for exploring this topic as there have been a range of scholarly perspectives, across multiple disciplines, related to how to best conceptualize the ADHD construct. There are many sides to this debate, with some in support of the current ADHD construct, and others questioning its legitimacy. Thus, a review of literature is

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broad enough to explore and synthesize the multitude of perspectives surrounding this controversy. It is important to explore this topic as ADHD is a commonly diagnosed disorder, and the way it is constructed should be scientifically robust. There needs to be a focus on harm reduction and treating disordered symptomatology, rather than causing more harm by medicalizing non-disordered behavior. People with ADHD and symptoms of ADHD need treatment and care. Conceptualizing their symptoms as a disorder may lead to harmful consequences. Obtaining a better understanding and defining the ADHD construct may advance the understanding of human behavior and psychology.

### **Etiology of ADHD**

In the DSM-5, ADHD is understood as a neurodevelopmental disorder with a genetic component and is correlated with neurophysiological differences in the brain (American Psychiatric Association, 2013; Curatolo et al., 2010; Castellanos et al., 2003; Faraone et al., 2005; Faraone & Larsson, 2019). Curatolo and colleagues (2010) found that children with ADHD have smaller overall brain volume compared to healthy controls. Similarly, Castellanos and others (2003) revealed that identical twins with ADHD had reduced caudate volumes than twins without ADHD. Decreased white matter connectivity and dopamine dysregulation are key factors in how ADHD functions as a disorder (Curatolo et al., 2010). Stimulants that target the brain have been effective in treating ADHD symptoms, suggesting a neurobiological basis (Curatolo et al., 2010). Altogether, this implies there are neurological indices associated with ADHD.

Though ADHD may present neurobiological differences, evidence of what constitutes this neurobiological basis remains ambiguous. ADHD lacks a specific biological marker or test for diagnosis, instead relying on clinical observation (American Psychiatric Association, 2013;

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Timimi & Taylor, 2004). Moreover, ADHD is generally hypothesized to be caused by the interaction of multiple genes, each having a small effect (Gizer et al., 2009; Faraone & Larsson, 2019; Alonzo-Gonzalez, 2019). Different genes could potentially result in similar phenotypic expression of the disorder (Gizer et al., 2009). Thus, it is difficult to ascertain the exact genes implicated in every case, and researchers have not yet established a genetic roadmap that may lead to the development of ADHD. Neurobiologically, ADHD is still not fully understood.

Furthermore, the etiology of ADHD may not solely be neurobiological or genetic, though it has been defined as a neurodevelopmental disorder in the DSM-5 (American Psychiatric Association, 2013). For example, multiple environmental factors occurring before, after, and during pregnancy may correlate to the development of ADHD, such as: prenatal alcohol exposure, maternal smoking, low-birthweight, malnutrition, social deprivation, and childhood traumatic brain injury (Curatolo et al., 2010; Quinn & Lynch, 2016; Yang et al., 2016). Researchers lack a clear understanding of the complex etiology of ADHD, and there have been various attempts to define ADHD (e.g., neurodevelopmental disorder, hyperkinetic disorder, and/or heterogeneous condition; Quinn & Lynch, 2016). Overall, this indicates ADHD is not entirely understood as a disorder and may also challenge its legitimacy as a construct.

### **Categorical vs Dimensional Approach**

In addition to the debate surrounding ADHD's etiology, studies have shown that ADHD may be best conceptualized as a dimensional disorder rather than a categorical one (McLennan, 2016). A categorical model is practical in dichotomous situations, such as deciding when to prescribe a specific medication for the treatment of ADHD (McLennan, 2016). However, current research broadly shows that a categorical approach may be misleading. ADHD traits examined through a genetic and neurophysiological perspective seem to be present in the general

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population to a lesser degree. In an extensive study of twin pairs, researchers found there are similar heritability rates of extreme symptoms of ADHD, compared to subclinical symptoms not meeting the criteria for diagnosis (Larsson et al., 2011). Stergiakouli and colleagues (2015) found that alleles with expressions signal an increased risk of ADHD diagnosis and are related to corresponding ADHD trait levels in the general population, further demonstrating a dimensional, dose-response relationship.

From a neurophysiological perspective, a large population-based study showed a dimensional relationship between cortical thinning and ADHD symptoms (e.g., hyperactivity, inattention; Mous et al., 2014). Past studies suggest a dual categorization approach may be ideal, rather than a strictly categorical one (Elton et al., 2014). Symptom severity measures were dimensionally associated with functional differences in the brain for both children with ADHD and typically developing children. However, there were differences in functional connectivity magnitude between the two groups, suggesting both dimensional and categorical aspects to the ADHD condition (Elton et al., 2014). There is neurobiological evidence that a categorical approach for ADHD may be insufficient and may be better understood through a dimensional framework.

Additionally, the dimensional nature of ADHD can be argued based upon symptoms and treatment of these symptoms. For instance, the deficits in basic information processing in children with ADHD are observed in subclinical cases (Salum et al., 2014). Stimulants thought to target ADHD symptomatology show improvements for children diagnosed with ADHD but also the broader population. This suggests that the benefits may not be specific to children with ADHD (Agay et al., 2010; Bagot & Kaminer, 2013). Previous researchers have questioned if

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ADHD is a neurological disorder, or if it is an example of normative childhood development (Timimi, 2004; Quinn & Lynch, 2016).

### **Children with ADHD**

Given the dimensional approach of ADHD, it is possible that ADHD symptomatology is part of normative child development rather than a disorder. Critics of the ADHD construct have expressed how the dimensional nature of ADHD leaves a “zone of ambiguity,” which can be interpreted differently; some have commented that ADHD is diagnosed at different rates in the U.S. and Europe (Parens & Johnston, 2009). This “zone of ambiguity” may occur when diagnosing the same individual, depending on who is doing the diagnosing. Klasen (2000) interviewed parents of hyperactive children as well as general practitioners and found that parents preferred to medicalize the disorder to reduce feelings of alienation, whereas the doctors were more hesitant. It is important to consider who is benefiting from the medicalization of ADHD symptoms. Other critics of the ADHD construct comment that the prescription of psychostimulants and the corresponding effects on behavior, may be more beneficial for parents and teachers than for the children experiencing the symptoms (Visser & Jehan, 2009).

The medicalization of ADHD might have benefits for parents and teachers that are unrelated to supporting the mental wellbeing of the child. Previous researchers argue that the ADHD construct medicalizes “annoying” behavior on the extreme end and imposes an arbitrary cut-off for the disorder (Mayes, 2019; Quinn & Lynch, 2016). Children with ADHD are often disruptive in classrooms due to their inattention and hyperactivity, whereas medication makes them more compliant. However, children are often disruptive simply because they are children. Childhood development is a complex process and requires extensive social learning about what behavior is permissive and what is not (Bandura, 1971). Past research suggests that children who



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are relatively younger than their peers (i.e., children born in December vs January of the same year) are more likely to be diagnosed with ADHD than their older peers, despite ADHD being a lifelong condition (Ford-Jones, 2015). This suggests clinicians may be medicalizing childhood behavior that is typical for a child's developmental age by comparing such behaviors to their more mature peers. Finally, ADHD traits are present in the general population and are not unique to people with the disorder. As a result of ADHD traits existing dimensionally, ADHD may be medicalizing typical childhood development (Quinn & Lynch, 2016).

### **Overdiagnosis of ADHD**

Given the unclear etiology of ADHD and its possible dimensional nature, diagnosis can be difficult. There are many factors to take into consideration and clinicians must rely on their own judgments to decide what is typical and what is not. Critics of ADHD emphasize the possible overdiagnosis of the disorder (Fresson et al., 2019; Bruchmüller et al., 2012). Cotuono (1993) found that only 22% of a sample of 92 children who had been previously diagnosed with ADHD, received a primary diagnosis upon careful reevaluation. Desgranges (1995) revealed that only 38% of those who had been referred by a clinic for an ADHD evaluation had the disorder. This further implies that ADHD is being overdiagnosed in children.

Overdiagnosis of ADHD may be influenced by the gender of the child. The ratio of boys with ADHD compared to girls is estimated between 3:1 to 9:1 (Fresson et al., 2019). Girls with the disorder tend to be less hyperactive, have fewer conduct problems, and are more inattentive than boys. This difference may result in a lower likelihood of diagnosis (Fresson et al., 2019). Though these innate sex differences are well-documented in the literature, they may not paint the full picture as to why girls are less likely to be diagnosed than boys (Bruchmüller et al., 2012; Fresson et al., 2019).

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A potential reason for this diagnostic discrepancy could be an innate therapeutic bias (Fresson et al., 2019). A vignette (brief description of an individual across several contexts) can be used by clinicians to assess for possible disorderly behavior. Bruchmüller and others (2012) found that therapists were more likely to diagnose a written vignette of a child as having ADHD if the child was a boy, all else held equal. Fresson and colleagues (2019) showed that boys were impaired by perpetuated stereotypes while being evaluated. In turn, may have worsened the symptoms of the young boys and contributed to overdiagnosis (Fresson et al., 2019). Boys that were stereotyped as being impulsive or inattentive, tended to internalize such stereotypes and were presented with stronger ADHD symptoms (Fresson et al., 2019). In post-diagnosis, boys with ADHD were more likely to receive treatment than girls with ADHD (Bruchmüller et al., 2012). The current application of the ADHD label and treatment may be biased and subjective rather than based on rigorous diagnostic criteria (Bruchmüller et al., 2012).

ADHD is often conflated with other disorders, such as conduct disorder (CD) and autism spectrum disorder (ASD), thus potentially contributing to the overdiagnosis of ADHD (Bélanger et al., 2018). ADHD is highly comorbid with CD and ASD, and the two disorders may not be fully distinct (Thapar et al., 2001; Ronald et al., 2008). However, research shows differences in grey matter abnormalities between brains with ADHD and conduct disorder, along with etiological differences between ADHD and ASD (Stevens & Haney-Caron, 2012; Ronald et al., 2014). Research generally supports ADHD as a distinct disorder, but overall is quite ambiguous and may lead to diagnostic confusion (Bélanger et al., 2018).

Other skeptics highlight the role of pharmaceutical companies in the possible overdiagnosis of the disorder. There have been claims that ADHD has been medicalized to increase the market demand of these companies (Quinn & Lynch, 2016). Particularly, skeptics

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argue that although psychostimulants have been effective in the treatment of ADHD, pharmaceutical companies have funded some of this research and may have a vested interest in the results (Quinn & Lynch, 2016). Pharmaceutical companies tend to aggressively advertise ADHD medication in a variety of ways. Specifically, they downplay the negative side effects of stimulant medication and emphasize the benefits, claim ADHD is underdiagnosed, and highlight the deleterious effects of the disorder if unmedicated (Schwarz, 2013). However, evidence is mixed about the benefits of psychostimulant medication for ADHD, especially in the longer term (Kazda et al., 2021). Additionally, it is difficult to study these long-term effects due to natural fluctuations of the disorder through time, treatment quality, and treatment adherence (Hazell, 2011). Although psychostimulants can be helpful in treating ADHD, they may be more beneficial in severe cases, but riskier in milder cases (Kazda et al., 2021). In milder cases, there is less of a chance of large symptom reductions caused by medication. Thus, the risks may outweigh the possible benefits (Kazda et al., 2021). Psychostimulant medication may be an effective form of treatment, but it is important to be aware of its possible consequences in the case of inaccurate diagnosis.

### **An Evolutionary Perspective**

From an evolutionary perspective, the symptoms of ADHD may have once had adaptive functions that have become maladaptive in modern society (Tremblay & Rosen, 1996). Tremblay and Rosen (1996) explore possible theories as to why ADHD, which has such a strong genetic component, persists against the current force of natural selection. The researchers found that ADHD-related traits may have allowed humans to remain flexible while hunting. Further, they note that hyperactive symptoms we recognize today could have manifested themselves as aggression in early civilization and could have helped people fight against predators. Today,

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ADHD hyperactivity is muted with treatment, but has been manifested as aggression in certain untreated situations. For instance, it is believed that up to 60% of those in the prison system may have ADHD (Tremblay & Rosen, 1996). These hyperactive traits may have become aggression if warranted by a predatory threat. Tremblay and Rosen (1996) posit that ADHD symptoms could have developed to help sustain maternal attention while tidal wading, increasing the likelihood of survival. However, recent research has failed to provide support for the evolutionary theory of ADHD (Arildskov et al., 2021).

If ADHD is an evolved set of dimensional traits that were once beneficial, then perhaps it is a disorder of present-day society rather than the individual, further warranting ADHD as a social construct (Amaral, 2007). Treatment differs cross-culturally, and cultures such as the United States tend to medicate more than others (Amaral, 2007; Bachmann et al., 2017). This suggests that culture plays a key role in the interpretation of ADHD traits as disordered (Amaral, 2007). Additionally, ADHD traits may be beneficial in some niches. People with ADHD can experience intense states of focus, known as hyperfocus, and perform better on divergent creativity tasks. An example is the Unusual Uses Task, where participants are asked to brainstorm as many uses as they can for a common object (Hupfield et al., 2018; White & Shah, 2005). Therefore, the perspective of ADHD as a disorder may be culturally oriented and context dependent.

### **Benefits and Possible Harms of the ADHD Construct**

Proponents of the ADHD construct argue that ADHD is harmful and has been shown to have negative outcomes. ADHD, if left untreated, may result in poor academic achievement, self-injury, emotion dysregulation, sleep issues, risky sexual behaviour, substance use, low self-esteem, and/or poor social functioning (Hinshaw, 2018; Nigg, 2013; Harpin et al., 2016).

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Economically, childhood ADHD has been shown to have negative consequences on the adult labor market and potentially lead to problems with sustained employment (Fletcher, 2013; Hinshaw, 2018). When medicated, people with ADHD are significantly less likely to have motor vehicle accidents, experience traumatic brain injuries, and engage in substance use or suicide (Pliszka, 2019). Thus, fully abandoning ADHD as a construct might be harmful (Hinshaw, 2018).

A diagnosis of ADHD can potentially cause harms that outweigh the benefits. Owens and Jackson (2017) examined a nationally representative sample of U.S. students with ADHD and found that children diagnosed with mild ADHD symptoms had poorer grades than undiagnosed children with similar symptom profiles. The researchers proposed that these findings were a result of a social labeling effect. Other researchers discuss how an ADHD diagnosis can result in a sense of disempowerment, causing the individual to accept their condition rather than seek help (Kazda et al., 2021). Though an ADHD diagnosis may be critical for the wellbeing of many individuals, it has the potential to harm some, especially those with milder cases. Questioning the ADHD construct, particularly its application for less severe cases, is necessary for overall harm reduction and must be further explored.

### **Conclusion**

Whether or not the construct of ADHD is valid, ADHD is more complicated than it is presented in the DSM-5. It is etiologically ambiguous and its current conceptualization in the DSM-5 as a neurodevelopmental disorder may be reductionist, despite having major support in the literature. Furthermore, ADHD may be better understood as dimensional and its nature as a disorder may be context or culture specific, as shown in this review. Although research does support the distinction between ADHD and its comorbidities, they are often conflated, and the

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distinction is vague. Overall, it is essential to consider the political and sociological implications of a rising rate of diagnosis and to confront any therapeutic biases (e.g., gender) that may need correction. To establish ADHD more thoroughly as a valid and robust construct, future research is needed to uncover the complex etiology and underlying mechanisms of ADHD and separate these from other comorbid conditions. More research should be conducted about women and adults with ADHD, as these areas have been understudied and could result in therapeutic bias. In conclusion, non-stimulant treatment methods should be further explored to provide better understanding of this construct (Hinshaw, 2018).

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