9-11-2023

Gender and Sociodemographic Discrepancies in ADHD Symptom Endorsement

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A Thesis Submitted to The Graduate School at the University of Missouri-St. Louis
in partial fulfillment of the requirements for the degree
Master of Arts in Psychology
with an emphasis in Behavioral Neuroscience

December
2023

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Abstract

Historically, the prevalence of attention deficit hyperactivity disorder (ADHD) has been found to be higher in men than women. However, recent work suggests that part of this discrepancy might be because ADHD may manifest in women in less disruptive ways and therefore be underdiagnosed. This issue is compounded by the fact that some ADHD traits may seem more "normative" at certain ages. To further understand potential biases in parent perception of ADHD symptoms, this study examines parent endorsement of the 18 DSM-5 criteria for ADHD cross-sectionally in a non-clinical sample of children from 3.3 to 6 years of age. It is hypothesized that controlling for effortful control, measured by the Children's Behavior Questionnaire (Putnam & Rothbart, 2006), results will show a higher ADHD symptom endorsement for boys than girls, higher endorsement by white than non-white parents, a lower symptom endorsement for older than younger children, and higher subjective social status related to lower symptom endorsement. Results of a hierarchical multiple regression show that beyond the variation due to effortful control differences, some of the variation in ADHD symptom endorsement is influenced by the child's gender and age. However, race and subjective social status did not significantly predict ADHD symptom endorsement. The results of this research indicate that certain sociodemographic variables, such as gender and age, have a substantial influence on predicting parental endorsement for ADHD symptoms using the DSM-5 criteria. However, factors like race and subjective socioeconomic circumstances may not have the same predictive significance.

Keywords: Attention Deficit Hyperactivity Disorder, DSM-5 criteria, Effortful Control, Children's Behavior Questionnaire, Subjective Social Status.

Gender and Sociodemographic Discrepancies in ADHD Symptoms Endorsement

Attention Deficit Hyperactivity Disorder (ADHD) is a complex neurodevelopmental and behavioral condition characterized by difficulties with attention, hyperactivity, and impulsivity symptoms such as trouble focusing, disorganization, impulsive behavior, and excessive activity (American Psychiatric Association [APA], 2013). While the underlying causes of ADHD remain uncertain, research suggests that genetic and environmental factors are involved (Faraone et al., 2015). Although often diagnosed in childhood, ADHD can persist into adulthood, impacting daily functioning and quality of life. In the past, it has been observed that ADHD is more commonly identified in men compared to women. Nonetheless, more recent research indicates that this difference might be partially attributed to the possibility that ADHD could manifest in women with less conspicuous symptoms, potentially leading to lower rates of diagnosis.

Effective treatment of ADHD typically involves a multifaceted approach that may include medication, therapy, and lifestyle modifications (APA, 2013). However, disparities have been found in diagnosing and treating ADHD among various demographic groups. For instance, research has shown that boys are likelier than girls to receive an ADHD diagnosis (APA, 2013). Moreover, children from low-income families and minority groups may be at an increased risk of receiving inadequate treatment (Larson et al., 2011;). Culture also plays a part, with Black children being more like to be diagnosed with the hyperactive-impulsive subtype of ADHD, while Asian American children are more likely to receive a diagnosis of the inattentive subtype (Bussing et al., 2005; DuPaul et al., 2016). Such disparities highlight the need for greater understanding

and more equitable approaches to assessing and managing ADHD. Hence, the present study aims to investigate potential discrepancies in parental endorsement of the DSM-5 criteria for diagnosing ADHD. This investigation involves assessing whether gender, age, race, and subjective socioeconomic status (SES) influence parents' reporting of ADHD symptoms in their children.

DSM-5 Criteria for ADHD Diagnosis

To determine if the DSM-5 (APA, 2013) criteria for ADHD have been met, clinicians carefully examine the child's symptoms and behaviors. The DSM-5 categorizes ADHD into three presentations: Predominantly Inattentive, Predominantly Hyperactive-Impulsive, or Combined Presentation. In the case of inattention, the clinician identifies if the child exhibits at least six out of nine symptoms associated with inattention (APA, 2013). Similarly, for hyperactivity and impulsivity, the clinician assesses if the child displays at least six out of nine symptoms indicative of hyperactivity and impulsivity (APA, 2013).

Role of Parental Reports in Diagnosis and Management of ADHD

The diagnosis and management of ADHD requires the involvement of primary care clinicians who play a crucial role in evaluating and providing appropriate treatment options for affected individuals. When a child presents with symptoms suggestive of ADHD, the primary care clinician takes the lead in initiating a comprehensive evaluation (Wolraich et al., 2019). Importantly, the primary care clinician obtains reports from parents and other individuals who are involved in the child's daily life, such as teachers, grandparents etc. These reports provide valuable insights into the child's behavior across different settings, helping to comprehensively understanding of the child's symptoms

(Wolraich et al., 2019). Therefore, parents are typically the primary observers of their child's behavior and can provide valuable insights into the child's symptoms and daily functioning.

Additionally, parents play a significant role in the treatment and management of ADHD. After a thorough assessment and diagnosis, the primary care clinician takes on the responsibility of recommending appropriate treatment options for children and adolescents with ADHD. The choice of treatment is influenced by the child's age and specific presentation of ADHD symptoms. For preschool-aged children (aged 4–5 years), it is recommended that their parents and/or teachers administered behavior therapy (Wolraich et al., 2019). Behavior therapy focuses on improving the child's behavior by reinforcing positive behaviors, teaching self-control strategies, and providing structure and routine. For children in elementary school (ages 6–11), the primary healthcare provider might propose the use of FDA-approved medications for ADHD or behavior therapy administered by parents and/or teachers, whereas for adolescents (ages 12–18), the standard recommendation is a combination of FDA-approved medications and behavior therapy (Wolraich et al., 2019). Therefore, when it comes to children's diagnosis and management of ADHD, parents play a pivotal role. Parents provide critical information about their child's behavior and symptoms, aiding the clinician in making an accurate diagnosis and determining the most appropriate treatment plan. However, the questions arises whether parental reports can be considered reliable or not.

Reliability of parental report of ADHD symptoms

Current research aims to utilize parental reports of their children's ADHD symptoms as a valuable source of information and attempts to investigate the reliability

of parental reports when assessing ADHD symptoms in children. More specifically, the study investigates the extent to which parental reports align with the diagnostic criteria outlined in the DSM-5 and how sociodemographic factors, including the child's gender, age, race, and subjective socioeconomic status (SES), influence parental reports of ADHD symptoms.

Disparities in ADHD diagnosis

Recent research has highlighted significant discrepancies in the diagnosis and treatment of ADHD between different demographic groups. This study aims to explore the factors contributing to these disparities and shed light on the role of demographic factors such as age, race, gender, and subjective socioeconomic status.

Historically Boys Are More Likely to be Diagnosed

Studies have shown that there are variations in the rates of ADHD prevalence between genders. Research has indicated that the occurrence of ADHD is 2-9 times higher in boys compared to girls in clinical samples, and 2-3 times higher in epidemiologic samples (Barkley et al., 2006; Nussbaum, 2012). These findings align with similar prevalence rates observed in European countries, where ADHD rates in boys are 3-16 times higher than in girls (Nøvik et al., 2006). However, recent research has questioned this disparity, suggesting that ADHD may be underdiagnosed in women (Quinn & Madhoo, 2014).

One explanation for the underdiagnosis of ADHD in women is the difference in symptoms between genders. Women with ADHD may present with less stereotypical symptoms of the disorder, such as inattention rather than hyperactivity or impulsivity (Biederman et al., 2010). These symptoms may not be recognized as ADHD by

healthcare professionals and may be attributed to other causes, such as anxiety or depression. In recent years, there has been growing recognition of the need to improve the diagnosis and treatment of ADHD in women (Abdelnour et al., 2022). Healthcare professionals are being educated about the gender differences in ADHD and the importance of recognizing the disorder in women (Quinn & Madhoo, 2014). There is also a growing body of research on the presentation of ADHD in women and the best approaches for diagnosis and treatment.

One approach proposed for improving the diagnosis of ADHD in women is using gender-sensitive screening tools. These tools consider the diverse ways that ADHD may present in women and can help healthcare professionals recognize the disorder in this population (Kooij et al., 2019). Another approach is to increase awareness and reduce the stigma surrounding ADHD in women. This can be achieved through education campaigns and advocacy efforts to raise awareness of the disorder and its impact on women's lives. In terms of treatment, evidence suggests that women with ADHD may respond differently to medication than men. Women may be more sensitive to the side effects of stimulant medication and may require lower doses than men (Sobanski et al., 2012). It is suggested that women with ADHD may benefit from non-pharmacological interventions, such as cognitive-behavioral therapy or mindfulness training (Quinn & Madhoo, 2014).

ADHD May Present in Women in Less Disruptive Ways

While traditionally believed to be more prevalent in males, recent research suggests that ADHD may be underdiagnosed in women (Nigg et al., 2016). This may be partly because ADHD may present in women in less disruptive ways, making it harder to

recognize and diagnose. Girls with ADHD are likelier to present with inattentive symptoms, such as difficulty with organization and planning than boys (Quinn & Madhoo, 2014). In contrast, boys with ADHD are more likely to exhibit hyperactive and impulsive symptoms. These gender differences in symptom presentation may contribute to the underdiagnosis of ADHD in women, as healthcare professionals may not recognize the more subtle symptoms of inattention as indicative of the disorder.

Moreover, women with ADHD may develop coping mechanisms to manage their symptoms, making it more challenging to recognize the disorder. For instance, women with ADHD may develop a heightened sense of responsibility to compensate for their difficulties with attention and organization (Quinn & Madhoo, 2014). This coping mechanism may lead to overachievement and perfectionism, which may mask the underlying symptoms of ADHD.

Another factor that may contribute to the underdiagnosis of ADHD in women is the stigma surrounding the disorder. ADHD is often associated with negative stereotypes, such as being lazy or lacking discipline. Women may hesitate to seek help for fear of being judged or stigmatized. Moreover, the lack of awareness among healthcare professionals about ADHD in women may further reinforce these negative stereotypes, thereby reducing the likelihood of diagnosis (Quinn & Madhoo, 2014).

Consequences of Underdiagnosis in Women

The underdiagnosis of ADHD in women can have profound consequences, including a delay in treatment and a negative impact on mental health. Women with ADHD may struggle with academic or work performance, leading to lower achievement levels and missed opportunities (Quinn & Madhoo, 2014). Relationship difficulties are

also common among women with undiagnosed ADHD, as they may struggle with communication, forgetfulness, and impulsivity (Barkley & Fischer, 2010). Furthermore, previous studies have indicated that children and adolescents with ADHD often experience significant psychiatric comorbidities, such as depression, conduct disorder, and autism spectrum disorders and many non-psychiatric comorbidities including obesity, diabetes mellitus, and chronic inflammatory disorders like asthma and allergic rhinitis (Chen et al., 2018; Cortese et al., 2018; Faraone et al., 2021; Fluegge & Fluegge, 2018; Schmitt et al., 2016). Women with ADHD are also at a higher risk of developing mental health problems, such as anxiety and depression, which can exacerbate the symptoms of ADHD and make it harder to cope (Biederman et al., 2008). Therefore, it is crucial for researchers to identify causes of underdiagnosis of ADHD among women and improve treatment.

Addressing the Underdiagnosis in Women

One way to address the underdiagnosis of ADHD in women is to increase awareness among healthcare professionals. This can be achieved through education campaigns and training programs that focus on the gender differences in symptom presentation and the importance of recognizing the disorder in women. In addition, healthcare professionals can use gender-sensitive screening tools that consider the diverse ways that ADHD may present in women (Kooij et al., 2019). Furthermore, non-pharmacological interventions, such as cognitive-behavioral therapy or mindfulness training, may be particularly beneficial for women with ADHD. These therapies may help women develop coping strategies to manage their symptoms and improve their overall quality of life (Quinn & Madhoo, 2014). In terms of medication, there is some

evidence to suggest that women with ADHD may respond differently to stimulant medication than men. Women may be more sensitive to the side effects of stimulant medication and may require lower doses than men (Sobanski et al., 2012). Healthcare professionals should take these gender differences into account when prescribing medication for women with ADHD.

Gender and ADHD in Children

The prevalence of ADHD is known to vary by gender among children as well, with boys being diagnosed with ADHD at a higher rate than girls (Gaub, 1997; Quinn, 2008; Skogli et al., 2013). Studies have reported that boys are more likely to exhibit hyperactive and impulsive symptoms, while girls are more likely to exhibit inattentive symptoms (Quinn, 2008; Skogli et al., 2013). This has led to the suggestion that girls may be underdiagnosed and undertreated for ADHD. Studies have shown that boys are up to 3 times more likely to be diagnosed with ADHD than girls (Bruchmüller et al., 2012). Research also shows that girls with ADHD tend to have fewer externalizing symptoms, such as hyperactivity and impulsivity, and more internalizing symptoms, such as anxiety and depression (Hinshaw et al., 2012). This may make it less likely for girls to be diagnosed with ADHD, as they may not present with the typical symptoms of the disorder. Girls with ADHD may also be more likely to have inattentive symptoms, such as difficulty paying attention, rather than hyperactive or impulsive symptoms, which can make them less likely to be diagnosed (Hinshaw et al., 2012). Overall, it is not clear whether this discrepancy is due to a true difference in the prevalence of the disorder between the sexes or if it is due to a bias in the diagnostic process.

Research has shown that parental biases can have a significant impact on the reporting of psychopathology in children. The role of response bias and parenting stress in contributing to parent-child discrepancies in the report of psychopathology (Stokes et al., 2011). Research shows that response bias features, such as defensiveness and exaggeration, are significantly associated with parent-child discrepancies, such that parents who exhibit higher levels of defensiveness or exaggeration were more likely to report higher levels of psychopathology in their children compared to the child's own report (Stokes et al., 2011). Additionally, studies show parenting stress also plays a role in parent-child discrepancies, such that parents who reported higher levels of stress were more likely to overreport symptoms of psychopathology in their children (Stokes et al., 2011). However, it is important to note that the relationship between parenting stress and response bias is complex and further research is needed to fully understand this relationship. By understanding these biases, clinicians can make more accurate assessments and develop appropriate interventions for children with psychopathology. Therefore, current study investigates the parental biases in their children's ADHD symptom reporting. It is important to consider parental biases when assessing mental health issues in children and study its impact on the account when interpreting parent-child discrepancies in the report of psychopathology.

Age Disparities in ADHD Diagnosis

Research shows that the developmental course of ADHD is heterogenous as many biopsychosocial factors play a role in determining the initial levels of inattention and hyperactivity symptoms and the fluctuation in symptoms with age (Asherson & Agnew-Blais, 2019). The initial levels of inattention and hyperactivity symptoms in ADHD

patients differ significantly from one another, and the severity of these symptoms changes with age. Longitudinal research shows that inattention usually persists while hyperactivity tends to lessen as individuals age. Inattention symptoms often persist into adulthood, while hyperactivity symptoms typically reduce as individuals age (Biederman et al., 2010). Therefore, early intervention and continuous management of ADHD symptoms are essential to alleviate the negative impact of these symptoms on an individual's academic, social, and occupational functioning.

Children diagnosed with ADHD before the age of six often display symptoms of hyperactivity and impulsivity. These children may have difficulty following rules, taking turns, and sitting still for extended periods. They may also have difficulty in social situations, and their behavior may be disruptive to others. Preschool children with ADHD often exhibit elevated levels of energy and may engage in constant motion, such as running, climbing, or jumping (Max et al., 2004). They may have difficulty controlling their impulses and may act without thinking of the consequences. As children with ADHD enter elementary school, their symptoms may become more apparent, and they may struggle academically as they have difficulty focusing on classroom activities, completing homework, and staying organized (Max et al., 2004).

As children with ADHD enter adolescence, some no longer meet the diagnostic criteria for ADHD, indicating symptom remission or a significant decrease in symptom severity (Shur-Fen Gau et al., 2010). This rate of symptom remission in ADHD patients is associated with a range of factors, such as age and gender (Ramtekkar et al., 2010). Additionally, while hyperactivity typically diminishes as children grow older, childhood hyperactivity has been found to predict higher levels of inattention in adolescence, even

after controlling for early childhood inattention (Greven et al., 2011). These findings suggest that clinicians should monitor the development of ADHD symptoms carefully, considering the potential long-term impact of hyperactivity symptoms on an individual's cognitive functioning.

Finally, ADHD can persist into adulthood, with symptoms often affecting occupational and interpersonal relationships (Wilens et al., 2010). Adults with ADHD may have difficulty with time management, organization, and completing tasks (Langberg et al., 2008). They may also struggle with impulse control, leading to difficulties in relationships and career success (Kiraz & Sertçelik, 2021). Adults with ADHD may also experience comorbid conditions, such as anxiety and depression, marital problems, financial difficulties, higher rates of substance use disorders and other mental health conditions (Katzman, et al., 2017). Treatment for adult ADHD often involves a combination of medication, behavioral therapy, and support groups to improve executive functioning skills, time management, and interpersonal relationships.

Sociodemographic Factors

The developmental course of ADHD is not solely influenced by child-related factors, but also by family adversity, as suggested by previous research (Counts et al., 2005). For instance, low socioeconomic status (SES), large family size, and single-parent status have been linked to high chance of ADHD diagnosis (Russell et al., 2015). Theoretical accounts propose that exposure to family adversity may worsen or perpetuate ADHD symptoms by increasing stress levels and decreasing support, both of which hinder the development and functioning of self-regulatory systems (Sasser et al., 2012). Additionally, family adversity may impair parenting and exacerbate negative parent-child

interactions. For instance, research shows that coercive parenting differentiated children in low versus high ADHD groups and linked inconsistent parenting with increased ADHD symptoms one year later (Galéra et al., 2011; Hawes et al., 2013). Taken together, these studies suggest that low SES, single-parent status, exposure to stressful life events, and ineffective parenting may all contribute to persistent high diagnosis of ADHD.

Research has shown that sociodemographic variables, such as race and socioeconomic status, play a significant role in the diagnosis and symptoms of ADHD. Studies have consistently found that low-income families and minority groups' children are more likely to be diagnosed with ADHD but less likely to receive appropriate treatment (Larson et al., 2011; Visser et al., 2014). This disparity in treatment and diagnosis may be attributed to a range of factors, including cultural differences, lack of access to quality healthcare, and insufficient representation of diverse groups in research studies.

One of the main reasons for the disparity in ADHD diagnosis and treatment among different sociodemographic groups is the cultural differences that exist. For instance, research studies have revealed that Black children are more likely to be diagnosed with the hyperactive-impulsive type of ADHD (Bussing et al., 2005). This type of ADHD is characterized by hyperactivity, impulsivity, and disruptive behavior. Center for Disease Control and Prevention (CDC) report shows that while Black children are more likely to be diagnosed with ADHD than White children, they are less likely to be reported by their parents as having ADHD symptoms (Danielson et al., 2019). On the other hand, Asian American children are more likely to be diagnosed with the inattentive type of ADHD, which is characterized by forgetfulness, distractibility, and difficulty

paying attention (DuPaul et al., 2016). These cultural differences may be due to varying perceptions of behavior and symptoms, as well as different expectations of child development and behavior among diverse cultures.

Another factor contributing to the disparity in ADHD diagnosis and treatment is the lack of access to quality healthcare for certain groups. Low-income families and minority groups often face significant barriers to accessing quality healthcare, including financial limitations and lack of access to healthcare facilities (Visser et al., 2014). This can lead to delays in diagnosis and treatment, as well as inadequate or inappropriate treatment for those who are diagnosed. Moreover, families from diverse cultural backgrounds may have different beliefs and attitudes toward healthcare and families from some cultures may be less likely to seek medical help for their child's symptoms (Morgan et al., 2013). For instance, the perception of racism or stigmatization can discourage parents of children with ADHD from seeking treatment (Bailey et al., 2014). Therefore, non-White parents' apprehension related to publicly disclosing their children's ADHD diagnosis might lead to a lower ADHD symptom endorsement.

In addition to cultural differences and lack of access to quality healthcare, insufficient representation of diverse groups in research studies also contributes to the disparities in ADHD diagnosis and treatment. Research studies have shown that minority groups and low-income families are underrepresented in ADHD research studies, which limits the understanding of the disorder's impact on different sociodemographic groups (Bussing et al., 2005; Visser et al., 2014). This lack of representation can lead to a lack of awareness and understanding of the unique challenges faced by these groups, which can affect the diagnosis and treatment of ADHD.

To address the disparities in ADHD diagnosis and treatment among different sociodemographic groups, it is crucial to increase awareness and understanding of the cultural differences that exist. Healthcare professionals must be trained to understand and respect the cultural beliefs and attitudes of their patients, as well as the potential impact of cultural differences on the diagnosis and treatment of ADHD. Additionally, efforts must be made to increase access to quality healthcare for low-income families and minority groups, including the provision of financial assistance and increased availability of healthcare facilities in underserved areas.

Moreover, increasing the representation of diverse groups in research studies can help to improve understanding of the unique challenges faced by these groups and develop more effective diagnostic and treatment strategies for ADHD. Research studies should aim to include a diverse range of participants, including those from different racial and socioeconomic backgrounds, to gain a more comprehensive understanding of ADHD's impact on different sociodemographic groups. Further research is needed to better understand these discrepancies and to develop more appropriate treatments and interventions for individuals with ADHD from diverse backgrounds.

Effortful Control

While current research primarily focuses on the impact of socio-demographic variables (such as gender, age, race, and subjective social status) on parental endorsement of ADHD, it is crucial to also consider cognitive processes that require regulation. This consideration is essential for discerning the degree to which these socio-demographic factors contribute to that role. Effortful control, cognitive processes necessary for self-regulation (Rothbart & Bates, 2006), holds relevance within ADHD research due to its

connection to the core symptoms and underlying mechanisms of ADHD. Effortful control refers to an individual's ability to regulate their emotional responses, behaviors, and attention to achieve a goal or respond appropriately to a situation (Rothbart & Bates, 2006). It involves using cognitive processes such as inhibitory control, working memory, and attentional control to modulate and manage one's responses (Diamond, 2013). Individuals with high levels of effortful control can regulate their behavior effectively, delaying gratification and controlling impulses to achieve long-term goals (Moffitt et al., 2011). They are also able to adapt to changing situations and inhibit automatic responses that may not be appropriate. On the other hand, individuals with low levels of effortful control may struggle with self-control, have difficulty managing emotions, and may be more impulsive in their decision-making (Eisenberg et al., 2010). Effortful control is believed to be an important factor in social and emotional development and has been linked to a range of positive outcomes such as academic achievement, social competence, and mental health (Eisenberg et al., 2010; McLeod et al., 2007). Previous studies have shown no gender and age difference in effortful control making it a more objective measure compared to ADHD criteria, on which boys score higher than girls (Arnett et al., 2015; Atherton, 2020). Current study uses effortful control as a control variable to investigate the unique influence of parental bias in ADHD endorsement of children.

Rationale

ADHD is a prevalent disorder effecting numerous children and persisting well into adulthood, negatively impacting everyday functioning and overall quality of life. Although a substantial amount of research has been dedicated to understanding this disorder, it is important to note that there is still a need to explore the underlying

mechanisms, leading to discrepancies in gender and other sociodemographic variables with respect to ADHD diagnosis. The current research asks to what extent is parental report of ADHD symptoms on the DSM 5 criteria affected by the sociodemographic factors such as child's gender, age, and race and subjective SES? The study aims to examine potential biases in parent perception of ADHD symptoms in young children by analyzing parent endorsement of the 18 DSM-5 criteria for ADHD in a non-clinical sample of children aged 3.5 to 6 years. The findings will help determine the disparity in parental report of ADHD symptoms based on gender (boys vs. girls), age (older vs. younger children), race (White vs. non-White children), and subjective socioeconomic status of the parents (low vs. high). The study also explores age differences between boys and girls with respect to parental report of ADHD. The outcomes of the current study have the potential to support the previous literature that posits the DSM-5 criteria for ADHD may not be equally applicable to different genders and age groups and underscore the importance of considering normative age-related changes, particularly for boys.

Hypotheses

It is hypothesized that while controlling for effortful control, (H1) parental endorsement of ADHD symptoms is higher for boys than girls, (H2) parental endorsement of ADHD symptoms is higher for White than non-White children, (H3) ADHD symptom endorsement is higher for young children than older children. Additionally, (H4) higher subjective social status of parents is related to lower ADHD symptom endorsement of their children.

Additional Exploration

Additionally, the study explores the extent to which parent endorsement of hyperactivity is higher for boys compared to girls, parent endorsement of inattention is higher for girls compared to boys, and if hyperactivity endorsement is higher for Black than White children.

Method

Participants

Participants included 132 parents from a non-clinical sample with children (66 girls and 66 boys) between 3.5 to 6 years of age (M = 4.64 years). Participants were recruited through birth announcements at the local hospital to participate in studies at the University of Kentucky's Infant Memory Lab. The recruitment took place when children were between 3 to 9 months of age. Parents received a follow-up survey when their children reached the age of 3 to 6 years. The survey asked parents to respond to questionnaires on child's ADHD symptoms based on the DSM-5 criteria, effortful control, race, age, gender, and subjective social status. Participants were informed of the study's purpose and their rights as participants, including their right to withdraw from the study at any time. Since the data was collected online, a waiver of documentation of consent was obtained. The study received approval from the institutional review board. Parents were entered into a raffle for a $50 Amazon gift card as compensation for their time. The study received approval from the University of Kentucky's Institutional Review Board.

Instruments

DSM 5 Criteria for ADHD

The questionnaire included 18 items assessing child's ADHD symptoms based on the DSM-5 criteria (see Appendix; American Psychiatric Association, 2013), measuring both inattention and hyperactive symptoms. Participants were instructed to rate their child's behavior on a 4-point scale ranging from 0 (never or rarely) to 3 (very often). Sample items for inattention include "Often fails to give close attention to details or

makes careless mistakes in schoolwork, at work, or during other activities (e.g., overlooks or misses details, work is inaccurate)" and "Often has difficulty sustaining attention in tasks or play activities (e.g., has difficulty remaining focused during lectures, conversations, or lengthy reading)." Hyperactivity/impulsivity items include items such as "Often fidgets with or taps hands or feet or squirms in seat" and "Often unable to play or engage in leisure activities quietly." Previous studies have used similar methods for indexing ADHD symptoms (Nolan et al., 2001; Sullivan et al., 2006). The internal reliability has also been reported to be high (α = 0.89; White et al., 2022). Furthermore, the parents were asked whether their child had ever received a recommendation to consult a specialist for ADHD-related issues or was presently receiving treatment for ADHD. None of the children were reported to have a confirmed diagnosis of ADHD or undergoing treatment for it. However, two parents disclosed that their child was referred to a medical expert for ADHD screening.

Subjective Social Status

Subjective Social Status was measured using the MacArthur Scale of Subjective Social Status (MacArthur SSS Scale; Adler et al., 2000). In a typical scale administration, the respondents view a drawing of a ladder with 10 rungs representing societal standing (see Appendix). The ladder is accompanied by the text "At the top of the ladder are the people who are the best off, those who have the most money, most education, and best jobs. At the bottom are the people who are the worst off, those who have the least money, least education, worst jobs, or no job. Please place an 'X' on the rung that best represents where you think you stand on the ladder." To score this measure, researchers simply note the number of the rung (1-10) on which the respondent placed their "X." For the current

study, data was collected online and therefore the administration of this scale was slightly different than tradition, such that participants couldn't place an X on the rung they chose but rather clicked a number between 1 and 10 representing the rung they wanted to choose to indicate their perceived social status. Previous studies have found the scale to have robust validity and test-retest reliability (Galvan et al., 2022; Giatti et al., 2012).

Effortful Control

The current study used effortful control as a control variable. It is one of the factors of temperament measured by the Children's Behavior Questionnaire Very Short Form (CBQ-VSF; Putnam & Rothbart, 2006). Previous research has found the CBQ scale to have a high reliability ($a > .80$; Teglasi et al., 2015). Three factors have been recovered from this instrument, labeled Negative Affectivity, Surgency Extraversion, and Effortful Control. The current study uses the 12 items of effortful control factor as a control variable (see Appendix). Parents responded on a 7- point rating scale ranging from 1 (extremely untrue of your child) to 7 (extremely true of your child) to items such as "My child likes the sound of words, such as nursery rhymes," "My child is quickly aware of some new item in the living room" and "My child when drawing or coloring in a book, shows strong concentration." A high score indicated better effortful control as compared to a low score.

Procedure

Parents were asked to complete a questionnaire assessing their child's ADHD symptoms based on the DSM-5 criteria and effortful control. Parents also reported child's race (Black, White, Hispanic, Multi-racial, etc.), age (in years), gender, and subjective social status (MacArthur Ladder).

Data Analysis

The data was analyzed using multiple linear regression models. The models include gender, age, race, and subjective social status as predictors of symptom endorsement. Separate models were conducted for overall symptom endorsement and for inattention and hyperactive symptoms. Beta coefficients, *t*-values, and *p*-values were reported for each predictor variable.

Sensitivity Analysis

The model examining the 7 proposed predictors (Intercept, Gender, Age, Age-Gender Interaction, Race, Subjective Social Status, and Effortful Control) was conducted using multiple linear regression. A sensitivity analysis in G*Power (Faul et al., 2007) using 'Linear multiple regression: Fixed model, R^2 deviation from zero' indicated that 132 participants and 7 predictors would be sensitive to detect effects of $f^2 = 0.11$ with 80% power (alpha = .05), which indicates a small to medium effect and is within the expected range as established by previous research (Kang, 2021).

Results

The objectives of the study were achieved by analyzing the data using appropriate statistical procedures. Descriptive statistics were computed for all the measures used in the study to analyze the overall trend of the data. Cronbach's alpha was used to determine the internal consistency of the scales. Pearson's Product Moment Correlation was used to determine the relationships among the variables along with their relationships with demographic variables. Hierarchical regression analysis was used to explore the predictive role of gender, age, child race and subjective SES in the parental endorsement of ADHD. The results are tabulated as follows:

Table 1. Descriptive statistics, reliability, and correlations for all variables (N = 135)

Variables	ADHD	Inattention	Hyper-activity	Effortful Control	Child Gender	Age	Child Race	Subjective SES
ADHD	1							
Inattention	.90**	1						
Hyperactivity	.92**	.66**	1					
Effortful Control	-.37***	-.43**	-.26**	1				
Child Gender	.19*	.21*	.15	-.04	1			
Age	-.22**	-.22*	-.17	.05	.06	1		
Child Race	.15	.07	.16	-.03	.01	-.01	1	
Subjective SES	-.08	-.03	-.06	.03	.04	.04	-.26**	1
Means	32.34	15.33	16.96	63.44	-	4.53	-	6.12
Standard Deviations	8.90	4.66	5.10	8.69	.50	.72	.99	1.27
Range	1-37	9-30	9-31	31-80	1-2	3.39-5.94	1-5	1-8
Possible Range	0-72	9-36	9-36	12-84	1-2	3.39-5.94	1-5	1-10
Cronbach's Alpha	.91	.88	.85	.74	-	-	-	-
Test-Retest Reliability	-	-	-	-	-	-	-	.66

Note. Statistical significance: *$p < .05$; **$p < .01$; ***$p < .001$

The results presented in Table 1 provide an overview of the relationship between ADHD, Effortful Control, Child Gender, Age, Child Race, and Subjective SES. The correlation table reveals several significant associations. There is a negative correlation between ADHD symptom endorsement and Effortful Control, indicating that higher levels of ADHD symptom endorsement are associated with lower levels of Effortful Control. ADHD also shows a positive correlation with Child Gender and a negative correlation with Age, suggesting that ADHD symptom endorsement is more prevalent among boys and tends to decrease with age. ADHD exhibits a non-significant correlation with Child Race, indicating that race and ADHD symptom endorsement are not related. Furthermore, no significant correlation is found between ADHD and Subjective SES. Finally, Effortful Control does not have any significant correlations with the other variables.

Moving on to the descriptive statistics in Table 1, the mean ADHD score is less than the middle of the possible range of scores. The mean Effortful Control score is a high average considering that the maximum score possible. The average age of the children is 4.53 years. With respect to race of the participants, a large majority were White (110), compared to Black (8), Hispanic (3), Multiracial (9). The average score for subjective SES shows that parents ranked themselves to be higher than middle on subjective SES. The standard deviations information is also provided for each of the measures to indicate the variability within each measure. Finally, Cronbach's Alpha is reported for ADHD symptom endorsement, Inattention subscale, Hyperactivity subscale, effortful control, and subjective SES, indicating satisfactory internal consistency of the scales.

Table 2. Hierarchical Regression Model of ADHD

Variables	*R*	R^2	R^2 *Change*	*B*	*SE*	β	*t*
Step 1	.37	.14***					
Effortful Control				-4.56	1.19	-.37***	-4.44
Step 2	.49	.24**	.11**				
Effortful Control				-4.49	.1.14	-.36***	-4.62
Gender				3.31	1.64	.19*	2.36
Age				-2.99	1.15	-.24**	-3.04
Race				1.14	.86	.13	1.56
Subjective SES				-.22	.67	-.03	-.38
Step 3	.49	.24**	<.001				
Effortful Control				-4.48	.1.15	-.36***	-3.89
Gender				3.29	1.67	.19	1.98
Age				-3.07	1.49	-.25**	-2.11
Race				1.15	.87	.13	1.32
Subjective SES				-.212	.68	-.03	-0.31
Age x Gender				.178	1.88	.01	0.10

Note. Statistical significance: *$p < .05$; **$p < .01$; ***$p < .001$

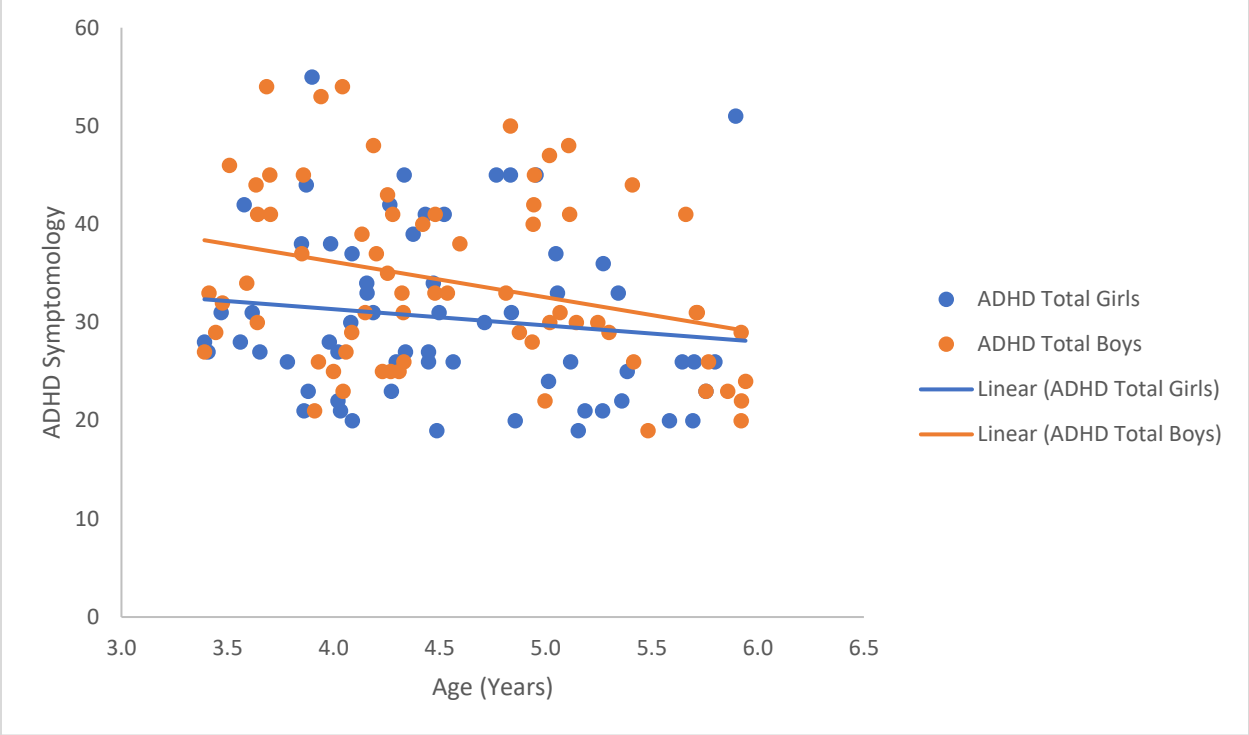
Hierarchical multiple regression was performed to investigate the ability of sociodemographic factors (gender, age, race, and Subjective SES) to predict levels of ADHD, after controlling for effortful control. Initial analyses were carried out to ensure that there were no violations of the assumptions of normality, linearity, or homoscedasticity. Furthermore, the correlations amongst the study's predictor variables (gender, age, race, and Subjective SES) were examined as represented in Table 1. The table shows that all correlations were weak, ranging between $r = .15$, $p < .05$ and $r = .26$,

$p < .01$. This result indicates that the likelihood for multicollinearity was low (see Tabachnick and Fidell, 2007).

The results show that some of the predictor variables did not have a correlation with ADHD symptom endorsement. All the significant correlations between the four predictor variables and ADHD symptom endorsement were small to medium, ranging from $r = .15$, $p < .05$ to $r = .37$, $p < .001$. In the first step of hierarchical multiple regression, one predictor was entered, i.e., effortful control. This model was found to be statistically significant F (1, 126) = 13.75; $p < .001$ and explained 14% of variance in ADHD symptom endorsement, which made a significant unique contribution to the model (see Table 2). After the entry of gender, age, race, and subjective SES at Step 2, the total variance explained by the model was 24% (F (5, 122) = 7.60; $p < .001$). The introduction of gender, age, race, and subjective SES explained additional 11% of variance in ADHD symptom endorsement, after controlling for effortful control (R^2 Change = .11; F (4, 122) = 4.34; $p = .003$). In the final model, three out of five predictor variables were statistically significant, with effortful control recording a higher Beta value ($\beta = .37$, $p < .001$) than gender ($\beta = .19$, $p = .02$) and age ($\beta = -.24$, $p = .003$). In Step 3, an interaction between age and gender was tested as both variables significantly affected the parental endorsement of ADHD. Table 2 shows that the inclusion of the Age x Gender interaction in Step 3 did not significantly improve the model's fit ($\Delta R^2 < .001$). The pattern of predictors' associations remained consistent with Step 2. In summary, while controlling for the effect of effortful control, the results show that younger age, and female gender were associated with lower ADHD symptoms, while being male and older

were linked to higher ADHD symptoms. Race and subjective SES did not emerge as significant predictors.

Figure 1. Gender and ADHD Symptoms Endorsement



In addition to running a regression with ADHD combined, separate hierarchical multiple regressions were conducted with hyperactivity and inattention as outcome variables. The preliminary analyses confirmed that there were no violations of normality, linearity, and homoscedasticity assumptions in those separate models.

Table 3. Hierarchical Regression Model of Inattention

Variables	*R*	R^2	R^2 *Change*	*B*	*SE*	β	*t*
Step 1	.43	.18***					
Effortful Control				-2.74	.520	-.43***	-5.26
Step 2	.53	.28*	.10**				

Effortful Control				-2.75	0.50	-0.43***	-5.53
Gender				1.92	0.72	0.21*	2.68
Age				-1.59	0.50	-0.24*	-3.16
Race				0.24	0.42	0.05	0.57
Subjective SES				0.0	0.3	0.0	-0.1
Step 3	.53	.28	.002				
Effortful Control				-2.77	0.50	-0.43***	-5.54
Gender				-1.00	4.69	-0.11	-0.21
Age				-2.61	1.69	-0.40	-1.55
Race				0.22	0.38	0.05	0.58
Subjective SES				0.00	0.30	0.00	0.01
Age x Gender				0.64	1.02	0.36	0.63

Note. Statistical significance: *$p < .05$; **$p < .01$; ***$p < .001$

The results from the hierarchical regression analysis for inattention, presented in Table 3, indicate that the model overall accounted for 18% of the variance in inattention ($R^2 = .18$). In Step 1, when only effortful control was included as a predictor, it significantly contributed to the model ($\beta = -.43$, $p < .001$), indicating that lower levels of effortful control were associated with higher levels of inattention.

Moving to Step 2, additional predictors were introduced into the model. The inclusion of gender, age, race, and subjective SES resulted in a significant increase in the variance explained (R^2 Change = .10, $p < .01$), with the overall model explaining 28% of the variance in inattention ($R^2 = .28$). Among the added predictors, gender showed a significant positive association with inattention ($\beta = .21$, $p < .01$), indicating that being male was related to higher levels of inattention. On the other hand, age demonstrated a significant negative association ($\beta = -.24$, $p < .01$), suggesting that older individuals exhibited lower levels of inattention. The predictors of race and subjective SES did not

reach statistical significance. In Step 3, an interaction between age and gender was tested as both variables significantly affected the parental endorsement of inattention. Table 3 shows that the inclusion of the Age x Gender interaction in Step 3 did not significantly improve the model's fit ($\Delta R^2 < .001$). The predictor relationships remained consistent with Step 2. In summary, while controlling for the effect of effortful control, younger age, and male gender were linked to fewer inattention symptoms, whereas being female and older were associated with more inattention symptoms. Race and subjective SES did not emerge as significant predictors.

Figure 2. Gender and Inattention Symptom Endorsement

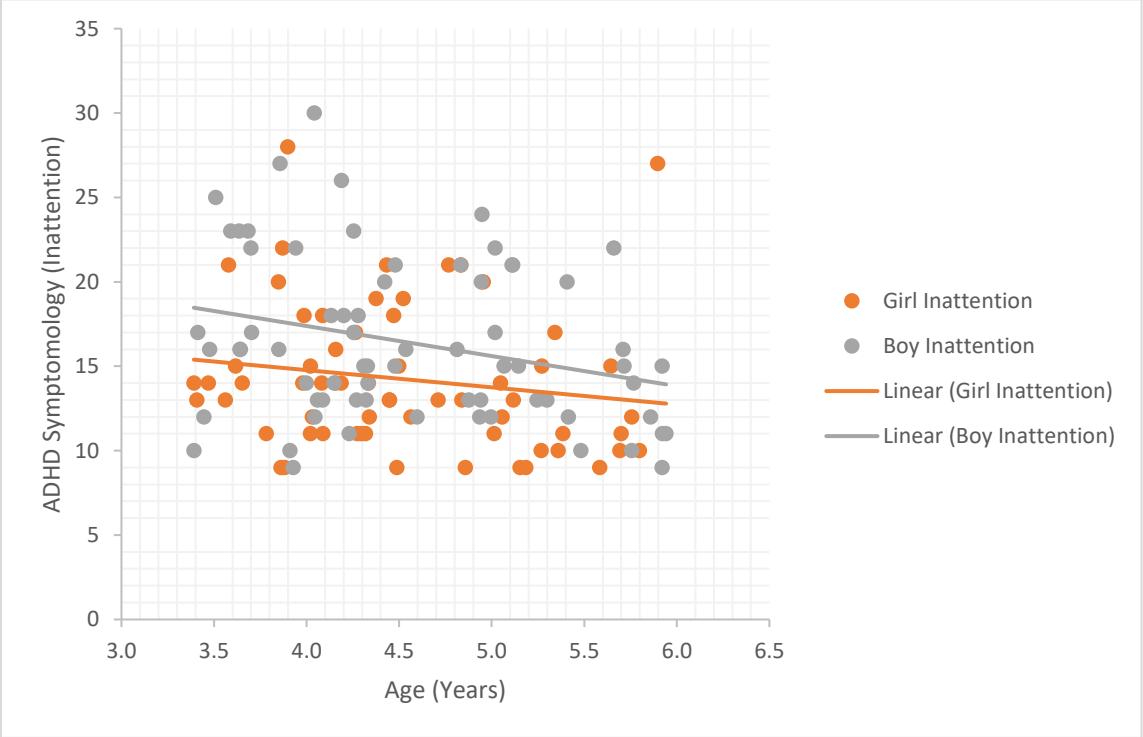


Table 4. Hierarchical Regression Model of Hyperactivity

Variables	*R*	R^2	R^2 *Change*	*B*	*SE*	β	*t*
Step 1	.26	.07**					

Effortful Control				-1.84	.61	-.26**	-3.04
Step 2	.38	.14*	.073				
Effortful Control				-1.84	0.59	-0.26**	-3.10
Gender				1.46	0.86	0.14	1.70
Age				-1.27	0.60	-0.18*	-2.12
Race				0.80	0.50	0.14	1.59
Subjective SES				-0.06	0.35	-0.02	-0.17
Step 3	.38	.14*	.003				
Effortful Control				-1.78	0.60	-0.25**	-2.98
Gender				4.76	5.60	0.47	0.85
Age				-0.17	2.02	-0.02	-0.08
Race				0.73	0.45	0.14	1.62
Subjective SES				-0.09	0.35	-0.02	-0.24
Age x Gender				-0.72	1.22	-0.37	-0.60

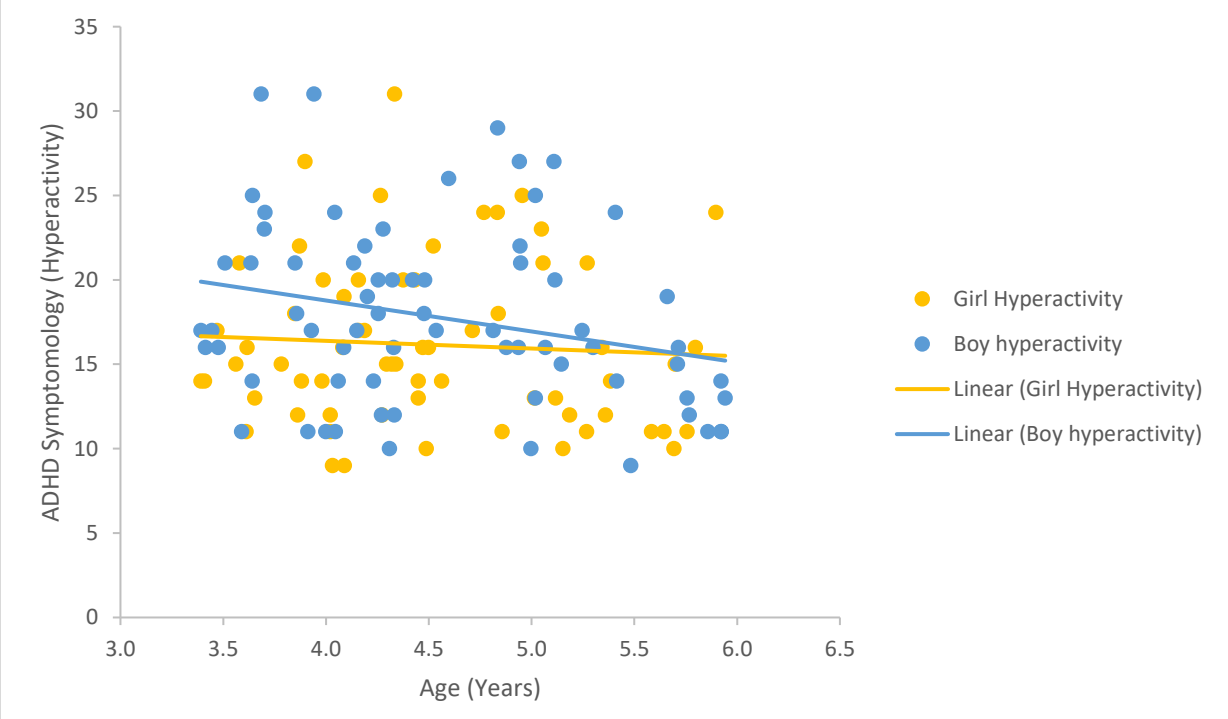
Note. Statistical significance: *$p < .05$; **$p < .01$; ***$p < .001$

Similarly, for the hierarchical regression analysis of hyperactivity presented in Table 4, the overall model explained 7% of the variance in hyperactivity symptoms (R^2 = .07) in Step 1. Effortful control as the sole predictor demonstrated a significant negative association (β = -.26, $p < .01$), indicating that lower levels of effortful control were associated with higher levels of hyperactivity.

In Step 2, the inclusion of gender, age, race, and subjective SES resulted in a significant increase in the variance explained (R^2 Change = .073, $p < .05$), with the overall model accounting for 14% of the variance in hyperactivity (R^2 = .14). Among the added predictors, age showed a significant negative association (β = -.18, $p < .05$), indicating that older individuals exhibited lower levels of hyperactivity. Gender, race, and subjective SES did not reach statistical significance in their associations with

hyperactivity symptoms. In Step 3, an interaction between age and gender was tested to maintain consistency with the previous tests represented in Table 2 and 3 even though Gender did not significantly affect parental endorsement of hyperactivity. Table 4 shows that the inclusion of the Age x Gender interaction in Step 3 did not significantly improve the model's fit ($\Delta R^2 < .001$). The predictor relationships remained consistent with Step 2. In summary, while controlling for the effect of effortful control, higher effortful control was associated with fewer hyperactivity symptoms, while none of the demographic variables showed significant associations.

Figure 3. Gender and Hyperactivity Symptom Endorsement



Finally, the analysis failed to confirm a significant relationship between parent endorsement of hyperactivity and gender, parent endorsement of inattention and gender, and parental endorsement of hyperactivity and race beyond the effect of effortful control.

Discussion

The present study aimed to examine potential biases in parent perception of ADHD symptoms in young children and explore the influence of sociodemographic factors such as a child's gender, age, race, and subjective socioeconomic status (SES) on parent endorsement of ADHD symptoms while controlling for effortful control. The findings provide insights into the relationship between these variables and their impact on ADHD symptom endorsement. Overall, the results tested whether the inclusion of effortful control in the hierarchical regression suggest an influence of sociodemographic factors on parent endorsement of ADHD symptoms above and beyond the child's self-regulation abilities.

Regarding the **first hypothesis**, the results supported the notion of gender bias in parent perception of ADHD symptoms. The positive correlation between ADHD symptom endorsement and child gender suggests that parents are more likely to endorse ADHD symptoms in boys compared to girls. This finding aligns with previous research indicating a higher prevalence of ADHD in boys than girls (APA, 2013). However, it is important to note that the effect size of this correlation was small, indicating that gender alone does not fully account for the variation in ADHD symptom endorsement.

The findings of this study align with the historical prevalence of ADHD being higher in boys than girls. Research has consistently shown that ADHD is more commonly diagnosed in boys compared to girls, with prevalence rates ranging from 2-9 times higher in boys in clinical samples and 2-3 times higher in epidemiological samples (Nussbaum, 2012). Similar patterns have been observed in European countries, where ADHD rates in boys are 3-16 times higher than in girls (Nøvik et al., 2006). One explanation for the gender disparity in ADHD diagnosis is the difference in symptom presentation between

boys and girls. Girls with ADHD are more likely to exhibit inattentive symptoms, such as difficulty with organization and planning, while boys are more likely to display hyperactive and impulsive symptoms (Quinn et al., 2014), although present study found a non-significant effect of gender on hyperactive and impulsive symptoms after controlling effortful control. These differences in symptomatology may contribute to the underdiagnosis of ADHD in girls, as the more subtle symptoms of inattention may not be recognized as indicative of the disorder.

The focus on externalizing symptoms in the diagnostic process may overlook the more internalizing symptoms, such as anxiety and depression, that girls with ADHD commonly experience (Hinshaw et al., 2012). Additionally, girls may have a higher prevalence of inattentive symptoms, further contributing to their underdiagnosis (Owens et al., 2008). The underdiagnosis of ADHD in girls can have significant consequences. Girls with undiagnosed ADHD may struggle with academic performance and grow up to experience difficulties in relationships and are at a higher risk of developing mental health problems such as anxiety and depression (Barkley & Fischer, 2010; Quinn & Madhoo, 2014). This emphasizes the importance of addressing the underdiagnosis of ADHD in girls early on in life and improving access to diagnosis and treatment. The current research provides evidence of the underdiagnosis in women, which could act as the first step to addressing it.

Supporting the **second hypothesis**, the results indicated a negative correlation between ADHD symptom endorsement and child age. The finding suggests that ADHD symptoms tend to be lower in older children as compared to younger children. This finding is consistent with previous research showing a decline in ADHD symptoms with

age (Biederman et al., 2000) and that children diagnosed with ADHD before the age of six often display symptoms of hyperactivity and impulsivity (Max et al., 2004). This is the reason why young children with ADHD may have difficulty following rules, sitting still, and controlling their impulses. As these children transition into elementary school, their symptoms may become more apparent and affect their academic performance (Max et al., 2004). The literature indicates that adolescence is a period when some individuals no longer meet the diagnostic criteria for ADHD, indicating symptom remission or a significant decrease in symptom severity (Shur-Fen Gau et al., 2020). Research also shows that while hyperactivity tends to diminish with age, childhood hyperactivity has been found to predict higher levels of inattention in adolescence (Greven et al., 2011). This highlights the importance of considering normative age-related changes when diagnosing ADHD closely monitoring the development of ADHD symptoms, considering the potential long-term impact of hyperactivity symptoms on cognitive functioning.

Previous research has demonstrated that ADHD symptoms, particularly inattention and hyperactivity, change in severity as individuals age (Asherson & Agnew-Blais, 2019). Longitudinal studies have consistently shown that while inattention symptoms tend to persist into adulthood, hyperactivity symptoms tend to decrease with age (Biederman et al., 2010). However, the current study did not find a difference in age effect between parental endorsement of inattention and hyperactivity symptoms in children. There can be a number of possible reasons why parents endorsed less symptoms for older children as compared to younger children without any discrimination for inattention and hyperactivity. Firstly, this study involved parental endorsement of children’s symptoms, rather than a standard diagnosis of children through a clinician.

Secondly, this was a cross-sectional study design as compared to the longitudinal design. A related reason might be the age range of 3.39 to 5.94, while the previous studies included a 10-year follow-up of children between the age of 6 and 17. Therefore, it is possible that a difference in inattention and hyperactivity symptom regression might appear in later ages. These findings are in line with the notion that early intervention and continuous management of ADHD symptoms are crucial to mitigate the negative impact of these symptoms on academic, social, and occupational functioning. However, it is important to note that this was a cross-sectional study and the age-based differences in ADHD symptom endorsement do not reflect developmental changes, such as regression of ADHD symptoms, in particular individuals.

Contrary to the **third hypothesis**, the results did not reveal any significant differences in ADHD symptom endorsement between White and non-White children. This finding suggests that race may not play a significant role in parent perception of ADHD symptoms in the current non-clinical sample. However, it is essential to acknowledge that this study had a relatively less diverse sample. As indicated in the Results section, there was a huge disparity between the number of White compared to Black, Hispanic, and multiracial participants. For instance, there were only 8 participants as who indicated their race as Black compared to 110 participants who indicated their race as White. Therefore, the nonsignificant findings related to race can be attributed to the lack of racial diversity of the sample. Therefore, definitive conclusions regarding racial differences in ADHD symptom endorsement cannot be made, unless there is high racial diversity in the sample. Another explanation can be the relatively high affluence of

the participants. Further research with a more diverse and larger sample is needed to draw definitive conclusions regarding racial differences in ADHD symptom endorsement.

Similar to the race-related findings, the fourth hypothesis was also not confirmed as the results did not demonstrate a significant relationship between subjective SES and ADHD symptom endorsement. This suggests that subjective socioeconomic factors may not have had a direct impact on parent perception of ADHD symptoms in this sample. The lack of significant findings for subjective social status as a predictor of ADHD symptom endorsement may be influenced by multiple factors. It is important to acknowledge that subjective SES was measured using a single-item measure, which may not have captured the full range of socioeconomic factors that can influence ADHD symptoms and diagnosis. Other objective indicators of socioeconomic status, such as household income or educational attainment, may provide a more comprehensive understanding of the relationship between socioeconomic status and ADHD symptom endorsement. Another reason could be limited variability in data due to sample being relatively affluent. This may have resulted in a narrower range of socioeconomic status levels, limiting the ability to detect significant associations. Future research should use more comprehensive measures of socioeconomic status and a more diverse sample of participants from lower and upper SES.

The findings regarding race and subjective social status underscore the need for further research to better understand the complexities of sociodemographic factors in ADHD diagnosis and symptom endorsement. Future studies should aim to include larger and more diverse samples, specifically targeting underrepresented populations, to provide a more comprehensive understanding of the impact of sociodemographic factors on

ADHD. Additionally, qualitative research exploring cultural beliefs, attitudes, and experiences related to ADHD among different racial and ethnic groups would provide valuable insights into the cultural factors influencing symptom endorsement and diagnosis.

The hierarchical regression analysis provided additional insights into the predictive role of sociodemographic factors in ADHD symptom endorsement while controlling for effortful control. The inclusion of effortful control as a covariate aimed to account for the influence of self-regulation skills on parent perception of ADHD symptoms. Effortful control is considered a key factor in the regulation of behavior and emotions, and individuals with high levels of effortful control are better able to manage their responses and exhibit self-control (Rothbart & Bates, 2006). On the other hand, individuals with low levels of effortful control may struggle with self-regulation and exhibit more impulsive behaviors (Eisenberg et al., 2010).

In the current study, effortful control was included as a control variable to account for its potential influence on parent endorsement of ADHD symptoms. The results showed a negative correlation between effortful control and ADHD symptom endorsement, indicating that higher levels of effortful control were associated with lower levels of ADHD symptom endorsement. This finding suggests that children with better self-regulation skills may exhibit fewer ADHD symptoms as reported by their parents. The inclusion of effortful control as a control variable in the hierarchical regression model allows for the examination of the unique influence of sociodemographic factors on ADHD symptom endorsement, independent of the child's self-regulation abilities. In this context, the significant contributions of gender and age in predicting ADHD symptom

endorsement, even after controlling for effortful control, suggests that gender and age play distinct roles in parent perception of ADHD symptoms. These findings align with previous research indicating gender differences in ADHD prevalence and the potential influence of developmental factors on symptom presentation (APA, 2013; Biederman et al., 2000).

It is important to note that effortful control, as measured in this study, provides an objective measure of self-regulation skills that is not influenced by gender or age as indicated in results of the hierarchical regression (see Tables 1-4). This strengthens the interpretation of the results related to gender and age differences in ADHD symptom endorsement, as they are not solely attributed to variations in effortful control. However, it is necessary to consider that effortful control is just one aspect of self-regulation and may not capture the entirety of self-regulatory processes involved in ADHD symptomatology. Future research should explore other aspects of self-regulation, such as inhibitory control and working memory, to gain a more comprehensive understanding of their contributions to parent perception of ADHD symptoms. Overall, the results related to the inclusion of effortful control in the hierarchical regression suggest that the influence of some sociodemographic factors on parent endorsement of ADHD symptoms goes beyond the child's self-regulation abilities. Gender and age remain significant predictors of ADHD symptom endorsement, even after accounting for effortful control. These findings emphasize the importance of considering gender and developmental factors in the assessment and diagnosis of ADHD.

Additionally, based on previous literature (Quinn, 2008; Rucklidge, 2010; Skogli et al., 2013; Slobodin, & Davidovitch, 2019), the study explored the extent to which

parent endorsement of hyperactivity is higher for boys compared to girls and parents endorsement of inattention is higher for girls compared to boys. The findings challenge previous research by revealing no gender differences in hyperactivity, while indicating that boys exhibit higher levels of inattention. This contrast may have emerged from the fact that earlier studies primarily focused on adolescents and employed a longitudinal design (Rucklidge, 2010; Slobodin & Davidovitch, 2019) whereas current study used a parental report of young children and a cross-sectional design. This finding prompts a reevaluation of our understanding of gender-related patterns in attention and hyperactivity, urging researchers to explore the nuances and potential factors contributing to these observed differences.

The current research also attempted to explore if hyperactivity endorsement is higher for Black than White children. This exploration is based on previous literature that shows that Black children are more likely to be diagnosed with hyperactive-impulsive type than White children (Bussing et al., 2012), whereas Asian American children more likely to be diagnosed with inattentive type (DuPaul et al., 2016). Current data showed no significant differences between White and non-White parents in in endorsement of ADHD, Hyperactivity and Inattention symptoms. A possible reason is the relatively low racial diversity in the sample with a large majority of participants reporting as being as compared to Black and multiracial.

In conclusion, the findings of this study indicate that certain sociodemographic variables, such as gender and age, have a substantial influence on predicting parental support for ADHD. However, factors like race and subjective socioeconomic circumstances may not have the same predictive significance. The results suggest that

gender bias may contribute to the higher endorsement of ADHD symptoms in boys, while cultural and contextual factors may outweigh the influence of race on symptom endorsement. The difference in symptom endorsement with respect to age may be attributed to developmental changes and environmental factors. The lack of a significant relationship between subjective SES and symptom endorsement calls for further exploration using more comprehensive measures of socioeconomic status. However, it is important to interpret these findings with caution due to the limitations of the current study, including the cross-sectional nature of sampling, the small sample size for race-based comparisons, and the use of a non-clinical sample. Future research should aim to replicate these findings in larger and more diverse samples, considering objective measures of SES and including clinical populations to enhance the generalizability of the results. Finally, research that relies on the longitudinal method along with more objective observational data is likely to produce findings that are more robust and reliable.

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Appendix

ADHD Symptoms

Inattention

1. Fails to give close attention to details or makes careless mistakes in schoolwork, at work, or during other activities (e.g., overlooks or misses details, work is inaccurate).
2. Has difficulty sustaining attention in tasks or play activities (e.g., has difficulty remaining focused during lectures, conversations, or lengthy reading).
3. Does not seem to listen when spoken to directly (e.g., mind seems elsewhere, even in the absence of any obvious distraction).
4. Does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., starts tasks but quickly loses focus and is easily sidetracked).
5. Has difficulty organizing tasks and activities (e.g., difficulty managing sequential tasks; difficulty keeping materials and belongings in order; messy, disorganized work; has poor time management; fails to meet deadlines).
6. Avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (e.g., schoolwork or homework; for older adolescents and adults, preparing reports, completing forms, reviewing lengthy papers).
7. Loses things necessary for tasks or activities (e.g., school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones).
8. Easily distracted by extraneous stimuli (for older adolescents and adults, may include unrelated thoughts).

9. Forgetful in daily activities (e.g., doing chores, running errands; for older adolescents and adults, returning calls, paying bills, keeping appointments).

Hyperactivity and Impulsivity

1. Fidgets with or taps hands or feet or squirms in seat.
2. Leaves seat in situations when remaining seated is expected (e.g., leaves his or her place in the classroom, in the office or other workplace, or in other situations that require remaining in place).
3. Runs about or climbs in situations where it is inappropriate. (Note: In adolescents or adults, may be limited to feeling restless.)
4. Unable to play or engage in leisure activities quietly.
5. Is "on the go," acting as if "driven by a motor" (e.g., is unable to be or uncomfortable being still for extended time, as in restaurants, meetings; may be experienced by others as being restless or difficult to keep up with).
6. Talks excessively.
7. Blurts out an answer before a question has been completed (e.g., completes people's sentences; cannot wait for turn in conversation).
8. Has difficulty waiting his or her turn (e.g., while waiting in line).
9. Interrupts or intrudes on others (e.g., butts into conversations, games, or activities; may start using other people's things without asking or receiving permission; for adolescents and adults, may intrude into or take over what others are doing).

Effortful Control Scale Items in the CBQ-VSF (Putnam & Rothbart, 2006)

21. Likes the sound of words, such as nursery rhymes.

24. Is quickly aware of some new item in the living room.

27. Sometimes becomes absorbed in a picture book and looks at it for a long time.

9. Likes being sung to.

3. When drawing or coloring in a book, shows strong concentration.

36. Comments when a parent has changed his/her appearance.

18. Is good at following directions.

15. When building or putting something together, becomes very involved in what (s)he is doing, and works for long periods.

12. Notices it when parents are wearing new clothing.

33. Enjoys gentle rhythmic activities such as rocking or swaying.

30. Approaches places (s)he has been told are dangerous slowly and cautiously.

6. Prepares for trips and outings by planning things (s)he will need.

MacArthur Scale of Subjective Social Status (MacArthur SSS Scale; Adler et al., 2000)

Instructions: Think of this ladder as representing where people stand in the United States. At the top of the ladder are the people who are the best off – those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off – those who have the least money, least education, the least respected jobs, or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

Where would you place yourself on this ladder?

Please place a large “X” on the rung where you think you stand at this time in your life relative to other people in the United States.

Average ADHD Symptomology by Each Race

Race	*N*	%	Mean ADHD	SD
White	110	79.7	13.56	8.45
Black	8	5.8	19.38	8.33
Hispanic	3	2.2	19.33	17.56
Multi	9	6.5	17.11	7.83

Average ADHD Symptomology by Each Ladder Step

Ladder Steps	*N*	%	Mean ADHD	SD
1.00	1	0.7	0	N/A
3.00	1	0.7	24	N/A
4.00	11	8.0	15.6	7.19
5.00	27	19.6	14.44	7.66
6.00	36	26.1	14.97	9.15
7.00	39	28.3	12.23	9.11
8.00	17	12.3	15.29	9.8