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Attachment-Based Intervention for Inattention, Hyperactivity, and Impulsivity: Does Relationship Matter?

Stephanie M. Ess
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Walden University

College of Education and Human Sciences

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Stephanie M. Ess

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Walden University
2024

Abstract

Attachment-Based Intervention for Inattention, Hyperactivity, and Impulsivity: Does
Relationship Matter?

by

Stephanie M. Ess

MA, Saint Mary's University of Minnesota, 2006

BS, University of Mary, 2002

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Developmental Psychology

Walden University

November 2024

Abstract

While the prevailing notion attributes attention deficit hyperactivity disorder (ADHD) largely to a genetic response, there is increasing evidence of its multifactorial nature, involving both genetic and environmental factors, including the parent–child attachment relationship. Given the limitations of pharmacological and behavioral treatment methods, this study addressed the critical need for alternative ADHD interventions. The purpose of this study was to examine the differences in inattention, hyperactivity, and impulsivity among toddlers approximately 48 months old in an attachment-based intervention group ($n = 63$), a control intervention group ($n = 58$), and a low-risk group not requiring intervention ($n = 52$). Grounded in Bowlby’s attachment theory and a biopsychosocial framework, this study utilized a quantitative, nonexperimental, comparative design with secondary data analysis. ADHD symptoms were measured postintervention using the preschool version of the Child Behavior Checklist. A one-way analysis of variance revealed differences in attention problems, $F(2, 162) = 7.0, p = .001$, and ADHD problems, $F(2, 162) = 6.0, p = .003$, across the three groups, with the attachment-based intervention group showing reductions in attention and ADHD problems compared to the control intervention group and not differing significantly from the low-risk comparison group at postintervention. These findings contribute to the understanding of the efficacy of attachment-based interventions as an alternative treatment approach to traditional treatments for ADHD. This study has positive social implications by informing ADHD treatment approaches, potentially shifting preferences towards family-centered interventions, and improving long-term outcomes for children and their families.

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Dedication

This dissertation is dedicated to all the children who have crossed my professional path and provided the foundational "why" for this work. I extend particular gratitude to the children of the Mille Lacs Band of Ojibwe, who courageously opened up their life experiences to me, revealing the many shortsighted explanations by a world blinded to their plights of owning a selfhood authentically their own and who were with me at the beginning of this endeavor and were the major impetus of this work. Their courage and plight have left an indelible influence in my life, and they are always close in thought and heart. Miigwech.

I also dedicate this work to my beloved dog, Nietzsche—once infectious and effervescent and now gracefully aged—and to my beautiful son, Levi, who have both taught me the invaluable lessons of rest, stillness, silliness, humility, and unconditional love. They gave me the "how" that supported this arduous yet rewarding research process.

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Chapter 1: Introduction to the Study

Prevalence rates of attention deficit hyperactivity disorder (ADHD) in children continue to uphold the disorder as among the most common diagnosed in children (Centers for Disease Control and Prevention [CDC], 2022). Data collected prior to the parent-reported 2016-2019 National Survey of Children's Health (NSCH) indicated that children aged 3–17 years that had ever been diagnosed with ADHD was approximately 6 million children (9.8%), while at the time of the survey, approximately 5.3 million children aged 3–17 years had been diagnosed (CDC, 2022). Stimulant medications and psychosocial treatments remain the prevailing ADHD recommended treatment approaches for children (CDC, 2022). However, the research literature demonstrates minimal support for these approaches.

Research indicates that, especially for school-aged children with ADHD, three treatment approaches are effective: psychosocial interventions, stimulant medications like methylphenidate, or a combination of the two approaches (Halperin & Healy, 2011; Van der Oord et al., 2008). Stimulant treatments help reduce ADHD symptoms in children and enhance their academic achievements (Halperin & Healey, 2011; Van der Oord et al., 2008), particularly, fidgetiness, off-task behaviors, and improved classroom manageability (Whitaker, 2015). Moreover, research has shown that medicated children tend to finish more work and remain focused for longer periods (Pelham et al., 2022). While the touted benefits of stimulant treatments have shown improved concentration and mitigated behavioral difficulties, these benefits have been demonstrated only in the short-term; academic achievement in the long-term was not supported by subsequent

studies (Pelham et al., 2022; Sroufe, 2012; Van der Oord et al., 2008; Whitaker, 2015).

Other touted benefits of stimulant treatments include enhanced performance in repetitive, attention-demanding tasks, but these benefits too have only been shown in the short-term without notable changes occurring with learning, problem-solving, or reasoning, particularly long-term (Pelham et al., 2022; Sroufe, 2012; Van der Oord et al., 2008; Whitaker, 2015).

Furthermore, the research literature indicates that psychosocial treatment methods, especially behavioral parent training, help children diagnosed with ADHD by reducing symptoms (Halperin & Healey, 2011; Sonuga-Barke & Halperin, 2010; Van der Oord et al., 2008) and associated oppositional behaviors and functional challenges (Halperin & Healey, 2011; Sonuga-Barke & Halperin, 2010). Additionally, strengths of behavioral parent training consist of enhancement in parental well-being by reducing stress and increasing their sense of competence. Another psychosocial treatment approach to childhood ADHD, behavior contingency management, has been shown to improve child behavior in the classroom, enhance academic output, and is positively recognized by teachers (Halperin & Healey, 2011). While psychosocial interventions have empirical backing as effective treatments for children with ADHD, they come with notable drawbacks. First, like stimulant treatments, their benefits often fade after treatment stops (Halperin & Healey, 2011; Sonuga-Barke & Halperin, 2010). This suggests that these interventions, similar to stimulant medication, only offer temporary relief, with underlying ADHD causes remaining unaddressed (Halperin & Healey, 2011). Secondly, these interventions are time-consuming and complex, making them less

effective in treating core ADHD symptoms (Halperin & Healey, 2011; Sonuga-Barke & Halperin, 2010). ADHD's persistent course of symptomology necessarily beckons for a sustained treatment strategy. However, the extended duration of these psychosocial treatment approaches often leads to noncompliance due to the significant commitment required from key adults, like teachers and parents (Halperin & Healey, 2011). These interventions demand consistent and high-fidelity application to be effective which can be strenuous. Lastly, research indicates a lack of long-term benefits from psychosocial treatments, such as improved academic and social skills (Halperin & Healey, 2011; Pelham & Fabiano, 2008; Van der Oord et al., 2008). These treatments often do not stabilize children diagnosed with ADHD functioning entirely and may not generalize across various settings (Halperin & Healey, 2011; Pelham & Fabiano, 2008).

The general understanding that continues to dominate the populace discourse is that ADHD stems merely from genetics (Syrjänen et al., 2018); however, research highlights a more complex picture. ADHD's development is influenced by a mix of genetic and environmental factors (Fearon, 2015; Storebø et al., 2016; Syrjänen et al., 2018), and additionally, more relative recent research attention has focused on the attachment dynamics between a child and their parent. Multiple studies point to a link between insecure attachment and ADHD onset (Darling Rasmussen et al., 2019, 2021; Kissgen et al., 2009; Sempio et al., 2016; Sochos & Yahya, 2015; Storebø et al., 2016; Syrjänen et al., 2018). Recognizing the significant role of biopsychosocial factors in the development of ADHD is fundamental to identifying effective treatment approaches that necessarily emphasize parent-child attachment relationships. Despite this understanding,

public perceptions still heavily lean towards ADHD being solely genetic. This perception biases treatment expectations towards stimulant and behavioral methods rather than family-focused treatments, such as attachment-based interventions (Storebø et al., 2016; Syrjänen et al., 2018). These family interventions are crucial in understanding and addressing ADHD, regardless of its causes.

From the body of literature, research demonstrates that ADHD is not exclusively genetic; that the attachment relationship between child and parent mediates important regulatory functions involved in attention, hyperactivity, and impulsivity; that psychopathology is an outcome of multiple developmental pathways; and that the stimulant and psychosocial are common ADHD treatment approaches whose effects seem to diminish in the long-term. Children diagnosed with ADHD are at significant risk for multiple adverse outcomes. In addition to high rates of conflict and negative parent–child relationships reported by families with a child diagnosed with ADHD (Harold et al., 2013), children face impairments academically, cognitively, and socially, culminating into future occupational difficulties (Nijmeijer et al., 2008). These challenges often persist into adulthood, including higher risks of criminal behavior, substance abuse, and a higher mortality rate (Darling Rasmussen et al., 2019; Nigg, 2012). Even if they no longer meet ADHD criteria as adults, functional impairments remain (Darling Rasmussen et al., 2019). Factors like coexisting health conditions and parental mental health issues can influence the continuation of these symptoms, as evidenced by the Multimodal Treatment Study, which found that initial ADHD severity and comorbidity can predict adult outcomes (Darling Rasmussen et al., 2019).

The diagnosis of ADHD is primarily based on behavioral symptoms, suggesting that for some children, ADHD may arise more from attachment issues than inherent neuropsychological differences (Storebø et al., 2016). While genetic factors are pronounced in what researchers describe as “core” ADHD, attachment may be more significant in “symptomatic” ADHD (Storebø et al., 2016). The relationship between ADHD and attachment problems is complex, making it challenging to determine which leads to the other. They appear to be intertwined risk factors, with the presence of one elevating the risk for the other. Early treatment for ADHD might help in preventing subsequent attachment problems and intervention for attachment problems may interrupt the development of ADHD symptomology ultimately undermining the current poor outcomes of children diagnosed with ADHD and their families. Therefore, a research imperative focused on relationship-based interventions for the treatment of children exhibiting ADHD symptoms begins to emerge. This study aimed to compare the effects of attachment-based intervention with other treatments in children exhibiting ADHD symptoms. The following sections in Chapter 1 will summarize the research literature, state the research problem, and describe the purpose of the study including the research question and hypotheses. Furthermore, the theoretical and conceptual framework will be explained, while the rationale for the research design, definitions, assumptions, scope and delimitations, limitations, significance, and a summary conclude the chapter.

Background

Attention deficit hyperactivity disorder (ADHD) from its inception as “minimal brain dysfunction,” has evolved into a commonly catchall term used to characterize a

spectrum of behavioral challenges in children (Whitaker, 2015). The exact causes and best treatments for ADHD remain topics of debate (Johnson, 2015; Mallett et al., 2014, Whitaker, 2015). The *International Classification of Diseases* (10th Revision; *ICD-10*) classifies ADHD based on primary features such as inattention, hyperactivity, and impulsivity, while also addressing the disorder's diverse aspects by categorizing children who show marked social interactions differently (Kissgen & Franke, 2016). The transition from the fourth edition revised *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV TR*) to the current *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*) involved minor revisions, retaining the core symptom categories but viewing the subtypes as presentations that can shift over a person's life (Kissgen & Franke, 2016). While the *DSM-5* introduces a multifaceted perspective on the development of ADHD, it refrains from including interpretations related to etiology, particularly perspectives outside of traditional interpretations (Kissgen & Franke, 2016). However, recent research has expanded from including only neuropsychological and cognitive impairments as possible origins for the development of ADHD to family factors influencing children.

The research literature demonstrates that there is an association between insecure attachment and the development of ADHD (Darling Rasmussen et al., 2019, 2021; Kissgen et al., 2009; Sempio et al., 2016; Sochos & Yahya, 2015; Storebø et al., 2016; Syrjänen et al., 2018). Researchers have posited that beginning in the early years, children exhibiting ADHD symptoms can present challenges to the development of secure attachment due to their inattention, hyperactivity, and impulsivity (Kissgen &

Franke, 2016). These behaviors can undermine a caregiver's ability to understand and respond to the child's needs accurately. Consequently, the opportunities, therefore, of forming a secure attachment with such children may be lower compared to those children not exhibiting ADHD symptoms as a result of such misattunement by the caregiver (Kissgen & Franke, 2016). This is particularly significant in terms of the association between insecure attachment and the development of ADHD in children due to the inherent challenges in emotional and behavioral regulation associated with insecure attachment (Bowlby, 1988; Davies & Troy, 2020; Sroufe et al., 2009). Conversely, secure attachment has been shown to increase impulse control, enhance attention-related tasks and attention span, and increase delay in gratification, core deficit components of ADHD symptomology (Bowlby, 1988; Davies & Troy, 2020; Sroufe, 1997; Sroufe et al., 2009). Additionally, while some researchers posit that the association between insecure attachment and ADHD is an outcome of misattunement by the caregiver to a child exhibiting inattention, hyperactivity, and impulsivity resulting in an insecure attachment, other researchers suggest that ADHD is an outcome of insecure attachment. Thus, early interactions between the caregiver and the child can impact the development of regulatory problems in children exhibiting ADHD symptoms irrespective of endogenous ADHD or developed ADHD.

Research has shown that an association between insecure attachment and ADHD exists; however, there is a gap in the research literature regarding whether or not attachment-based interventions are effective in ameliorating ADHD symptoms in children. This study aimed to contribute to the body of knowledge, particularly a

common childhood mental health disorder, by investigating the effectiveness of an attachment-based intervention for childhood ADHD symptoms.

Problem Statement

The specific problem addressed through this study is that the scholarly community does not know the extent to which attachment-based interventions influence the pathogenesis of ADHD. Although the popular perception attributes ADHD exclusively to genetic factors (Syrjänen et al., 2018), emerging research highlights its multifaceted nature, emphasizing the intricate interplay between genetics and environmental conditions, particularly the parent–child attachment relationship (Fearon, 2015; Storebø et al., 2016; Syrjänen et al., 2018). Notably, several studies have identified a link between insecure attachment and ADHD development (Darling Rasmussen et al., 2019, 2021; Kissgen et al., 2009; Sempio et al., 2016; Sochos & Yahya, 2015; Storebø et al., 2016; Syrjänen et al., 2018). Identifying the integral biopsychosocial components in ADHD’s development is crucial for creating effective treatment strategies. However, the prevailing public perception that ADHD is wholly rooted in genetics may influence treatment preferences towards pharmacological and behavioral methods, which the research has shown to be ineffective in the long run, thereby excluding potentially critical family-centric, attachment-based interventions that could play a significant role in ameliorating ADHD symptoms and improve long-term outcomes for children and their families. This study addressed the problem by examining the differences between ADHD symptomology in children participating in attachment-based intervention from children participating in a nonattachment-based intervention.

Purpose of the Study

The purpose of this quantitative, comparative study was to examine ADHD symptomology differences in children receiving an attachment-based intervention from children who received a control intervention. I examined the outcomes (i.e., inattention, impulsivity, and hyperactivity) across different groups to identify whether the intervention group demonstrated notable improvement compared to the control and low-risk groups to determine the efficacy of attachment-based interventions in treating ADHD symptoms in children.

Research Question and Hypotheses

Research Question: What are the differences in inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention?

H_0 : There are no statistically significant differences in inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention.

H_1 : There are statistically significant differences in inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention.

Theoretical and Conceptual Framework for the Study

John Bowlby's seminal work on attachment theory beginning around the mid-20th century provided the theoretical foundation for this study, while the principles of

developmental psychopathology undergirded a conceptual framework involving a biopsychosocial perspective of psychopathology.

Bowlby's theory of attachment focuses specifically on the concepts of responsive, sensitive, nurturing, and reliable responses of the caregiver to the infant during times of stress, separation, or danger as the mediating determinants of developing a sense of security within a child (Bowlby, 1969). This sense of security establishes a pattern (i.e., secure pattern of attachment) that structures the infant's future expectations of relationships as being trustworthy and positive (Bowlby, 1969). Bowlby (1973) proposed that the expectation of relationships being trustworthy and positive had the potential to endure across the lifespan in the form of what he termed internal working models. An internal working model is a mental representation of self, other people, and the relationships between self and others that is constructed through repeated lived experiences of the caregiver-child relationship (Bowlby, 1973). Internal working models are central to attachment theory because, essentially, internal working models shape the expectations and beliefs about relationships and help infants develop strategies (i.e., secure or insecure attachment patterns) to ensure that their needs will be met (Bowlby, 1980). One critical implication of secure attachment and a subsequent positive internal working model is the development of self-regulation. Further in-depth details of Bowlby's attachment theory are discussed in the Chapter two Literature Review of this study.

Several studies stress the association between children experiencing inconsistent, insensitive, intrusive, and unpredictable caregiving (i.e., insecure attachment) with the

development of ADHD (Darling Rasmussen et al., 2019; Kissgen et al., 2009; Sempio et al., 2016; Sochos & Yahya, 2015; Storebø et al., 2016; Syrjänen et al., 2018). Therefore, studies have identified the importance of their finding implications as being the potential for repairing the parent–child attachment relationship as a means for preventing and ameliorating symptoms of hyperactivity, impulsivity, and inattention, and in particular, as an alternative to common treatment practices focused primarily on pharmacological and behavioral interventions which have shown modest effects at best and risk of adverse effects at worst.

Developmental psychopathology is a relatively young discipline that emerged in the early 1970s from successful, concerted efforts to integrate abnormal psychology, child psychiatry, and developmental psychology (Sroufe, 2009). At its burgeoning inception, the main purpose was to develop a conceptual framework that encompassed both typical and atypical development with a specific orientation to the origins, pathways, and underlying processes of disorders (Labella & Cicchetti, 2017; Sroufe, 2009). Additionally, critically, contemporary developmental psychopathology seeks practical applications in creating programs that foster healthy development and prevention of mental health issues (Labella & Cicchetti, 2017; Sroufe, 2009). Important developmental psychopathology principles incorporate the viewpoint that disorders emerge from complex developmental processes, and rather than viewing neurophysiological factors as causes, they are regarded as indicators (Labella & Cicchetti, 2017; Sroufe, 2009). Furthermore, concepts such as developmental pathways, multi- and equifinality, gene-environment interaction, experience-dependent brain development, the “integrated nature

of development” are central to developmental psychopathology (Labella & Cicchetti, 2017; Sroufe, 2009). Developmental psychopathology’s core premise that three main determinants of behavior and development involve genes, environment, and prior developmental history provides a firm framework to conceptualize the pathogenesis of ADHD as being a multifactorial phenomenon, and one that includes early parent–child relationship. This conceptual framework is also discussed in further detail in the literature review in Chapter 2 of this study.

Nature of the Study

The present study is a nonexperimental, comparative research design with preexisting secondary data to address the research question. This study investigated the differences between the dependent variable (inattention, impulsivity, and hyperactivity problems) and the independent variable (intervention) in a group of toddlers. Data were analyzed using a one-way analysis of variance (ANOVA).

Definitions

Attachment: An emotional tie that an infant develops to a primary caregiver which promotes survival and serves to provide the infant with a sense of security, and to aid the infant to regulate affect and arousal, to communicate or express feelings, and to explore and learn (Davies & Troy, 2020).

Attention deficit hyperactivity disorder (ADHD): A neurodevelopmental disorder characterized by persistent patterns of inattention, hyperactivity, and impulsivity that can interfere with functioning or development (American Psychiatric Association [APA], 2013).

Behavioral interventions: Strategies used to teach positive behaviors and reduce or eliminate negative behaviors (CDC, 2022; Pelham & Fabiano, 2008).

Biopsychosocial: The complex interplay between biological, psychological, and social factors in understanding health and illness (Sonuga-Barke & Halperin, 2010).

Child Behavior Checklist (CBCL): A standardized measure of 113 items based on parent report utilized to identify behavioral and emotional difficulties in children (Lind et al., 2017).

Comorbidity: The simultaneous presence of two or more diseases or disorders in a single individual (Johnson, 2015).

Dimensional Change Card Sort (DCCS): A commonly utilized test for executive function and serves as a marker for the progression of executive function which is often found to be compromised in children diagnosed with ADHD and autism (Zelazo, 2006).

Developmental psychopathology: The study of how the interaction of biological, psychological, and environmental factors impact the onset and trajectory of both adaptive and maladaptive behaviors, thoughts, and emotions, as well as their course over time. (Labella & Cicchetti, 2017; Sroufe, 2009).

Etiology: The study of the causes or origins of a disease or disorder (Humphreys & Zeanah, 2015; Nigg, 2012; Sroufe, 1997).

Impulsivity: A pervasive tendency to act quickly without thinking or consideration of the consequences and interferes with functioning or development (APA, 2013).

Inattention: A pervasive inability to sustain attention resulting in difficulty with following through with instructions and organization that interferes with functioning or development (APA, 2013).

Insecure attachment: A type of attachment pattern where children display anxiety and uncertainty in relationships, typically stemming from inconsistent and dismissive caregiving responses. It is contrasted with secure attachment, where children feel confident in their caregiver relationships (Davies & Troy, 2020; Sroufe et al., 2009).

Neurodevelopmental: The growth and development of the brain and nervous system from its earliest stages of development throughout an individual's life (Halperin & Healey, 2011).

Neurodevelopmental disorders: Disorders that involve developmental problems in the brain or central nervous system (APA, 2013).

Neurophysiological: Relating to the functioning of the nervous system and its role in affecting cognition and behavior (Sroufe, 1997, 2009).

Neuropsychological: The study of the relationship between behavior and emotion, and cognition and brain function (Halperin & Healey, 2011; Sonuga-Barke & Halperin, 2010).

One-way ANOVA: Analysis of variance (ANOVA) is a statistical technique utilized to assess the variability among two or more group means for significant differences. A one-way ANOVA specifically tests the effect of one factor (independent variable) on an outcome (dependent variable; Stadtlander, 2015).

Parent study: A study that originally gathered the data set (Doolan & Froelicher, 2009).

Post-hoc test: statistical method utilized after data has been completed to find differences among multiple group means (Warner, 2021).

Primary caregiver: The main person, often a parent, responsible for raising and caring for a child (Bowlby, 1988; Davies & Troy, 2020).

Psychosocial interventions: The interconnection of social factors and individual thought and behavior (Pelham & Fabiano, 2008; Van der Oord et al., 2008).

Secure attachment: An attachment pattern where children feel secure and are confident that their caregivers will be available and responsive to their needs (Bowlby, 1988; Davies & Troy, 2020).

Self-regulation: The ability to control one's emotions, behaviors, and thoughts, and adapting them according to the situation and tasks at hand (Davies & Troy, 2020; Sroufe et al., 2009).

Translational: The practical application of scientific research findings to improve clinical practice and enhance human health and well-being (Labella & Cicchetti, 2017).

Assumptions

In the present study, I operated under the assumption that the secondary data were both accurate and unbiased. I also assumed that the interviewers from the parent study collected data objectively without altering questions or responses. Additionally, I assumed that the participants of the parent study willingly volunteered, were not harmed

by participation in the parent study, and participants from the parent study provided honest information regarding background history and objective measures.

Scope and Delimitations

This study is based on secondary data and therefore, primary data collection and contact with participants did not occur. The data represented findings or responses collected during a specific period; therefore, the study cannot consider events or data outside of this timeframe. Additionally, only variables available in the secondary data set were studied, and my analysis was constrained to the type and complexity of data available. Lastly, secondary data were collected for a different purpose than the parent study's purpose. Thus, any hypotheses or research questions developed were based on available data rather than data being collected based on the hypotheses as is inherent to secondary data analysis.

Limitations

Utilizing secondary data from the parent study had inherent limitations, as the original data collection objectives might not have aligned precisely with my study's goals. Additionally, the secondary data collected from the parent study had a potential limitation of being dated. Furthermore, data collected by the parent study specifically involved children from foster families and therefore, data may have cultural and geographic limitations.

Significance of the Study

The significance of this study becomes evident when considering that the prevailing approach to treating children diagnosed with ADHD, which leans heavily on

pharmacological and behavioral interventions, has been shown by the research to, at best, have short-term benefits (Pelham et al., 2022; Sroufe, 2012; Van der Oord et al., 2008; Whitaker, 2015) and, at worst, not only have adverse outcomes (Darling Rasmussen et al., 2021; Graham & Coghill, 2008; Halperin, & Healey, 2011; Sonuga-Barke & Halperin, 2010; Sroufe, 2012; Van der Oord et al., 2008; Whitaker, 2015) but hold no long-term benefit (Darling Rasmussen et al., 2021; Pelham et al., 2022; Sonuga-Barke & Halperin, 2010; Sroufe, 2012; Van der Oord et al., 2008; Whitaker, 2015). Furthermore, continued perceptions by the general public that ADHD is an outcome of genetics and not incorporating a biopsychosocial understanding, has the potential to communicate that despite the ineffectiveness of such treatment approaches, families have no viable alternatives to improving and altering the life course of children diagnosed with ADHD. The research literature demonstrates that intervening within the parent–child relationship may play a critical role in ameliorating ADHD symptoms in children.

Considering the body of research showing that an association exists between insecure attachment and ADHD (Darling Rasmussen et al., 2019, 2021; Kissgen et al., 2009; Sempio et al., 2016; Sochos & Yahya, 2015; Storebø et al., 2016; Syrjänen et al., 2018), investigating relationship-based interventions could, therefore, be pivotal in treating children exhibiting ADHD symptoms and interrupt future adverse outcomes. By comparing the efficacy of attachment-based interventions to other treatments, this study sought to shed light on a potentially transformative approach to ADHD treatment thereby contributing to the research literature and providing positive social change to children diagnosed with ADHD and their families.

Attachment-based interventions for children diagnosed with ADHD have potential cascading positive social change outcomes benefiting not only the individual child but also their family, educational systems, and society at large. At the individual level, positive social change benefits of attachment-based interventions for children diagnosed with ADHD potentially include improved parent–child relationships which enhance emotional regulation and social functioning (Guttmann-Steinmetz et al., 2011; Kissgen et al., 2009); reduced behavioral issues leading to improved social interactions (Guttmann-Steinmetz et al., 2011; Sempio et al., 2016); enhanced academic performance as a result of increased self-regulation (Sempio et al., 2016); long-term mental health benefits specific to resilience and subsequent reduction in the risk of future mental health disorders (Kissgen et al., 2009; Storebø et al., 2016); and prevention of future issues by addressing early life adversity to prevent adolescence/adulthood problems (Darling Rasmussen et al., 2021; Guttmann-Steinmetz et al., 2011).

From a family level perspective, positive social change may involve, similarly, improved parent–child relationships which increases likelihood of secure attachment between children diagnosed with ADHD and their parents (Darling Rasmussen et al., 2021; Kissgen et al., 2009; Mazzeschi et al., 2019; Storebø et al., 2016); reduced behavioral issues creating a more harmonious and cohesive family environment (Erdman, 1998; Harold et al., 2013; Mazzeschi et al., 2019; Syrjänen et al., 2018); and increased parental competence and confidence, thereby increasing a sense of empowerment within parents in managing ADHD challenges and subsequently reducing overall family stress (Mazzeschi et al., 2019).

Attachment-based interventions for ADHD additionally have potential positive social change outcomes specifically benefiting schools and the broader community. Within an education environment, benefits of attachment-based interventions for ADHD may result in enhanced academic performance which reduces strain on educational resources and teachers (Harold et al., 2013), social skills development in children which facilitates improved integration and interaction in school settings (Sempio et al., 2016), and decreased behavioral issues leading to a more conducive learning environment. As the cascading benefits of attachment-based interventions for ADHD ripple outward into the broader community, potential positive social change outcomes include decreased stigmatization which foster a more inclusive and understanding attitude towards childhood ADHD (Sroufe, 2012); reduction in long-term healthcare costs (Nigg, 2012); increased awareness and sensitivity about childhood ADHD and the important role of attachment issues; and prevention of future issues specifically mitigating risks of societal problems like substance abuse or criminal behavior (Darling Rasmussen et al., 2019, 2021; Nigg, 2012; Nijmeijer et al., 2008).

Summary

This chapter outlined the study's research problem and purpose, emphasizing the central research question, hypotheses, and the study's significance. This study focused on the link between attachment-based interventions and ADHD symptoms in children, aiming to deepen the existing research literature and contribute to the body of knowledge by evaluating the effectiveness of such interventions for ADHD. Insights from this study

have potential to enhance intervention strategies, mitigating long-term negative impacts for children with ADHD and their families.

Chapter 2: Literature Review

Introduction

ADHD continues to predominately be explained by lay people as a genetic deficit, an inevitable biological outcome (Syrjänen et al., 2018). However, studies underscore a multifactorial perspective which demonstrate that the development of ADHD can occur as an outcome of the interplay between genetics and environmental conditions (i.e., exogenous factors; Fearon, 2015; Storebø et al., 2016; Syrjänen et al., 2018). Specific to the environmental conditions, studies have particularly focused on the attachment relationship between child and parent and subsequently have concluded that an association between insecure attachment and the development of ADHD exists (Darling Rasmussen et al., 2019, 2021; Kissgen et al., 2009; Sempio et al., 2016; Sochos & Yahya, 2015; Storebø et al., 2016; Syrjänen et al., 2018). The recognition that there is indeed a biopsychosocial aspect to the development of ADHD is critical when considering treatment strategies to prevent or ameliorate ADHD symptoms that involve contextual concerns such as parent–child attachment relationship. While the general public maintains the perception that ADHD is solely genetic, the expectation for treatment will continue to rely more heavily in favor of pharmacological and behavioral interventions and less on involving family treatments (i.e., attachment-based interventions) which appears to be crucially important with understanding the progression and treatment of ADHD irrespective of etiology (Storebø et al., 2016; Syrjänen et al., 2018). The purpose of this quantitative study is to examine ADHD symptomology differences in children receiving an attachment-based intervention from children who receive a control

intervention. In the following sections of Chapter 2, how the research literature was found, and the identified grounding theoretical foundation and conceptual framework will be described. Concluding the chapter will be a thorough literature review which includes describing the studies related to the constructs and providing a summary.

Literature Search Strategy

I searched databases for relevant literature specific to psychology from APA PsycArticles, APA PsycBooks, APA PsycInfo , and SAGE Journals. The search was limited to peer-reviewed scholarly journals initially beginning with the following keywords: *attachment patterns AND neurobiology AND inattention*. However, this search generated no results. To narrow my search, the search terms *attachment patterns AND inattention* were utilized. This generated only five results. Based on the second search, I amended the keywords to *ADHD AND attachment*; results, 877. To narrow my search further, the following keywords were identified *ADHD AND attachment AND adults*. These keywords produced 200 results. Additionally, the references list of some articles, particularly review of the literature articles, also proved fruitful with resources.

Theoretical Foundation

Attachment Theory

According to Bowlby, the founder of attachment theory, human motivation is driven by innate behavioral systems that help ensure adaptation and survival—the biological function being protection (Bowlby, 1969). Specifically, these behavioral systems are organized around the caregivers of a child and in which Bowlby defined as attachment figures (Bowlby, 1969). Attachment theory proposes that infants have an

inherent, biological drive to seek proximity and comfort from their primary caregivers at times of need and vulnerability (Bowlby, 1969). Based on the responsive, sensitive, nurturing, and reliable responses of the caregiver to the infant when they are stressed, separated, or in danger, the quality of this relationship will develop a sense of security within the child (Bowlby, 1969; Siegel, 1999). Experiencing this security repeatedly culminates into a pattern (i.e., secure pattern of attachment) that organizes the infant's future expectations of relationships as being positive and reliable (Bowlby, 1969; Siegel, 1999). This anticipation of relationships as being positive and reliable Bowlby proposed ensures a likelihood of persisting throughout an individual's lifetime in the form of what he termed initially representational models, and which later became known as internal working models (Bowlby, 1973). An internal working model evolves from an infant's direct experience of the caregiver-child relationship and therefore, forms a mental representation or a cognitive framework of self, other people, and the relationships between self and others (Bowlby, 1973; Davies & Troy, 2020). Undergirding attachment theory, crucially, internal working models shape the expectations and beliefs about relationships and help infants develop strategies to ensure that their needs will be met whether that be adaptive (e.g., secure attachment) or maladaptive (e.g., insecure attachment; Bowlby, 1980; Siegel, 1999). The child's model of the self is built up through such internal working models, and the quality of the relationship with the primary caregiver as either responsive, sensitive, nurturing, and reliable or hostile, inconsistent, dismissive, and threatening will determine the internalization of the expectation for future relationships to be similar (Bowlby, 1988; Sroufe et al., 2009). In

other words, it is the caregiving experience that organizes and develops the child's mind—the relationship between child and caregiver is a powerful influencer and mediates the course of development and determines if an infant is able to regulate arousal and cope with stress (i.e., secure attachment) or not (insecure attachment).

Legacy of Secure Attachment

The lasting legacy of a secure attachment is its critical role in building a foundation for healthy relationships in childhood through adulthood. Bowlby (1980) encapsulated this legacy when he wrote “Intimate attachments to other human beings are the hub around which a person's life revolves, not only when he is an infant or a toddler or a schoolchild but through his adolescence and his years of maturity and on into old age” (p. 442). Viewed from the attachment perspective, the function of attachment behavior is to solicit and obtain comfort and protection, while the function of exploratory behavior is to engage in learning and mastery. The corollary of these early experiences, therefore, is an individual's ability to balance a sense of autonomy alongside dependency needs—this is what defines the term “healthy” within this attachment perspective context. Along the developmental trajectory to reaching this essential stage in human development, however, there are basic building blocks of secure attachment formation initiated at birth that begin laying the foundation for healthy development and subsequent healthy relationships. This is because, as an “integrative construct” (Sroufe et al., 2009, p. 42), attachment is the representation of the fully developed cognitive, emotional, and social capacities of the infant by the end of the first year (Sroufe et al., 2009). Attachment represents these cognitive, emotional, and social capacities because of its essential role in

undergirding the development of feeling safety (i.e., sense of security), managing emotions and level of arousal (i.e., regulation of affect and arousal), expressing emotions and communicating, and fostering curiosity and discovery (i.e., base for exploration; Davies & Troy, 2020). The importance of these attachment functions is that in time, an infant's relational experiences or histories become stable individual ways of regulating behavior, thinking, and feeling—the essential building blocks for healthy development and interpersonal relating (Sroufe et al., 2009).

Facilitating a Sense of Security. Infants signal their needs through what Bowlby (1969) termed attachment-seeking behaviors (e.g., looking, smiling, reaching) and what Mary Ainsworth termed signaling behaviors (e.g., crying, calling, smiling) as a means to solicit the caregiver's attention to either respond or to stay within proximity once contact had occurred (Ainsworth et al., 2015). A sense of security develops by the infant's experience of the caregiver as being consistent, reliable, responsive, and predictable in meeting these attachment needs (for comfort and protection) consequently facilitating an infant's confidence that their caregiver will meet their biological and emotional needs (Sroufe et al., 2009). This gradual confidence based on actual lived experience eventually manifests in the infant's ability, particularly at times of arousal, to “learn how to contain himself, how to control motor responses, and how to attend for longer and longer periods” (Brazelton, Koslowski, & Main, 1974, p. 47).

Regulation of Affect and Arousal. While the fundamental goal of attachment is to facilitate a sense of security in the infant, a secondary function is to regulate affect and arousal (Davies & Troy, 2020). Within the cradle of a secure attachment, because of a

history of the caregiver responding to the infant in a consistent, responsive, and sensitive way, the infant gradually learns that they can depend on the caregiver to respond to their cues of distress (i.e., arousal; Bowlby, 1988; Davies & Troy, 2020). This allows the infant to draw upon the caregiver to help regulate their affect and arousal and return to a physiological regulated state (Bowlby, 1988; Davies & Troy, 2020). Repeated experiences of the caregiver demonstrating to the infant an accurate reading of the infant's affect and subsequently providing soothing, facilitates the infant's ability to modulate their arousal (Bowlby, 1988; Davies & Troy, 2020). These repeated responsive and predictable experiences in which the infant's affect and arousal are soothed, effectively is the mechanism for internalizing self-regulation—that is, by repeatedly experiencing soothing by the caregiver, the infant learns how to soothe themselves thereby progressively increasing their confidence to competently regulate arousal and negative emotions (Bowlby, 1988; Davies & Troy, 2020).

Expression of Feelings and Communication. Along with providing a sense of security and regulating affect and arousal, attachment functions in supporting the expression of feelings and communication (Davies & Troy, 2020). A securely attached infant of 12 months of age has learned in the year, through the predictably responsive relationship with the caregiver, that when I express my feelings and communicate my needs (e.g., physiological needs, social needs, emotional needs), you respond (Davies & Troy, 2020). Therefore, when these interactions are successful with encouraging expression of feelings and communication, they showcase key features of the secure attachment relationship, such as mutual reinforcement of synchronous behaviors between

the caregiver and child, close involvement with each other, sensitivity to each other's emotions (i.e., attunement), and the caregiver's ability to be attentive and empathic (Davies & Troy, 2020). It is within this dyadic transactional, synchronous process that the infant comes to feel known through the process of the caregiver entraining them to increase their self-regulation capacities (Davies & Troy, 2020; Sroufe et al., 2009; Stern, 2000). These secure attachment-based experiences in which an infant comes to feel "known" lay down the foundation for executive functions such as self-regulation and impulse control that promote further adaptive development as a child grows (Sroufe et al., 2009).

Base for Exploration. Attachment theory while a developmental theory also has ethological roots (Bowlby, 1988). Conceptualized as a behavioral system, attachment incorporates both an attachment system and exploratory system working in tandem (Bowlby, 1988; Davies & Troy, 2020). Within this partnership, when one system is on, the other is off and vice versa. This partnership can increasingly be observed as development proceeds and particularly when a child is 12 months of age and is more mobile. Specifically, a child who has internalized confidence in the availability of their caregiver will experience their caregiver as a secure base to venture out assuredly (Bowlby, 1988; Davies & Troy, 2020; Sroufe et al., 2009). This implicit confidence in the caregiver permits the child to engage unencumbered within the exploratory system and enjoy the freedom (i.e., physiological flexibility) to learn and explore (Bowlby, 1988; Davies & Troy, 2020; Sroufe et al., 2009). This behavior essentially declares "my parent

looks out for me” (Davies & Troy, 2020, p. 13) and therefore, the child is unrestrained to direct attention towards developmental needs and gain a sense of mastery.

Legacy of Insecure Attachment

If the legacy of secure attachment is the organization of behavior and related attention, emotions, expectations, and physiology to serve a regulatory function to help a child maintain or regain equilibrium in the face of stress/fear so that information can be taken in and stimulation tolerated (Bowlby, 1988; Sroufe et al., 2009), then the opposite legacy of lacking confidence in the availability and responsiveness of others, regulation/expression of emotion, internal sense of safety, attention to/interpretation of cues, and perception of self as worthy/competent can be said of insecure attachment. The legacy of insecure attachment, however, cannot be understood unilaterally. While secure attachment develops from a single pattern, insecure attachment divides into three distinct patterns: insecure-avoidant, insecure-ambivalent/resistant, and insecure-disorganized/disoriented attachment.

Insecure-Avoidant. The relational history of avoidantly attached children can be described generally as one of chronic rejection, notably when they had signaled attachment needs (e.g., needs for comfort or protection) to their caregiver (Bowlby, 1988; Davies & Troy, 2020; Sroufe, 1997). Primary experiences by these children of signaling their distress only to be rejected by their caregiver has cascading effects on development. The first effect being rather than developing confidence or a sense of security as an outcome of experiencing an emotionally, physically, and psychologically available caregiver, as within a secure attachment, a child develops an expectation of caregiver

rejection in the face of signaling needs, thereby, “deactivating” attachment behaviors (Bowlby, 1988). Bowlby (1988) described this “defensive exclusion” (p. 35) as a defense against the vulnerability of expressing tender needs, particularly when distressed, and instead presenting a countenance of self-containment and insouciance. Consequently, an avoidantly attached child comes to learn through the relationship with the caregiver to repress or deactivate needs to ensure proximity to caregiver—essentially to not compromise their survival by threatening the relationship with attachment needs (Bowlby, 1988; Davies & Troy, 2020; Sroufe et al., 2009). The incipient lack of security developed by avoidantly attached children transpires into a defense strategy of intensified self-reliance by not showing needs or expecting needs to be met resulting in undermining self-regulation development, one of the key factors in executive functioning (Bowlby, 1988; Davies & Troy, 2020; Sroufe et al., 2009).

The cascading effects of experiencing chronic rejection begin by undermining an avoidantly attached child’s sense of security followed by an inability to regulate affect and arousal. A child who has learned that a caregiver will reject them or respond negatively to their attachment needs do not seek their caregiver for help in regulating affect and arousal opting instead to constrain strong affects (Bowlby, 1988; Davies & Troy, 2020). These experiences of repeated insensitive, rejecting responses to their emotional needs teach avoidantly attached children to regulate arousal by minimizing or deactivating emotional signals and signs of distress—to internalize an avoidance and overregulation of emotional expression (Bowlby, 1988; Davies & Troy, 2020). Consequently, these children learn that expressing emotional needs is a threat to

maintaining relationships and, therefore, they do not show upset at times that would be normatively distressing for children (Bowlby, 1988; Davies & Troy, 2020; Sroufe et al., 2009).

The repeated experiences of rejection to the expression of attachment needs by avoidantly attached children further compound their lack of sense of security and subsequent self-regulation development via the implicit message by their caregivers that expression and communication of feelings is intolerable (Bowlby, 1988; Sroufe et al., 2009). Because these children have learned to expect rejection by their caregivers when expressing attachment needs, they instead do not turn to them when distressed and shift their focus away from their own internal states to the outside world (Bowlby, 1988; Davies & Troy, 2020; Sroufe, 1997). The developmental outcome for children with such histories of chronic rejection in the face of attachment needs is a predominance of exploratory behaviors at the expense of attachment (Bowlby, 1988; Davies & Troy, 2020). In contrast to the securely attached child who maintains a balance between utilizing the caregiver relationship as a secure base to venture out, explore, and return, the avoidantly attached child maximizes exploration in a rigid and overly self-dependent manner (Bowlby, 1988; Davies & Troy, 2020). Belying their calm and self-reliant demeanor, avoidantly attached children have been shown by physiological tests (e.g., heart rates, cortisol levels) to experience internal distress (Gunnar, 2006; Gunnar et al., 1996). Yet despite their internal distress, avoidantly attached children isolate, withdraw, and do not seek caregivers for help or comfort (Bowlby, 1988; Davies & Troy, 2020). Avoidantly attached children sacrifice attachment, seeing themselves instead as unworthy

of care and developing a distrust of the availability of others and ultimately they will “generalize the defenses of avoidance and self-reliance to other relationships” (Davies & Troy, 2020, p.16).

Insecure-Ambivalent/Resistant. While avoidantly and ambivalent/resistantly attached children share similar relational early histories of insensitive caregiver responses to the activation of their attachment behaviors, ambivalent/resistantly attached children differ in that they experience inconsistent and/or insensitive responding to their needs (Bowlby, 1988; Davies & Troy, 2020; Sroufe, 1997) as well as intrusive caregiving in which caregivers project their states of mind onto their children (Siegel, 1999). The distinguishing term “ambivalent/resistant” describes the pattern of behavior in which a child has conflicting feelings of both seeking proximity and rejecting comfort from their primary caregiver as a response to the lack of consistency in the caregiver’s availability and responsiveness (Bowlby, 1988; Davies & Troy, 2020; Sroufe, 1997). Because these children lack confidence in the availability and responsiveness of their primary caregiver, this type of attachment is characterized by high levels of overt anxiety (i.e., heightened anxiety) and a lack of trust (i.e., sense of security) in the caregiver (Bowlby, 1988; Davies & Troy, 2020; Sroufe, 1997).

To resolve the implications of inconsistent availability and responsiveness on the part of the primary caregiver, the ambivalent/resistantly attached child engages in maximizing or activating/heightening affect and arousal to keep the caregiver in proximity but at a developmental cost (Bowlby, 1988; Davies & Troy, 2020; Siegel, 1999; Sroufe et al., 2009). The developmental consequences of ambivalent/resistant

attachment impact regulation of affect and arousal, the expression of feelings and communication, secure base formation in addition to facilitating a sense of security. Whereas a sense of security in the caregiver's availability and responsiveness experienced by the securely attached child facilitates regulation of affect and arousal, a lack of sense of security in a caregiver's availability and responsiveness due to inconsistency results in the ambivalent/resistantly attached child maximizing attachment behaviors, subsequently keeping the attachment system activated (i.e., in a state of hyperarousal) in attempts to maintain the caregiver's attention or proximity (Bowlby, 1988; Davies & Troy, 2020; Siegel, 1999). Essentially, this experience translates to an inability of the caregiving relationship to regulate affect and arousal or "turn off" attachment behavior of the ambivalent/resistantly attached child by either contact or proximity ensuring ongoing and unmitigated heightened affect and arousal (Bowlby, 1988; Davies & Troy, 2020; Siegel, 1999). Because these ambivalent/resistantly attached children experience uncertainty in the availability of their primary caregiver to meet their attachment needs, they are likely to experience difficulty with separation anxiety, clinginess, and anxiety with exploration (Bowlby, 1988; Davies & Troy, 2020) in addition to difficulty regulating their emotions (i.e., self-regulation), leading to mood swings, temper tantrums, and anxiety (Sroufe, 1997).

In contrast to the child with an avoidant attachment style who disregards their caregiver's emotional state and adopts a shutting down (i.e., deactivating) approach to the expression of feelings and attachment needs, a child with ambivalent/resistant attachment is more preoccupied by their own emotional state (i.e., hyperarousal) and is constantly

focused on the unpredictable nature of the attachment relationship with their caregiver resulting in maximizing their emotional expression and vigilance as a means for regulating their arousal (Bowlby, 1988; Siegel, 1999). Simply stated, the avoidantly attached child regulates their arousal (i.e., activation of attachment needs) by minimizing or deactivating emotional signals and signs of distress, the ambivalent/resistantly attached child regulates their arousal by maximizing or activating/heightening emotional expression. Furthermore, because the child with ambivalent/resistant attachment has learned through inconsistent experiences with their caregiver that their emotional state can also be infringed upon by the caregiver in unpredictable, non-attuned ways, this keeps them in a state of hyperarousal (Siegel, 1999). Instead of expression of feelings and communication with the caregiver having a predictably positive and enhanced effect on their mental and emotional state, the unpredictable nature of the caregiver's availability and responsiveness (i.e., attunement) causes chronic hyperarousal, hypervigilance, and an uncertainty of the ambivalent/resistantly attached child's own sense of effectiveness emotionally and socially (Davies & Troy, 2020; Siegel, 1999; Sroufe, 1997). Ambivalent/resistantly attached children are, therefore, too anxious and uncertain of their caregiver's availability and responsiveness to engage in exploration.

The ambivalent/resistantly attached child, unsure of their caregiver's availability and responsiveness, tends to concentrate instead on the caregiver's actions and emotions, ignoring other things (Davies & Troy, 2020). This preoccupation with attachment to the caregiver impedes the ambivalent/resistantly attached child's ability to explore and discover new interests (Davies & Troy, 2020). Therefore, rather than experiencing a

sense of confidence and competence to leave the attachment relationship as a base for exploration, the ambivalent/resistantly attached child inhibits exploration because the child is emotionally fixated on ensuring the presence of her attachment figures (Davies & Troy, 2020). The developmental repercussions of such undermined confidence and competence for exploring, learning about the world, and learning new skills for these children are behavioral inhibition, lack of assertiveness, social withdrawal, poor peer interpersonal skills (Davies & Troy, 2020).

Insecure-Disorganized/Disoriented. Disorganized/disoriented attachment develops when a child experiences conflicting and confusing emotions and responses (i.e., disorganized behaviors) towards their primary caregiver as a response to caregiver behavior that frightens them (Davies & Troy, 2020; Sroufe et al., 2009).

Disorganized/disoriented attached children have generally experienced their caregiver as either insensitive or intrusive as well as experiencing some form of maltreatment (Davies & Troy, 2020; Sroufe et al., 2009). Children with disorganized/disoriented attachment are therefore, in an untenable bind: the caregiver is both the source of safety and fear (Davies & Troy, 2020; Sroufe et al., 2009). Key to human adaptation and survival is the ability to flee from danger or threat and flee to a source of safety (i.e., the caregiver); however, when the caregiver's behavior is frightening or frightened, the disorganized/disoriented attached child is an "irresolvable paradox" (Davies & Troy, 2020, p. 20) that results in a lack of clear and consistent strategies for dealing with stress and seeking comfort from the primary caregiver (Davies & Troy, 2020; Sroufe et al., 2009).

Disorganized/disoriented attached children cannot minimize (i.e., avoidant strategy) or

maximize (i.e., ambivalent/resistant strategy) attachment needs with a caregiver who is the source of danger/threat therefore, their efforts to utilize attachment behavior to decrease their distress fail precisely because the caregiver, who should provide a sense of safety, also creates fear (Davies & Troy, 2020; Sroufe et al., 2009). Children with disorganized/disoriented attachment may display confused and conflicting responses, such as appearing dazed or fearful, when interacting with their caregiver: “The essence of disorganized attachment is fright without solution” (van Ijzendoorn et al., 1999, p. 226).

The developmental consequences of a disorganized/disoriented pattern of attachment can be significant and long-lasting and can become a foundation for significant future clinical disturbance (Siegel, 1999; Sroufe et al., 2009).

Disorganized/disoriented attached children having experienced frightened/frightening caregiving face a breakdown in a relational strategy of regulation, that is, they cannot minimize or maximize signal of distress and therefore, tend to struggle with effectively managing their emotions when they are feeling stressed (Davies & Troy, 2020; Siegel, 1999). Consequently, disorganized/disoriented attached children are unable to effectively communicate their need for comfort and support from a caregiver to regulate their emotions and are challenged prematurely to manage their own arousal (Davies & Troy, 2020; Siegel, 1999). Without adequate strategies to regulate their distress, they remain in a state of heightened arousal (Davies & Troy, 2020; Siegel, 1999). This persistent emotional dysregulation only adds to their sense of disorganization and disorientation and can have a lasting negative impact on their ability to regulate their emotions independently (Davies & Troy, 2020; Siegel, 1999). The child that is frightened by the

caregiving relationship cannot achieve organization of regulation; rather, they experience organized fear (Sroufe et al., 2009).

In contrast to the other forms of insecure attachment, which display organized patterns in interactions and communication with their caregivers, this particular form of insecure attachment is characterized by significant issues in the development of a cohesive mental framework (Siegel, 1999). The abrupt changes in emotional state experienced by disorganized/disoriented attached children lead to inconsistencies in their cognitive, emotional, and behavioral functioning, causing disruptions in their social interactions (Siegel, 1999). As a result of frightened/frightening caregiving, disorganized/disoriented attached children may become hostile and aggressive towards their peers and display a controlling behavior that makes it difficult for them to form and maintain social relationships (Davies & Troy, 2020; Siegel, 1999). This pattern of behavior is often seen when disorganized/disoriented attached children continue to face difficulties at home, leading to irresolvable problems and intense feelings that they are unable to manage (Davies & Troy, 2020; Siegel, 1999). Disorganized/disoriented attachment has been linked to severe family issues such as difficulty in resolving conflicts, chronic and severe depression in the mother, child abuse, and controlling, helpless, and manipulative behavior by caregivers (Siegel, 1999). Over time, the continued experience of such disorienting relationships reinforces the internal incoherence that causes difficulties with and undermines critical attachment functions such as feelings of safety (i.e., sense of security), managing emotions and level of arousal (i.e., regulation of affect and arousal), expressing emotions and communicating, and

fostering curiosity and discovery (i.e., base for exploration); further disrupting the development of the mind and future interactions with others (Siegel, 1999).

Conceptual Framework

Developmental Psychopathology

Developmental psychopathology is a branch of science with a central focus on behavioral adaptation and maladaptation, specifically examining how individuals adjust and cope with changing circumstances during development, including both successful (e.g., normative development) and unsuccessful strategies (e.g., disorder; Labella & Cicchetti, 2017). In other words, the ways in which behavior changes and adapts (or fails to adapt) as individuals grow and develop (Labella & Cicchetti, 2017). Prominently undergirding its perspective, developmental psychopathology considers the interplay between biological, psychological, and environmental factors that influence the emergence and course of adaptive and maladaptive behavior, thinking, and feeling and how they change over time (Labella & Cicchetti, 2017). This field seeks to understand the origins and pathways of mental health problems and how they impact individuals, families, and communities across the lifespan (Labella & Cicchetti, 2017). The ultimate goal of developmental psychopathology is to improve prevention, diagnosis, and treatment of mental health problems (Labella & Cicchetti, 2017) and culminating into “yielding a classification system informed by empirical study of individual development from the ground up, rather than simply a downward extension of adult categories of disturbance or acceptance of clinic-derived child entities” (Sroufe, 2009, p. 178). The

developmental psychopathology framework draws on a set of guiding principles that help us understand typical and atypical human functioning (Labella & Cicchetti, 2017).

Core Principles

Developmental Context

Developmental psychopathology emphasizes the importance of taking a holistic, developmental perspective when understanding the development of individuals and their behavior (Labella & Cicchetti, 2017; Sroufe, 2009). Developmental psychopathology stresses the importance of considering the context in which development takes place, including the family and cultural environment, as well as the individual's own biology and temperament (Labella & Cicchetti, 2017; Sroufe, 2009). Biology and environment are inextricably connected, communicating with each other throughout the life span, "experience influences physiology just as physiology influences experience" (Sroufe, 2009, p. 179). Importantly, developmental psychopathology asserts that behavior and experiences in childhood are not isolated events but are interconnected and have a profound impact on later development (Labella & Cicchetti, 2017; Sroufe, 2009). Development is not simply a linear process of maturation, in which genes determine physiological structures which then determine behavior (Labella & Cicchetti, 2017; Sroufe, 2009). Rather, it entails dynamic and interactive processes of mutual influence in which "behavior is not simply the interaction of genes and environment but genes, environment, and the history of adaptation to that point" (Sroufe, 1997, p. 252). Consequently, a comprehensive understanding of human development must consider the interplay between these various factors, and that this holistic perspective is essential for

understanding and addressing developmental problems and disorders (Labella & Cicchetti, 2017; Sroufe, 2009).

Delineating Adaptation and Disorder

Distinguishing developmental psychopathology from other approaches, a distinctive feature is its comprehensive approach to behavioral adaptation (Labella & Cicchetti, 2017). As a reference point to gaging health and disorder, the developmental psychopathology perspective evaluates whether individuals are meeting culturally normative developmental milestones instead of solely focusing on diagnosable disorders (Labella & Cicchetti, 2017). To determine whether someone is developing adaptively or experiencing a disorder, developmental psychopathology assesses their performance on what Labella and Cicchetti (2017) described as “valued developmental tasks” (p. 3), which are behaviors and achievements that are expected of individuals in a particular age group and social context. Additionally, such normative tasks are a set of developmental milestones that individuals are expected to achieve within a particular culture or society (Labella & Cicchetti, 2017). These developmental tasks can vary significantly across different cultures, but they generally involve several key areas of development such as establishing a secure attachment with a caregiver, which provides a foundation for healthy social and emotional development; developing a sense of autonomy, or the ability to make choices and take responsibility for one’s actions; acquiring language skills; forming friendships with peers; and abiding by community rules (e.g., hunting and gathering or excelling on standardized tests; Labella & Cicchetti, 2017).

In terms of disorder, deviation from the expected trajectory of adaptive development would be the key feature within the developmental psychopathology framework (Labella & Cicchetti, 2017). Maintaining its developmental perspective, developmental psychopathology holds that because a cumulative effect occurs from developmental achievements building on one another, difficulties in one adaptive domain can lead to problems in others later on (Labella & Cicchetti, 2017). Not succeeding in meeting developmental goals can result in mental health issues later in life (Labella & Cicchetti, 2017). As a result, early difficulties in adaptation can indicate that preventive measures may be needed (Labella & Cicchetti, 2017). Critically, emphasis from the developmental psychopathology perspective is that what is perceived as typical at one developmental stage may be viewed as atypical at another, and disorders may not display themselves similarly across various age groups (Labella & Cicchetti, 2017).

Interplay of Normal and Abnormal Functioning

Building from the defining feature of disorder as a deviation from the expected trajectory of adaptive development, developmental psychopathology, therefore, emphasizes the importance of studying both normal and abnormal functioning together (Labella & Cicchetti, 2017). It is through recognizing typical developmental patterns, held within a cultural context, that a developmental psychopathology framework can identify when individuals deviate from these adaptive patterns and investigate the reasons behind it (Labella & Cicchetti, 2017). Additionally, developmental psychopathology argues that studying atypical functioning can provide insights into normative development (Labella & Cicchetti, 2017). As such, developmental psychopathologists

Labella and Cicchetti (2017) asserted that “because disorders involve breakdowns in normally integrated systems, abnormal development may reveal new information about the underlying component systems and their typical interrelationships” (p. 4). Therefore, to comprehensively capture the diverse pathways of individual development, a thorough understanding of the interplay between normal and abnormal functioning is essential (Labella & Cicchetti, 2017).

Living Systems in Context

The developmental psychopathology framework incorporates an ecological perspective not only within an individual’s external environment but similarly within their internal environment (Labella & Cicchetti, 2017). Whereas an external ecological perspective considers an individual as interconnected to larger systems (e.g., micro-, meso-, macro-, and chrono-systems), an internal ecological perspective from a developmental psychopathology framework additionally considers individuals as intricate living systems that are continuously adapting and self-organizing (Labella & Cicchetti, 2017). The mechanism propelling such continuing adaptation and self-organization according to Labella and Cicchetti (2017) is the “ongoing interactions among many component systems, which include biological, cognitive, affective, representational, and interpersonal processes” (p. 5). These ongoing interactions within an individual, however, additionally interface with larger systems underscoring the developmental psychopathology perspective that “organism and context are viewed as inseparable” (Sroufe, 1997, p. 252). Comprehending the context, therefore, is extremely vital when examining psychological disorders since these disorders, from a developmental

psychopathology perspective, are characterized as an inability to adjust to cultural norms, rather than being solely attributed to the individual (Labella & Cicchetti, 2017). As such, the context and the individual's interaction with it are where the disorder lies (Labella & Cicchetti, 2017).

Multilevel Analysis and Influence

Based on the developmental psychopathology core principle of examining individuals as complex systems that operate at various levels, taking an interdisciplinary approach that involves measuring a wide range of phenomena, including biological, behavioral, and cultural factors is therefore, fundamental (Labella & Cicchetti, 2017). Additionally, notably, developmental psychopathology emphasizes bidirectional influences which fluctuate between levels, meaning that no single level can be solely responsible for causing an effect (Labella & Cicchetti, 2017). A common theme throughout the developmental psychopathology framework and underscored by Labella and Cicchetti (2017) is that biology is regarded as just one aspect of the “developmental system” (p. 5) that gives rise to behavior and is regulated by both environmental and behavioral factors. Accordingly, for developmental psychopathologists, biology is not seen as the sole cause of behavior, but “rather as one strand of reciprocal influence” (Labella & Cicchetti, 2017, p. 5) in the developmental process.

Translational Implications

Developmental psychopathology germinated from the belief that understanding the origins and mechanisms of disorders rather than holding a purely biological explanation was key in recognizing the “premorbid patterns of maladaptation that allow

targeted early intervention and prevention” (Sroufe, 2009, p. 178). Because of this, developmental psychopathologists see their framework as inherently translational, that is, conducting research to guide clinical interventions and practices, and therefore, offering significant value in designing culturally responsive prevention and intervention programs tailored to developmental level (Labella & Cicchetti, 2017). Adding further value to translational research, the core principles of the developmental psychopathology framework ensures that a holistic view of the individual, undergirded by a developmental perspective and encompassing a consideration to context and an emphasis on multiple levels of analysis, is the paramount route for early identification of adaptational problems, signaling a need for intervention before disorders are crystallized (Labella & Cicchetti, 2017).

Literature Review Related to Key Variables and Concepts

Attention Deficit Hyperactivity Disorder

From its inception as a recognizable diagnosable disorder, ADHD has progressively transformed not only into a specific classification of distinct features of psychopathology, but also into a generalized concept used to refer to behavioral difficulties observed in children (Whitaker, 2015). Initially, in the early 20th century, the precursor term for ADHD, “minimal brain dysfunction,” was used to describe children who exhibited symptoms of inattention, hyperactivity, and impulsivity (Volkmar, 2003; Whitaker, 2015). With the publication of the second *Diagnostic and Statistical Manual of Mental Disorders (DSM-II)* in 1968, the inadequacy of “minimal brain dysfunction” as a diagnostic concept was replaced by the diagnosis hyperkinetic reaction of childhood to

describe symptoms of distractibility, short attention span, overactivity, and restlessness (Mallett, Natarajan, & Hoy, 2014; Volkmar, 2003). It was not until 1980 that the APA included attention deficit disorder with or without hyperactivity (ADD) as a formal diagnosis in the third edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-III)*; Mallett et al., 2014; Volkmar, 2003; Whitaker, 2015).

Throughout its history, the diagnosis of ADHD has been subject to controversy and debate (Johnson, 2015; Mallett et al., 2014; Nigg, 2012; Whitaker, 2015). Some have argued that the increasing prevalence of ADHD diagnoses in recent years may be due to overdiagnosis or the medicalization of normal childhood behaviors (Gleason & Humphreys, 2019; Mallett et al., 2014; Whitaker, 2015). Others contend that the disorder is underdiagnosed and that children with ADHD may not be receiving adequate treatment and support (Volkmar, 2003). Despite these debates, ADHD remains a widely recognized and researched disorder in children, with ongoing efforts to improve its diagnosis and treatment.

Prevalence and Incidence Rates of ADHD

According to the CDC (2022), millions of children in the United States have been diagnosed with ADHD with the prevalence increased from an estimated 7.8% in 2003 to 10.2% in 2011 and 11.0% in 2016. Based on a national survey of parents, the estimated number of children aged 3–17 years who have ever received an ADHD diagnosis is 6 million (9.8%) using data from 2016–2019 (CDC, 2022). This includes 2% of children aged 3–5 years, 10% of children aged 6–11 years, and 13% of children aged 12–17 years (CDC, 2022). Boys are more likely to be diagnosed with ADHD (13%) than girls (6%).

Black and white, non-Hispanic children are diagnosed with ADHD at higher rates (12% and 10%, respectively) than Hispanic (8%) or Asian, non-Hispanic (3%) children (CDC, 2022). Additionally, studies have demonstrated that rural children have higher ADHD diagnosis rates but receive less behavioral treatment compared to urban or suburban peers (CDC, 2022). The rates of ADHD diagnosis among children aged 3–17 years and the use of any ADHD treatment vary by state, ranging from 6% to 16% for diagnosis and 58% to 92% for treatment, with the use of ADHD medication ranging from 38% to 81% and ADHD behavior treatment ranging from 39% to 62% (CDC, 2022).

Additionally important to note, in their investigation and review of the association between early adverse childhood experiences and subsequent psychopathology, Humphreys and Zeanah (2015) highlighted that ADHD is more prevalent among youth (12–17 years old) involved in child welfare investigations, with 19% meeting criteria compared to 5% in the general population. Their finding that maltreatment may specifically relate to increased inattention and impulsivity, but not hyperactivity, from a sample of school-aged children, further supports a developmental pathways understanding of ADHD genesis than a purely genetic etiology (Humphreys & Zeanah, 2015). Despite such recent findings, the present *Diagnostic and Statistical Manual of Mental Disorders (DSM)* states, “Family interaction patterns in early childhood are unlikely to cause ADHD but may influence its course or contribute to secondary development of conduct problems” (APA, 2013, p. 62).

Diagnostic Criteria for ADHD

In the United States, the identification of ADHD has been assessed through different versions of the *DSM*, with each edition featuring alterations to the diagnostic criteria (Mallett et al., 2014). The current version, *DSM-5*, included the following revisions to diagnostic criteria: age of onset criterion shifted from 7 to 12 years old, with the requirement of multiple symptoms for impairment; a reduction from six to five symptoms for certain children and teenagers; the need for multiple symptoms to establish a cross-situational diagnosis; and broadened diagnoses were permitted (e.g., comorbidities; Mallett et al., 2014). Current diagnostic features include inattention, identified by six or more symptoms generally characterized as failing to pay close attention to details, difficulties with sustaining focus, maintaining organization, and absent mindedness persisting for at least six months; and hyperactivity and impulsivity, identified by six or more symptoms generally characterized as excessiveness in motor activity, fidgeting, talking, interrupting, and impulsivity persisting for at least six months (APA, 2013). While the *DSM-5* acknowledges that ADHD symptomology emerges in childhood and that it is necessary for multiple symptoms to appear before the age of 12, it asserts that determining an exact age of onset is not specified due to challenges in retrospectively establishing the precise time of onset during childhood (APA, 2013). To fill the diagnostic gap related to identifying a developmentally informed age of onset for ADHD, the current *Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood (DC:0-5)* included for the first time a nosology to assess hyperactivity, impulsivity, and inattention (Zero to Three, 2016).

Separating Atypical Developmental Behaviors from Typical

To address the gap of a developmentally informed diagnosis of ADHD in young children, Zero to Three obtained survey responses from a variety of early childhood professionals ranging from mental health clinicians to researchers to advocates during their process of revising the previous *Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood (DC:0-3*; Gleason & Humphreys, 2019). Results indicated collectively the importance of differentiating atypical developmental behaviors from typical development (Gleason & Humphreys, 2019). From a developmental perspective, this differentiation is paramount (Gleason & Humphreys, 2019; Labella & Cicchetti, 2017; Sroufe, 1997). Equally paramount is the dialectical understanding that while disorders with extreme typical behaviors in their criteria provoke more concerns and questions than disorders with atypical behaviors, delayed identification of treatable neurodevelopmental processes also poses significant risks (Gleason & Humphreys, 2019).

The validity of ADHD diagnosis in young children is often questioned due to the possibility that symptoms may be developmentally normative, rather than indicative of a mental health issue (Gleason & Humphreys, 2019). In response to these concerns, the *DC:0-5* diagnostic criteria for ADHD align with research on preschool and school-aged children, featuring age-appropriate examples, such as inattention during parent–child book reading or intrusive play (Gleason & Humphreys, 2019). Moreover, importantly, *DC:0-5* ADHD criteria emphasize symptoms in play and relationships, as these are central to young children’s lives (Gleason & Humphreys, 2019). Of further significance,

DC:0-5 differentiates diagnostic criteria between hyperactivity/impulsivity and inattention by identifying two separate diagnoses of ADHD for children aged at least 36 months and Overactivity Disorder of Toddlerhood for children under 36 months with an age limit of 24 months (Zero to Three, 2016). This differentiation and separation of diagnoses for young children represents developmentally informed diagnostic practices—inattention developmentally does not present in the toddlerhood years, but hyperactivity/impulsivity demonstrate significant stability during the toddler years and into the school-age years (Gleason & Humphreys, 2019). Because normative developmental behaviors can consist of episodic or intermittent behavioral dysregulation in the face of stressors, the *DC:0-5* places particular emphasis on the persistence of symptoms and excessiveness especially compared to cultural and developmental norms (Gleason & Humphreys, 2019).

Risk of Overdiagnosing

Along with the questions raised regarding the differentiation between atypical developmental behaviors from typical behaviors, a parallel, related question regarding the risk of over-pathologizing normative development has also entered the stratosphere of ADHD diagnosis debate. Arguments undergirding the perspective that a phenomenon of over-pathologizing normative developmental behaviors is legitimate and exists focuses on two main points: the overreliance on parent and teacher reports of hyperactivity/impulsivity and inattention and the exponential rate of ADHD diagnosis since its inclusion in the *DSM* (Erdman, 1998; Whitaker, 2015). Additionally, consideration of broad differential diagnoses which include symptoms of hyperactivity

and impulsivity is an important factor for potential overdiagnosing of ADHD and preventing a “catchall” (Erdman, 1998, p. 184) diagnostic label for perceived childhood problem behaviors (Gleason & Humphreys, 2019). Gleason and Humphreys (2019) emphasized that clinical assessments should carefully evaluate young children for various conditions before diagnosing ADHD, considering factors like typical development, relationship-specific disorders, posttraumatic stress disorder (PTSD), sleep disorders, anxiety disorders, mood disorders, and even lead toxicity.

Symptoms of hyperactivity and impulsivity in children continue to be a main initiator for mental health referral (Gleason & Humphreys, 2019), with concerns primarily originating from teacher complaints as “only a minority of children with the disorder exhibit symptoms during a physician’s office visit” (APA, 2022; Whitaker, 2015, p. 220). Rating instruments and report checklists utilized during ADHD assessment are often completed by parents and teachers which research has shown can overestimate ADHD symptoms in contrast to diagnostic interviews, emphasizing the need for thorough, more comprehensive diagnostic assessments (Gleason & Humphreys, 2019; Whitaker, 2015). Indeed, ADHD diagnosis has been suggested as catering more to parents’ needs as well as classroom manageability than the child’s needs (Erdman, 1998; Whitaker, 2015).

Since its first appearance in the *DSM-III*, the rate of ADHD diagnosis has progressively increased (CDC, 2022; Mallet et al., 2014; Whitaker, 2015). Arguments to explain the increasing rate of clinical inattention, hyperactivity, and impulsivity center around a variety of factors, such as increased awareness and recognition of ADHD,

changes in diagnostic criteria, and improved access to healthcare and mental health services (CDC, 2022). However, others argue that the rising rates of ADHD diagnosis reflect further loosening of diagnostic criteria and an inclusion of a nosological structure that lacks empirical validity (Mallet et al., 2014; Whitaker, 2015). Indeed, Mallet and colleagues (2014) asserted that “Not only do independent (from the APA) reviewers concur that this diagnosis stands on shaky empirical ground, but some have found that ADHD has no genetic or neuroanatomic cause and is most probably not a disease entity” (p. 49). Mallet and colleagues (2014) additionally raised the alarm that the prevailing psychiatric diagnostic system (*DSM-5*) appears to have boundaries and classifications that are potentially flawed, as they were established using limited evidence for validity and reliability. This they state has potential for deleterious ramifications as “through injudicious widespread applications of such criteria, children and adolescents can be labeled with a mental health disorder: such labels will subsequently structure how their behaviors are understood and how interventions may be pursued. We may be inadvertently harming those whom we intend to help through an overinclusion of child and adolescent behaviors as conclusive evidence for having a mental health disorder” (Mallet et al., 2014, p. 49).

In accordance with concerns of the overdiagnosis of ADHD, some additionally point to the confluence of the Food and Drug Administration (FDA) approved ADHD medication treatments for children beginning in the 1990s and the rising rate of ADHD diagnosis (CDC, 2022; Whitaker, 2015). Support for this view include the approximately 1 million children diagnosed with ADHD in the United States in 1990 and the climbing

rates of 3.5 million children medicated by 2014 when the National Survey of Children's Health (NSCH) was completed (CDC, 2022; Whitaker, 2015). Based on the 2016 national parent survey, 62% of children aged 2-17 years received ADHD medication (CDC, 2022), this a practice mainly occurring in the United States, where children consume three times more stimulants than the rest of the world combined (Whitaker, 2015).

Contributors to ADHD Risk

While ADHD has an ongoing perception by the general public as having a genetic deficit basis, and therefore, leading them to view it as an unavoidable biological consequence (Syrjänen et al., 2018), a growing body of research in the past decade confirms that the “genetic risks implicated in ADHD generally tend to have small effect sizes or be rare” (Thapar et al., 2013, p. 3). High heritability rates have been demonstrated to be a contributing factor to the development of ADHD (Faraone et al., 2005; Nikolas, & Burt, 2010; Thapar et al., 1999), however, heritability estimates encompass not only genes but also gene-environment interactions, which are likely significant (Thapar et al., 2013). Studies have shown an association between parent ADHD and inadequate child behavior monitoring, inconsistent discipline, and more severe child ADHD symptoms (Leitch et al., 2023). Furthermore, studies have identified other predictors of child ADHD symptoms including parental stress and poor mental health, and negative parenting practices (Leitch et al., 2023). These conclusions additionally have been buttressed by the Multimodal Treatment Study which suggested that a strong link between parental mental health and the management or progression of

ADHD in children is a key feature, specifically that the “persistence” or “desistence” of ADHD symptomology in children heavily depends on the mental health status of the parent (Darling Rasmussen et al., 2021). Therefore, the high heritability estimates established in the research literature do not negate the role of environmental risk factors (Thapar et al., 2013).

Indeed, the research literature has shown that ADHD is a multifaceted disorder that likely arises from a combination of genetic, epigenetic, and environmental factors (Harold et al., 2013; Humphreys & Zeanah, 2015; Thapar et al., 2013). Genetic predisposition, coupled with epigenetic modifications, can play a crucial role in the development of ADHD (Harold et al., 2013; Humphreys & Zeanah, 2015; Thapar et al., 2013). Additionally, environmental factors, such as prenatal exposure to toxins, early life stressors, and family dynamics, can interact with and influence these genetic and epigenetic processes (Gleason & Humphreys; 2019; Humphreys & Zeanah, 2015; Thapar et al., 2013). Understanding the complex interplay of these factors is essential for a comprehensive view of ADHD etiology and for developing effective interventions and treatments.

Treatment for ADHD

The CDC data in 2022 reported that a majority of United States children diagnosed with ADHD receive treatment (CDC, 2022). The 2016 national parent survey found that 77% of children aged 2–17 years with ADHD were receiving treatment, with 62% taking medication, 47% receiving behavioral treatment, and 32% receiving a combination of both (CDC, 2022). From the total number of children taking medication,

18% of children were aged 2–5, 69% were aged 6–11 years, and 62% were aged 12–17 years (CDC, 2022). Of the children receiving behavioral treatment, 60% of children were aged 2–5 years, 51% were aged 6–11 years, and 42% were aged 12–17 years (CDC, 2022). However, approximately 23% of children with ADHD received neither medication nor behavioral treatment (CDC, 2022).

While stimulant medication and behavioral parent training continue their dominance as the typical approach of ADHD treatment, questions related to their efficacy have been raised as these ADHD treatment approaches do not directly address the stress and psychopathology faced by parents of affected children (Darling Rasmussen et al., 2021; Leitch et al., 2023). These questions are important to consider when addressing the treatment needs of children diagnosed with ADHD as studies have indicated that parents of ADHD children face increased stress, anxiety, depression, and substance-related issues compared to those with non-ADHD children (Leitch et al., 2023). To effectively address and treat ADHD symptomology in children, it is argued that a comprehensive ADHD treatment plan should address parent mental health, family stress reduction, family basic needs, and culturally relevant support (Gleason & Humphreys; 2019).

Efficacy and Side Effects of Pharmacological Treatments for ADHD. The empirical literature supports, particularly for school-aged children with ADHD, the effectiveness of three treatment options: psychosocial treatments (behavioral/cognitive-behavioral), stimulant treatments (primarily methylphenidate), or a combination of the two (Halperin & Healy, 2011; Van der Oord et al., 2008). Stimulant treatment approaches have been shown to be effective in mitigating symptoms of ADHD in children and

improving academic performance (Halperin, & Healey, 2011; Van der Oord et al., 2008). According to Whitaker (2015), National Institute of Mental Health (NIMH) investigators in 1995 touted the significant benefits of ADHD medications, referencing the advantages of decreased “task-irrelevant activity” (p. 224) such as fidgetiness and off-task behaviors and improved classroom manageability. Indeed, studies buttress this view in their succinct conclusion that “children complete more seatwork and spend more time on tasks when medicated” (Pelham et al., 2022, p. 368). However, the key word in the extant research literature regarding the efficacious nature of stimulant treatment for children diagnosed with ADHD is short-term; studies have demonstrated short-term benefits of stimulant treatment for the reduction of ADHD symptoms (Pelham et al., 2022; Sroufe, 2012; Van der Oord et al., 2008; Whitaker, 2015). Evidence of long-term stimulant treatment effectiveness, particularly with improving general functioning remains scant (Darling Rasmussen et al., 2021; Nigg, 2012; Pelham et al., 2022; Sonuga-Barke & Halperin, 2010; Sroufe, 2012; Van der Oord et al., 2008; Whitaker, 2015).

A significant criticism of stimulant treatment is that these pharmacological interventions often yield diminishing clinical benefits as time passes (Halperin & Healey, 2011; Sonuga-Barke & Halperin, 2010; Sroufe, 2012; Van der Oord et al., 2008; Whitaker, 2015). While short-term studies of stimulant treatment for childhood ADHD have demonstrated improvement with increased concentration and decreased behavioral difficulties, follow-up studies indicated that stimulants did not translate into long-term academic achievement (Pelham et al., 2022; Sroufe, 2012; Van der Oord et al., 2008; Whitaker, 2015). Additional benefits of stimulant treatment in the short-term have been

shown to boost performance in repetitive, attention-demanding tasks, but show no clear benefits for reasoning, problem-solving, or learning, especially in the long run (Pelham et al., 2022; Sroufe, 2012; Van der Oord et al., 2008; Whitaker, 2015).

Another documented negative ramification of stimulant treatment for children diagnosed with ADHD is the range of side effects, including appetite suppression, sleep disturbances, increased heart rate, increased blood pressure, headaches, dizziness, abdominal pain, and stunted growth (Darling Rasmussen et al., 2021; Graham & Coghill, 2008; Halperin, & Healey, 2011; Sonuga-Barke & Halperin, 2010; Sroufe, 2012; Van der Oord et al., 2008; Whitaker, 2015). In some cases, studies have indicated that children treated with stimulant medications may also experience psychiatric concerns such as mood changes, anxiety, irritability, apathy, psychotic symptoms, obsessive-compulsive symptoms, paranoia, mania, and hallucinations (Graham & Coghill, 2008; Nigg, 2012; Whitaker, 2015). Additionally, some studies have raised concerns about the potential of long-term exposure to methylphenidate, a common stimulant medication for ADHD, to cause permanent desensitization of the brain's dopaminergic pathways (Whitaker, 2015). As dopamine is involved in the brain's reward system, studies conclude that this could result in an individual who, after being medicated as a child and while the brain is still developing, may have a diminished capacity to experience pleasure as an adult (Whitaker, 2015).

Social and emotional costs to children diagnosed with ADHD and receiving stimulants as a primary treatment approach have also been highlighted by studies. Interpersonally, stimulant treatment has been deficient in improving peer relationships

(Hoza et al., 2005). Children diagnosed with ADHD often face peer problems due to their immaturity, dominating interaction style, marked by hyperactivity, aggression, and controlling behavior, which makes them less appealing to their peers (Hoza et al., 2005; Whalen & Henker, 1991). While studies have shown the utility of stimulant medication to reduce such behaviors, stimulant treatment approaches have failed to facilitate positive interpersonal behaviors within children diagnosed with ADHD (Hoza et al., 2005). Furthermore, stimulant treatment approaches have limited positive impact on a child's ability to form and maintain friendships yet have shown a high occurrence of adverse effects (Whitaker, 2015). Additionally, research has described how stimulant treatment has been found to negatively affect a child's self-esteem, as they may associate its use with being "bad" or "dumb" (Whitaker, 2015). "The child comes to believe not in the soundness of his own brain and body, not in his own growing ability to learn and to control his behavior, but in 'my magic pills that make me into a good boy'" (Sroufe, 1973, as cited in Whitaker, 2015, p. 224).

Whereas the efficacy and side effects of pharmacological treatments for school-aged children diagnosed with ADHD are well represented within the empirical literature, less is known for preschool-aged children diagnosed with ADHD and therefore, pharmacological treatments are not recommended as first line treatment approaches (Gleason & Humphreys, 2019). Gleason and Humphreys (2019) asserted that the significance of avoiding an immediate reliance on pharmacological treatment approaches for ADHD diagnosis in young children cannot be overstated. Instead, prioritizing developmentally centered approaches is crucial to successfully addressing the

requirements of preschool-aged children (Gleason & Humphreys, 2019). Gleason and Humphreys (2019) proposed that an effective treatment strategy is one that empowers parents to aid their child in mastering self-regulation. Recommended parenting methods are ones that are centered either on facilitating positive parent–child interactions or parent management strategies that are guided by behavioral principles, which tend to enhance a child’s emotional and behavioral control and foster improved self-regulation and positive behavior management within the child (Gleason & Humphreys, 2019).

Psychosocial Interventions for ADHD. The majority of children with ADHD receive some form of support or treatment (CDC, 2022). A survey conducted with parents of children aged 4 to 17 years old who had been diagnosed with ADHD showed that almost 90% of these children had received school support, such as accommodations and in-class help (CDC, 2022). Around 60% of the children received behavioral therapy or skills training, which included parent-delivered behavior therapy (30%), social skills training (40%), peer interventions (30%), and cognitive behavior therapy (20%; CDC, 2022).

However, healthcare claims data reveal disparities in treatment (CDC, 2022). A study analyzing healthcare claims from Medicaid or employer-sponsored insurance showed that during 2008-2011, children aged 2-5 years covered by Medicaid were twice as likely to receive clinical care for ADHD compared to those with commercial employer-sponsored insurance (CDC, 2022). Additionally, the data revealed that about 75% of children aged 2-5 years who received clinical care for ADHD received ADHD

medication, while less than half received any form of psychological services from 2008-2014 (CDC, 2022).

Research on certain branches of psychosocial treatment approaches for children diagnosed with ADHD such as behavioral parent training, has shown progress in alleviating not only ADHD-related symptoms (Halperin & Healey, 2011; Sonuga-Barke & Halperin, 2010; Van der Oord et al., 2008) but also concurrent issues with oppositional behavior and functional impairments (Halperin & Healey, 2011; Sonuga-Barke & Halperin, 2010). Additional evidence for the efficacy of behavioral parent training for ADHD treatment with children is enhanced parental functioning such as mitigated stress and increased sense of competency (Halperin & Healey, 2011). Halperin and Healey (2011) further pointed out that another psychosocial treatment approach, behavior contingency management (e.g., behavioral classroom interventions), leads to enhancements in teacher-reported child performance, improved conduct within the classroom environment, and increased academic productivity for children diagnosed with ADHD.

Despite empirical support for the implementation of psychosocial interventions as an effective treatment approach for children diagnosed with ADHD, several limitations of these interventions have been highlighted. Similar to the criticism of stimulant treatment failing to demonstrate gains after medication discontinuation, the efficacy of psychosocial treatments (especially when not combined with stimulant treatment) fail to endure past termination of treatment (Halperin & Healey, 2011; Sonuga-Barke & Halperin, 2010). According to Halperin and Healey (2011), this indicates that employing

psychosocial interventions (and stimulant medication) only temporarily alleviates behavioral challenges, which reemerge once treatment ceases. Consequently, Halperin and Healey (2011) concluded that no discernible alterations in the fundamental “deficits” (p. 3) causing ADHD’s behavioral expressions have been shown.

Furthermore, another limitation of psychosocial treatment approaches is the increased complexity and time requirements involved in terms of implementation and subsequently, only to generally exhibit lower efficacy in addressing the primary symptoms of ADHD (Sonuga-Barke & Halperin, 2010). The chronic nature of ADHD and its influence on functioning across social and academic settings inherently necessitates a long-term and multipronged treatment approach and therefore, for success to be achieved, long-term adherence to such an approach is implied (Halperin & Healey, 2011). However, it is precisely the necessary long-term time commitment to psychosocial treatments that often result in ultimate noncompliance (Halperin & Healey, 2011). Implementing such psychosocial interventions long-term requires commitment from especially from crucial adults, such as teachers and parents, who must apply these intensive strategies consistently and accurately, which is both essential and incredibly demanding (Halperin & Healey, 2011).

A final limitation identified by the research literature investigating psychosocial treatments, and similar to stimulant treatment, is the lacking empirical evidence of long-term benefits such as improved academic achievement and social skills for children diagnosed with ADHD (Pelham & Fabiano, 2008; Halperin & Healey, 2011; Van der Oord et al., 2008). Dovetailing with the concerns of insufficient evidence of long-term

benefits of psychosocial treatments, two additional factors render the overall efficacy of these treatments as discouraging. The inability for such interventions to completely normalize functioning in many children diagnosed with ADHD post-treatment, and the inability for treatment effects to apply broadly or extend beyond specific scenarios (Pelham & Fabiano, 2008; Halperin & Healey, 2011).

Developmental Perspective on ADHD

Historically, the bio-medical model or “biological essentialism” (Yates et al., 2011, p. 238) has been the dominant influence explaining ADHD as “arising from singular, endogenous pathogens” (Sroufe, 1997, p. 251). However, studies have highlighted the distinct importance of interpersonal relationships, specifically the parent–child relationship, in both the onset and perpetuation of ADHD symptoms. In their prospective study, Jacobvitz and Sroufe’s (1987) findings revealed that during early childhood (e.g., 6 months, 2 years, and 3 ½ years), there is a distinct influence of experiencing intrusive and excessively stimulating parental behaviors on the development of distractibility and hyperactivity in subsequent childhood years. Critically, their findings demonstrated that caregiving behaviors play a more significant role in predicting future ADHD symptoms than biological developmental indicators (Jacobvitz & Sroufe, 1987).

Additionally, eight years later, Carlson et al. (1995) in their prospective investigation, validated Jacobvitz and Sroufe’s (1987) previous research that ADHD is a heterogeneous disorder involving multiple pathways and in which the interplay of caregiving behaviors and contextual factors along with early distractibility strongly

predicted future hyperactivity. Distractibility, an early indicator of hyperactivity, was significantly correlated with the quality of caregiving which in turn was a stronger predictor than either biological or temperament factors (Carlson et al., 1995). Another important finding, Carlson et al.'s (1995) study indicated the significance of family variables as mediating the emergence and maintenance of ADHD. Carlson et al. (1995) identified family variables such as "relationship status at birth, social support for the parent, and the direct measures of parental overstimulation" (p. 50) contributing to a developmental pathway to ADHD.

The important contribution of these developmental investigations into the origins and course of ADHD is their shared finding that the quality of relationship between caregiver and child is critical in terms of understanding intervention and prevention. Relationship indeed appears to influence and alter the course of ADHD symptomology in children.

Attachment and ADHD

Kissgen and Franke (2016) in their review of the literature suggested that children who present with ADHD beginning in their earliest years significantly disrupt everyday family life due to their symptoms of inattention, hyperactivity, and impulsivity. Because of these behaviors, the potential exists to undermine caregivers' sensitive responses to their signals, which are crucial for forming a secure attachment. As a result, Kissgen and Franke posited that the conditions for developing secure attachment seem less optimal in children diagnosed with ADHD than in children not diagnosed with ADHD. This is of crucial importance as children with insecure attachments are more likely to struggle with

emotional and behavioral regulation (i.e., self-regulatory behaviors such as impulse control, inhibition, and the ability to calm down) which are main components of ADHD. Kissgen and Franke proposed, therefore, that the early interactions (i.e., attachment relationship) between a child and their primary caregiver can have a significant impact on the development of self-regulation problems in children diagnosed with ADHD. While Kissgen and Franke's review highlighted the ongoing debate surrounding the association between insecure attachment and ADHD, they noted that recent studies have demonstrated evidence supporting the conclusion, but that the outcomes of these studies are heterogeneous, leading to questions about the existence of the link.

Seeking to add to the research literature exploring the link between attachment and ADHD symptomology, Franke et al. (2017) investigated specifically the distribution of attachment representation between children diagnosed with ADHD and children without ADHD diagnosis. Their findings indicated that attachment patterns in children diagnosed with ADHD significantly vary from those of children without ADHD diagnosis. Notably, and consistent with previous research (Goldwyn et al., 2000; Pinto et al., 2006; Thorell et al., 2012), the study demonstrated that children diagnosed with ADHD are less likely to exhibit a secure attachment and more likely to show disorganized attachment (Franke et al., 2017). Franke et al. stated that while there are few direct comparisons in existing research, the available literature indicates that these patterns of attachment distribution of children diagnosed with and without ADHD are consistent. Additionally, although these descriptive comparisons cannot confirm causation, they underscore the potential role disorganized attachment may play in ADHD

(Franke et al., 2017). The prevalence of disorganized attachment, making up a third of all attachment styles in their sample of children with ADHD, suggests a possible link between the two phenomena (Franke et al., 2017).

Insecure Attachment Is Associated With ADHD

The research literature has shown that there is an association between insecure attachment and ADHD. In terms of prevalence rates, Darling Rasmussen et al. (2019) found significantly higher rates of insecure attachment representations in children diagnosed with ADHD and their mothers, compared to non-clinical populations. This was evident in 77% of the mothers and 85% of the children. The most predominant attachment strategy for both groups was the dismissing strategy, observed in 42% of mothers and 53% of children (Darling Rasmussen et al., 2019). In a randomized clinical trial designed to investigate the associations between ADHD and attachment competences which involved a group of newly diagnosed ADHD in children, Storebø et al. (2015) discovered an unusually high prevalence of insecure attachment. A mere 7% of the children were classified as securely attached at the start of the study in comparison to the 61% of securely attached children without ADHD diagnosis (Storebø et al., 2015).

Review of the research literature has further supported an association between insecure attachment and ADHD. In their review of 29 studies, Storebø et al. (2016) uncovered two important findings, the substantial links between ADHD and insecure attachment in both children and their parents. Specifically, the review's findings indicated that a parent's attachment status was connected to their child's ADHD, while a child's insecure attachment was linked to the emergence of ADHD symptoms and

externalized behaviors (Storebø et al., 2016). Storebø et al.'s review of literature highlighted that insecure attachment and ADHD are closely interconnected, each acting as a potential risk factor for the development of the other. The review indicates that if one condition is present, it heightens the likelihood of the other emerging (Storebø et al., 2016). As such, Storebø et al. offer that potentially efficacious treatment approaches could center on addressing attachment issues and emotional dysregulation in children diagnosed with both ADHD and attachment difficulties. Focusing on the parent–child relationship, or early intervention for ADHD, may help prevent the development of ADHD and attachment disturbance, underscoring the importance of early detection and treatment (Storebø et al., 2016).

Remarkably, in accordance with attachment theory predictions, studies have also demonstrated a correlation between parents' "state of mind" or parental reflective functioning towards attachment and the subsequent attachment patterns observed in their children (Mazzeschi et al., 2019). Furthermore, Kissgen et al. (2009) in their study investigating attachment representation in mothers of children diagnosed with ADHD found empirical support for their hypothesis that the more severe a child's ADHD symptoms were, the more likely the mother's attachment representation was insecure or unresolved. Similar to other studies investigating distribution differences with attachment representation, Kissgen et al.'s findings demonstrated that patterns of attachment varied significantly between the two groups of mothers with children diagnosed with and without ADHD. Mothers of children diagnosed with ADHD were found to exhibit

insecure and disorganized attachment more frequently compared to mothers of children without ADHD (Kissgen et al., 2009).

The association between insecure attachment and ADHD symptomology in children, however, is not limited to the parent–child relationship, children experiencing insecure attachment and ADHD symptomology have been shown to also affect the teacher-child relationship. A study conducted by Sempio et al. (2016) aimed to not only repeat and extend the findings of a previous study, which showed an association between insecure attachment and ADHD in children, but more central to their purpose, to determine if insecure attachment (via the parent–child relationship) would generalize to schoolteachers. The results of the study supported both the hypothesis that insecure attachment is associated with ADHD and the hypothesis that children with both insecure attachment and ADHD diagnosis had negatively impacted relationships with their teachers (Sempio et al., 2016).

In terms of stability related to insecure attachment in children diagnosed with ADHD, Darling Rasmussen et al. (2021) followed up with a group of children from their previous 2015 study in which those diagnosed with ADHD had shown 85% insecure attachment. At their three-year follow-up, these children exhibited not only continued significantly high rates of insecure attachment, but results demonstrated an increase of 10% in insecurely attached children diagnosed with ADHD (a total of 90%). Darling Rasmussen et al. noted that while their results were too challenging to definitively interpret the clinical implications of, important to note as well was the finding that problems with insecure attachment continued to persist, despite adherence to the national

treatment recommendations. Based on this finding, Darling Rasmussen et al. asserted that insecure attachment could be a key factor impacting the lack of progress in the functioning and prognosis of children diagnosed with ADHD, making this issue significant. Moreover, the shared aspect of emotional dysregulation in attachment security and ADHD, as shown by the research are not directly addressed by current treatments, could partly account for the stagnation in ADHD symptom improvement (Darling Rasmussen et al., 2021). As Darling Rasmussen et al.'s research highlights the significance of attachment issues persisting with children diagnosed with ADHD and the attachment research emphasizing how attachment behaviors in children mirror the quality of consistent interactions with attachment figures, integrating these two phenomena suggests parenting and parental functioning serve as critical roles when ascertaining effective ADHD treatment approaches.

Parallel Influences of Attachment and ADHD

The extant research literature confirms that early experience influences not only gene expression (Dismukes et al., 2019) but also psychopathology (Humphreys & Zeanah, 2015). The dichotomous nature versus nurture debate no longer has the empirical dominance it once had, being replaced by current empirical research demonstrating a gene-environment interdependence (Davies & Troy, 2020; Humphreys & Zeanah, 2015). Indeed, Fearon's (2015) review of the literature emphasized the current scientific consensus, particularly for those with a developmental psychopathology perspective, that "no single gene that directly causes disorder, no single experience with wholly predictable and lasting effects, no single phenotype to arise from familial risk, no single

pathway or system affected by a rare genetic disorder; no one disorder has a common and inevitable long-term outcome” (p. 203).

Within the research literature showing an association between insecure attachment and ADHD questions remain regarding etiology: is insecure attachment a precondition for ADHD development or does ADHD undermine attachment security? Investigations into early experience mediating a developmental pathway toward ADHD, Humphreys and Zeanah (2015) demonstrated that severe early childhood neglect, such as institutional care, often leads to a high prevalence of ADHD symptoms among children. Additionally, these issues frequently coexist with other mental health problems specific to deprivation, such as quasi-autism, disinhibited attachment, and cognitive impairment (Humphreys & Zeanah, 2015). In a study involving 641 adopted adolescents conducted by Roskam et al. (2014) revealed that the length of early attachment deprivation predicted increased ADHD symptoms, even when key variables were controlled. Roskam et al., therefore, suggest that infants deprived of stable, sensitive care might face enduring developmental impacts.

From the opposite perspective, Franke et al. (2017) and Kissgen and Franke (2016) offered that it is precisely because symptoms of inattention, hyperactivity, and impulsivity place emotional and physical hardship on caregivers and therefore, undermine their ability respond to their children’s emotional and behavioral needs sensitively that leads to a likelihood of insecure attachment. A study by Guttman-Steinmetz et al. (2011) investigated the attachment-related scripts between mothers and their children with the aim of having a window into parent–child relations in families of

children diagnosed with ADHD. Guttman-Steinmetz et al.'s findings indicated an existing association between mothers' secure base scripts (i.e., mental representations of attachment) and their children without ADHD. However, in the group of children diagnosed with ADHD no association was found (Guttman-Steinmetz et al., 2011). Guttman-Steinmetz et al. suggested that in considering the extensive research literature indicating parent-child relationship difficulties when children exhibit behavioral concerns like those associated with ADHD, it is plausible these behavioral issues could disrupt parent-child interactions and impede children's secure base scriptedness, irrespective of the mother's secure base script. Nevertheless, the results from Guttman-Steinmetz et al.'s research suggested that creating an environment that promotes secure attachment is more challenging for children with ADHD. This is because their parents often face obstacles that limit their capacity to offer a secure foundation, encompassing both emotional and physical presence, which is essential for scaffolding the child's exploration of their surroundings (Guttman-Steinmetz et al., 2011).

Attachment-Based Interventions as Alternative to Pharmacological Interventions

Irrespective of the etiology mediating the association between insecure attachment and ADHD symptomology in children, there is an overlap of regulatory function difficulties exhibited by both insecure attachment and ADHD. An attachment-based intervention could address the self-regulation difficulties at the heart of ADHD symptoms. Additionally, research by Clarke et al. (2002) highlighted the advantages of secure attachment on specific competencies, especially those often found deficient in children diagnosed with ADHD. Secure attachment, in contrast to insecure attachment,

not only undergirds qualities such as enthusiasm, readiness to cooperate, perseverance, and effectiveness (Matas et al., 1978), but also augments performance in attention-focused tasks and prolongs attention spans (Fearon & Belsky, 2004). Furthermore, early secure attachment during childhood has been linked with impulse control, delayed gratification, and the ability to attend to tasks (Jacobsen et al., 1997).

Moreover, results from Darling Rasmussen et al.'s (2021) research highlighted the critical shortcomings of current ADHD treatment strategies, particularly in which they do not evaluate the significance of parental mental health issues, personality traits, and capability for providing sensitive, responsive caregiving (i.e., secure attachment). Their findings, consistent with prior research, emphasize the importance of looking beyond core ADHD symptoms and conducting holistic family assessments. Such assessments can pave the way for tailored treatments that not only address primary ADHD symptoms but also significantly improve overall functional well-being. Additionally, in her review of the literature regarding the association between attachment patterns and ADHD, Erdman (1998) suggested the importance of conceptualizing ADHD within a systems and attachment framework and for treating ADHD by focusing on parent–child relationships rather than solely on a child's behavior. Erdman (1998) highlights the significance of intergenerational transmission of attachment patterns and links insecure attachment in children with maladaptive behaviors and suggests that a treatment approach based on attachment theory could reduce ADHD symptomology and improve the parent–child relationship.

Another study by Mazzeschi et al. (2019) investigated the role of parental reflective functioning (PRF) on the development of ADHD in children. Mazzeschi et al. compared the levels of anxiety, depression symptoms, co-parenting alliances, and PRF in mothers and fathers of children diagnosed with and without ADHD. They found that mothers and fathers of children diagnosed with ADHD experienced more depressive symptoms and lower PRF compared to those without. Mazzeschi et al.'s results also showed that parents with children with ADHD struggled more in their PRF capacities compared to parents with children without ADHD. The study concluded that depression symptomatology, maternal perceptions of low co-parenting alliance, and low PRF are significant risk factors for being in a clinical group (Mazzeschi et al., 2019). Mazzeschi et al.'s study demonstrated valuable insights into the role of sensitive, supportive parenting in the development of ADHD and highlighted the need for future treatment strategies that focus on improving PRF as a means to decrease ADHD symptomatology in children.

Currently, while there have been studies conducted to investigate the effectiveness of attachment-based interventions for children with histories of serious adversity and maltreatment (e.g., Child Parent Psychotherapy, Attachment and Biobehavioral Catch-Up), and emotional and behavioral issues (e.g., Circle of Security), research in their effectiveness to address inattention, hyperactivity, and impulsivity is scant. However, despite this gap, the success demonstrated by attachment-based interventions for childhood adversity and emotional and behavioral problems holds promise for prospective childhood ADHD treatment. Child Parent Psychotherapy (CPP), as one example, is an evidenced-based treatment for infants, toddlers, and preschoolers

who, as a result of experiencing serious adversity and maltreatment, either exhibit mental health issues or are at higher risk for developing emotional and behavioral disturbance (Lieberman et al., 2019). CPP has been shown to be an effective intervention in enhancing the mental health of high-risk toddlers and preschoolers through findings by five randomized trials (Lieberman et al., 2019). Symptom reduction in both children and mothers, enhanced perceptions of children by their mothers, increased child attachment security, and improved mother-child relationships and cognitive functioning in children were demonstrated by these studies (Lieberman et al., 2019). Most notably, long-term benefits, up to 9 years later, were observed in several outcome metrics, including child cortisol levels (indicating stress response), attachment security, behavior issues, aggressive behaviors, PTSD symptoms, comorbidity, cognitive functioning, caregiving avoidance, psychiatric symptoms, and satisfaction in marital relationships (Lieberman et al., 2019).

Attachment and Biobehavioral Catch-Up (ABC), another empirically validated intervention for young children aged 6 months to 36 months-old, aims to foster caregiver nurturance to child signals of distress, facilitate caregiver delight in following a child's lead, and curtail harsh, insensitive, and frightening caregiver behaviors, particularly for children with histories of adversity such as abuse, neglect, and disrupted care (Dozier & Bernard, 2019). While initially focused on children in foster care placement, ABC has been adapted and applied to various high-risk populations, including biological families with high levels of stress or a history of trauma (Dozier & Bernard, 2019). Based on the research literature indicating a susceptibility for children with histories of adversity and

trauma developing insecure and disorganized attachment, a critical target of the ABC intervention is improved attachment security (Dozier & Bernard, 2019). Randomized clinical trial studies have indicated ABC's effectiveness in improving attachment security and cortisol levels, and increased regulatory competence and executive functioning (Dozier & Bernard, 2019).

Another attachment-based intervention with a strong evidence base, the Circle of Security (COS) model, focuses on enhancing attachment security between parents and children to promote healthy emotional and social development (Coyne et al., 2019). To enhance attachment security between parents and children, COS emphasizes developing parental understanding of their children's emotional and attachment needs thereby increasing their capacity to respond sensitively and appropriately to these needs (Coyne et al., 2019). Empirical evidence supports COS effectiveness in reducing child behavior problems, and increasing parental responsiveness and sensitivity to attachment needs, leading to improved emotional and social outcomes for children, including sustained improvements in parent-child attachment security (Coyne et al., 2019).

Gaps in the Current Research

The common recommended approach of ADHD treatment for children continues to be stimulant medication, behavioral strategies, or combination of both. However, to date, research has failed to indicate long-term benefits of these treatment modalities. The research literature supports the view of conceptualizing ADHD as a complex disorder with heterogeneous and multifactorial origins that requires a multimodal treatment approach. As such, a directive for the search of new effective treatments has emerged.

ADHD treatment strategies focused on family relationships within an attachment framework could potentially be the most effective in treating ADHD symptoms. The literature review completed by Storebø et al. (2016) concluded by highlighting the importance for future research to study effective treatments by focusing on the entire family as a means for interrupting maladaptive relating between parents and their children diagnosed with ADHD who also have insecure attachments. Syrjänen et al.'s (2018) multiple-case study proposed that one area for future research should investigate treatment strategies based on a family system's perspective, and in which ADHD symptomology is seen as serving a functional purpose within relationships. In her recommendations following the completion of her review of the literature, Erdman (1998) asserted that comparing the effectiveness of traditional treatment approaches to treatment approaches incorporating an attachment theory perspective would be beneficial. Kissgen et al. (2009) followed the conclusion of their study results by identifying that an area for future research should involve treatment strategies for children diagnosed with ADHD to be attachment-based and focused on family relationships versus focused on individual child-based treatments. While Mazzeschi et al.'s (2019) study focused primarily on the PRF of parents with children diagnosed with ADHD, their study nevertheless highlighted areas for future research focused on treatment strategies designed on improving PRF as a means for decreasing ADHD symptomology in their children.

Summary

The current research literature lacks understanding about the efficacy of non-pharmacological interventions for childhood ADHD, specifically relational interventions such as attachment-based treatment strategies that are based on the perspective that repairing the attachment relationship is the linchpin for preventing or ameliorating symptoms of hyperactivity, impulsivity, and inattention. The present study fills a gap in identifying whether or not attachment-based treatment strategies are effective in treating children and their families experiencing ADHD. Current research concludes that the development of ADHD can occur as the outcome of genes interacting with environmental conditions (i.e., attachment relationship; Fearon, 2015; Storebø et al., 2016; Syrjänen et al., 2018). While the general public maintains the perception that ADHD is wholly genetic, the expectation for treatment will continue to rely more heavily in favor of pharmacological and behavioral interventions and less on involving family treatments. Irrespective of current studies demonstrating a correlational relationship between insecure attachment and ADHD, providing early intervention in the form of attachment-based parent–child interventions to families with children diagnosed with ADHD may prevent the development of attachment problems. The research literature abundantly makes clear the link between secure attachment as a protective factor and a host of adverse developmental outcomes from insecure attachment, regulatory disturbances such as hyperactivity, impulsivity, and inattention being such an example.

Chapter 3: Research Method

Introduction

Though the broader public continues to believe that ADHD is exclusively genetic, current research shows that ADHD is the outcome of the interplay of genetic and environmental influences (Fearon, 2015; Storebø et al., 2016; Syrjänen et al., 2018). This perception, therefore, influences treatment preferences, leading to an emphasis on pharmacological and behavioral interventions and neglect relationally focused treatments. The research literature demonstrates that a correlation between insecure attachment and ADHD exists, consequently, early intervention via attachment-based parent–child treatments could be effective in preventing numerous detrimental developmental outcomes, including symptoms typically associated with ADHD such as hyperactivity, impulsivity, and inattention. Despite studies showing an association between insecure attachment and ADHD, currently, there is insufficient research examining the effectiveness of non-pharmacological and non-behavioral intervention approaches such as attachment-based treatments. This study addresses this gap by assessing whether attachment-based interventions can indeed be effective for treating children with ADHD and their families.

In this chapter, a summary of the research design and rationale for the utilization of secondary data as the optimal methodology is described. Chapter 3 highlights the variables of interest and outlines the standards used for obtaining secondary data. The plan for data analysis, which acknowledges any potential threats to validity, is also

shared. Concluding the chapter, ethical concerns, alongside a summary of the research methods, are described.

Research Design and Rationale

To address the research question in this quantitative study, a nonexperimental, comparative research design with preexisting secondary data was utilized. This study investigated the differences between the dependent variable (symptoms of inattention, impulsivity, and hyperactivity) and the independent variable (intervention) within a group of toddlers. This research design compared outcomes (inattention, impulsivity, and hyperactivity) across different groups to identify if the intervention group showed significant improvement compared to the control and low-risk groups to determine the efficacy of attachment-based interventions in treating ADHD symptoms in children. The application of a nonexperimental research method enabled examination of preexisting data, the investigation of variables, and the assessment of statistical relationships among these variables (Burkholder et al., 2020). By employing a nonexperimental, comparative design, a one-way ANOVA statistical measure was utilized to articulate and determine the extent of differences between these variables. This approach provided a comprehensive understanding of the differences between groups without manipulating or controlling any variables (Burkholder et al, 2020).

In their methodological review, Doolan and Froelicher (2009) described the rationale, benefits, and limitations of utilizing preexisting secondary data. Secondary analysis is the appropriate research method when an existing data set is available to answer a new research question (Doolan & Froelicher, 2009). A significant advantage of

secondary analysis when compared to primary data collection and analysis is the reduction in time and costs involved in answering a research question (Doolan & Froelicher, 2009). Additionally, the preference for secondary analysis becomes particularly significant when the research question necessitates tracking a large number of participants or monitoring them for an extended period (Doolan & Froelicher, 2009). Moreover, conducting research on a sample of participants can inherently involve some risk; however, the use of secondary analysis holds the advantage of addressing research questions without subjecting participants to a heightened risk of negative consequences (Doolan & Froelicher, 2009). Identified potential limitations of secondary analysis include inaccessibility to data set due to need for permission, original method of collection or coding undermining new research question, and poor quality of data set and/or nonrepresentational (Burkholder et al, 2020; Doolan & Froelicher, 2009). Doolan and Froelicher (2009) emphasized that the appropriateness of utilizing preexisting secondary data rests on the alignment of a new research question with a “data set that is adequate to address the question” (p. 205). My research aimed to answer the question of whether or not attachment-based interventions affect symptoms of inattention, hyperactivity, and impulsivity in children; a preexisting data set existed to answer that new research question.

A quantitative research design was identified to answer my research question in lieu of a qualitative research design due to the nature of the study investigating differences between groups in terms of specific variables (Burkholder et al., 2020). Exploring ideas, understanding perceptions, and gaining deeper insights into specific

phenomena (i.e., qualitative research) was not the aim of this study's research question (Burkholder et al., 2020).

Methodology

In this section, population, sampling procedures, secondary data protocols, data analysis, threats to validity, and the ethical concerns associated with data collection and storage are detailed and explained. The present study utilized a data set previously collected from a randomized controlled trial.

The parent study, Lind et al. (2017), aimed to examine the effectiveness of the Attachment and Biobehavioral Catch-up for Toddlers (ABC-T) intervention in improving the executive functioning of young children placed in foster care. Identifying the propensity of adverse experiences children in foster care often face such as maltreatment and instability of caregivers, which place them at risk for developmental problems, the parent study focused on assessing the impact of the ABC-T intervention on their self-regulatory capabilities.

Participants of the Lind et al. (2017) parent study comprised of parent–toddler dyads who were divided into three groups: foster families receiving the ABC-T intervention, foster families receiving a control intervention, and low-risk intact families. The parent study's key measure was the children's executive functioning abilities, evaluated at preintervention when the children were approximately 32 months old and at postintervention when the children were approximately 48 months old. This assessment was done using the attention problems scale of the preschool version of the Child Behavior Checklist (CBCL; Lind et al., 2017) at both preintervention and

postintervention, while due to age requirements, a graded preschool version of the Dimensional Change Card Sort (DCCS; Zelazo, 2006) was completed at postintervention.

The Lind et al. (2017) parent study results demonstrated that foster children whose foster parents participated in the ABC-T intervention, as well as children from low-risk, intact family backgrounds, exhibited less attention problems and considerable cognitive flexibility compared to foster children whose foster parents received the control intervention. These findings suggest that the ABC-T, an attachment-based intervention, is effective in enhancing the executive functioning of toddlers placed in foster care (Lind et al., 2017).

Population

Participants in the Lind et al. (2017) parent study included 173 parent–toddler dyads that were recruited from a university-based childcare center and local preschools. The number of male toddler participants totaled 89 and the number of female toddler participants totaled 84. The mean age (in months) at intervention was 31.8 for the control intervention group and 29.9 for the experimental intervention (i.e., attachment-based) group. At postintervention, the mean age (in months) was 48 for the control intervention group, 48.6 for the experimental intervention group, and 45.5 for the low-risk comparison group. Differences in demographic variables were observed between the intervention groups and the low-risk comparison group. The intervention groups involved a higher number of African American children, $\chi^2(4, n = 173) = 22.27, p < .01$, and parents, $\chi^2(4, n = 151) = 19.69, p < .01$, compared to the low-risk comparison group. The intervention group parents were also notably older than the parents in the low-risk

comparison group, $t(148) = -2.93, p < .01$. However, no substantial differences were noted regarding children's age, children's gender, or parents' gender between the ABC-T intervention group ($n = 63$), control intervention group ($n = 52$), and the low-risk comparison group ($n = 52$).

Sampling and Sampling Procedures

The data set from the Lind et al. (2017) parent study included foster families and a low-risk group from intact families. Foster families were randomly assigned to receive either the experimental intervention (i.e., attachment-based treatment) or control intervention. The sample of foster families involved 121 children and 99 parents. A total of 52 children who had not experienced foster care and were raised by their biological parents comprised the low-risk comparison group. In this particular group, intervention services were not provided to either the children or their parents. Within the foster families and respective intervention groups, no notable differences were observed specific to number of placements, placement types, age when first removed, time with foster parent at post-assessment, and reason for removal.

Inclusion and Exclusion Criteria

The Lind et al. (2017) parent study population consisted of parent–toddler dyads from foster care families. Children in foster care face a cascade of developmental risk ranging from regulating their emotions, behaviors, cognitions, and physiological responses. This enhanced developmental risk is an outcome of abuse, neglect, and insecure attachment relationships. The parent study, therefore, included toddlers from foster care homes to determine if attachment-based intervention was effective in

enhancing executive functioning. Children from low-risk environments (i.e., no history of foster care and raised by biological parents) were also included in the parent study to demonstrate that foster care children are at increased risk for executive functioning deficits compared to low-risk children as well as to determine if the attachment-based intervention improved executive functioning of foster care children to the levels of low-risk children compared to the control group.

Secondary Data Protocols

In the parent study, following random assignment of foster toddler-parent dyads into either the attachment-based intervention or control intervention groups, preintervention assessments were completed during an intake visit in participants' homes. Postintervention assessment data were collected following the completion of the interventions and during the 48-month visit. The attachment-based intervention group involved 63 parent–toddler dyads from foster care families who received the ABC-T intervention which focuses on enhancing parental responsiveness to the regulatory needs specific to this developmental stage, and in particular, to children who have adverse childhood experiences.

As an attachment-based intervention, the ABC-T intervention's main focus is on enhancing a toddler's regulatory capabilities by increasing parental nurturance to cues of distress, increasing parental attunement to cues of non-distress such as “following the lead” of the child, and increasing parental capacity to become a coregulator for a child when distressed (Lind et al., 2017). Critical importance is placed on opportunities for coregulation with the ABC-T intervention facilitating increased parental awareness

related to their significant role of staying psychologically available during times of a child's emotional dysregulation and eschewing from dismissive and insensitive responses and behaviors in favor of providing responsive nurturance and soothing instead (Lind et al., 2017). In unique contrast to other interventions designed for young children with regulatory difficulties such as emotional dysregulation and oppositional behaviors, the ABC-T intervention places significant importance on the parent-child attachment relationship as being the mechanism for enhanced child self-regulatory capability rather than approaches focused mainly on behavioral management (e.g., time-outs, operant conditioning techniques; Lind et al., 2017). ABC-T intervention, through instructing parents effective coregulation practices and increasing parental awareness of their own emotionally dysregulated states and responses, facilitates the development of more robust coregulatory practices between parents and their children (Lind et al., 2017). As a result of such improved coregulatory practices, children's self-regulation capacity is further enhanced and scaffolded as their development continues (Lind et al., 2017). The ABC-T intervention delivery is home-based and involves 10 manualized sessions (Lind et al., 2017). These sessions include discussions on child development research, video demonstrations, and highlighting instances of effective targeted behaviors by parents (e.g., nurturing, following the lead, calming; Lind et al., 2017).

The control group, which consisted of 58 parent-toddler dyads from foster care families, received the Developmental Education for Families (DEF), an intervention designed to improve children's development specific to motor functioning, cognitive functioning, and language skills. Through the DEF intervention, enhancing targeted

developmental areas (i.e., motor functioning, cognitive functioning, and language skills) were taught to parents via play activities (Lind et al., 2017). For example, The DEF intervention included activities focused on gross motor development, which were framed as playing with a ball for the child (Lind et al., 2017). The DEF intervention, similarly, involves 10 manualized sessions and is delivered in the home by parent coaches focused on practicing motor, cognitive, and language skills with parents and their children to facilitate the child's ability to meet developmental milestones (Lind et al., 2017). Also similar to the ABC-T intervention, to evaluate skills and determine progress made by a child during the course of intervention, video feedback was utilized (Lind et al., 2017).

Data Collection Tools

The parent study collected specific preintervention data from the attachment-based intervention group and control group related to foster care history. Additionally, preintervention data were collected for all three groups specific to attention regulation problems as assessed by the CBCL (Lind et al., 2017). At postintervention, all three groups completed the CBCL again, and to determine cognitive flexibility, the DCCS (Zelazo, 2006) task was also completed at that time. Although the parent study utilized the DCCS to collect data related to cognitive flexibility, this study focused on inattention, hyperactivity, and impulsivity, and therefore, DCCS data were not a primary focus.

The CBCL, a standardized measure of 113 items scored on a 3-point Likert scale (0 = *not true*, 1 = *somewhat or sometimes true*, 2 = *very true or often true*) to identify behavioral and emotional difficulties in children (Maust et al., 2012). For preschool-aged children, information is obtained from parents (using the CBCL/1.5–5) and teachers

(using the Teacher Report Form or C-TRF; Maust et al., 2012). This information contributes to seven syndrome scales, which include: (a) emotional reactivity; (b) anxiety/depression; (c) somatic complaints; (d) withdrawal; (e) sleep problems; (f) attention problems; and (g) aggressive behavior (Maust et al., 2012). Additionally, there are five scales aligned with *DSM* criteria: (a) affective problems; (b) anxiety problems; (c) pervasive developmental problems; (d) attention-deficit/hyperactivity problems; and (e) oppositional defiant problems (Maust et al., 2012). The parent study specifically utilized the attention problems scale, which consists of five items, to evaluate difficulties in attention regulation (Lind et al., 2017). This scale encompasses items such as challenges with concentration and attentiveness, trouble with remaining still, hyperactivity and clumsiness, rapidly switching between activities, and a tendency to wander off (Lind et al., 2017). Research using both large normative and smaller clinical samples have established the reliability and validity of the CBCL (Bingham et al., 2003). These studies explored characteristics of both parents and children (i.e., psychopathology and behavioral dysfunction levels) as well as attributes of the instrument itself (i.e., objectivity, specificity, clarity, and complexity) that could potentially reduce the agreement between raters (Bingham et al., 2003).

Instrumentation and Operationalization of Constructs

The present study utilized secondary data for the analyses and therefore, review of instrument validity and reliability was not required. The dependent variable for group differences in attention problems was parent reported attention problems at the time of the postintervention assessment, while the independent variable was group (i.e., ABC-T,

DEF, and low-risk comparison). The dependent variable for group differences in cognitive flexibility was DCCS score, and child, gender, and age as covariates, while the independent variable was group (i.e., ABC-T, DEF, and low-risk comparison).

Quality Assurance and Control

I reviewed the parent study data and performed all tests with SPSS (Version 29) to ensure quality assurance and control. Review of missing data and consistency of data within the data set was also completed. A chi-square test was run to determine whether there was a significant association between two categorical variables (i.e., gender and race/ethnicity) resulting in no differences in gender but notable differences within race/ethnicity due to African American participants representing the largest proportion of children in the foster care group (i.e., intervention and control groups) versus children in the low-risk group which represented the largest number of White individuals.

Procedure for Gaining Access to the Data Set

Inquiry into utilizing the parent study's data set was sent to Mary Dozier, Department of Brain and Psychological Sciences, University of Delaware. Communication also occurred between me and the University of Delaware's Institutional Review Board (IRB) to establish IRB of Record and to obtain documentation from the partner site approving the sharing of the data set and confirmed by a Data Use Agreement.

Data Analysis

The statistical software program I used to analyze the data was SPSS (Version 29). Data cleaning was conducted as the important first step in the data analysis process to ensure the potential for missing data and no significant score outliers were identified.

For my research question, the statistical test is described.

Research Question: What are the differences in inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention?

H_0 : There are no statistically significant differences in inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention.

H_1 : There are statistically significant differences in inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention.

This research question was analyzed using a one-way ANOVA. This tested the effect of one group (independent variable) on the outcome of attentional problems (dependent variable). The three groups that were compared consisted of children participating in an attachment-based intervention, a control group, and a low-risk group. The null hypothesis was rejected and a post-hoc test was performed to determine which groups significantly differed from each other (Stadtlander, 2015).

When utilizing a one-way ANOVA to compare the means of two or more groups several assumptions were important to note (Warner, 2021). These assumptions included

the following and none were violated: independence of observations, scores within each group were approximately normally distributed, variances within each of the groups being compared were roughly equal (i.e., homogeneity of variance), participants were randomly assigned to either the intervention or control group, and the dependent variable was measured at the interval level (i.e., with meaningful numerical values; Warner, 2021).

Threats to Validity

Due to the nature of this study being a secondary data analysis, steps were taken to ensure this study's validity would not be compromised by issues such as errors in the transformation and recoding of variables, and omissions in data. Additionally, threats to external and internal validity inherent to the parent study were important to consider.

External validity pertains to the ability to extrapolate the findings of a study to broader populations and different contexts (i.e., generalizability; Stadtlander, 2015). The parent study exhibited minimal threats to external validity such as absent testing reactivity, interaction effects of selection biases and experimental variables, reactive effects of experimental arrangements, and multiple treatment interference. However, the parent study's researchers acknowledged limited generalizability due to the attachment-based intervention only being implemented with foster care families (i.e., purposive sampling), and therefore, studying the effects of the ABC-T intervention on children's executive functioning with children from different populations but who have experienced adversity early in life, would buttress the model's efficacy.

Internal validity refers to the extent to which a study can establish a trustworthy cause-and-effect relationship between its variables, and in particular, ensuring that the results are due to the experimental treatment and not influenced by other confounding factors (Burkholder et al, 2020). Specifically, internal validity determines whether the changes observed in the dependent variable are the result of changes in the independent variable, and not by other external or extraneous variables. Threats to internal validity of the parent study were addressed by including a control group which was randomized and absent overall mortality and differential mortality.

Threats to parent study construct and statistical conclusion validity were also considered. *Construct validity* is concerned with the extent to which a test or measurement tool accurately measures the theoretical concept or construct it is intended to measure (Burkholder et al, 2020). Essentially, construct validity confirms that the research tool is measuring what it is supposed to measure and not something else.

Statistical conclusion validity refers to the extent to which conclusions drawn from statistical analyses of data are accurate and appropriate (Burkholder et al, 2020).

Statistical conclusion validity focuses on the relationship between the statistical analyses and the conclusions that are drawn from it. Threats to construct and statistical conclusion validity in the parent study were addressed by utilizing a statistical model that was relevant to their research question and data set, and including measurements and interventions that accurately represented the constructs being studied.

Ethical Procedures

Ethical concerns were minimal as a result of this study utilizing a secondary data set, and in particular, no contact with the target population occurred. Moreover, the use of secondary data analysis excluded the requirement for informed consent. Nevertheless, secondary data collection for this study adhered to research ethics such as participant identities were not directly or indirectly disclosed.

Permission from Walden University IRB to proceed with contacting the primary investigator for the permission and access to the secondary data and subsequently analyze the data set occurred following IRB approval of the proposal (03-28-24-0986504).

Summary

This chapter described the research design and highlighted the rationale for the utilization of secondary data as the optimal methodology to answer this study's research question which aimed to investigate the association between an attachment-based intervention and ADHD symptomology in children. This study was a nonexperimental, comparative research design with preexisting secondary data. This study's dependent variable was attention problems (i.e., symptoms of inattention, hyperactivity, and impulsivity), while the independent variable was the intervention group (i.e., attachment-based intervention, control intervention, and low-risk comparison) in a group of toddlers. This research question was analyzed using a one-way ANOVA.

Chapter 4: Results

Introduction

In this quantitative, comparative study, I conducted a secondary data analysis using the data set from a 2017 randomized controlled trial. The study focused on examining outcomes (inattention, hyperactivity, and impulsivity) across different groups to determine whether the intervention group showed significant improvement compared to the control and low-risk groups, thereby assessing the efficacy of attachment-based interventions in treating ADHD symptoms in children. Descriptive and inferential statistical analyses were performed using SPSS (Version 29) to determine whether there were statistically significant differences between the independent and dependent variables.

The research question for this study was: What are the differences in inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention? The dependent variable for this question was attention problems and ADHD problems as recorded by the parent preschool version of the CBCL at the time of the postintervention assessment, while the independent variable was intervention group (i.e., ABC-T, DEF, and low-risk comparison).

This chapter provides an overview of the secondary data collection process along with detailed statistical analyses used to answer the research question. Moreover, included in the chapter are the conducted hypothesis testing and the comparison of means

of more than two groups on a continuous dependent variable. Descriptive analyses are presented through tables and figures, and inferential analyses are displayed in tables.

Data Collection of Secondary Data Set

The data set from a randomized controlled trial study (Lind et al., 2017) included the data collection from parent–toddler dyads who were divided into three groups: (a) foster families receiving the ABC-T intervention, (b) foster families receiving a control intervention (DEF), and (c) low-risk intact families to examine the effectiveness of the ABC-T intervention in improving the executive functioning of young children placed in foster care.

The randomized controlled trial’s key measure was the children’s executive functioning abilities which was evaluated both at preintervention and postintervention when the children were approximately 32 months old and approximately 48 months old, respectively, utilizing the attention problems scale of the preschool version of the CBCL (Lind et al., 2017). In addition to the CBCL syndrome scale of attention problems, scores from the scale aligned with *DSM* criteria for ADHD were also collected. Data collection also comprised of demographic information, foster care history, and cognitive flexibility. Participants in the randomized controlled trial consisted of 173 parent–toddler dyads that were recruited on a voluntary basis from a university-based childcare center and surrounding preschools.

Results

Univariate Statistics

Descriptive Characteristics of the Sample Population

In this secondary data analysis, the total number of respondents (N) included was 173 children. Values were not reported as missing. The study included 89 male and 84 female toddler participants. The average age at the time of intervention was 31.8 months for the control group and 29.9 months for the experimental group, which focused on an attachment-based intervention. At postintervention, the mean ages were 48 months for the control group, 48.6 months for the experimental group, and 45.5 months for the low-risk comparison group. Demographic differences were identified between the intervention groups and the low-risk comparison group. Specifically, the intervention groups (i.e., foster care children) had a higher number of African American children, $\chi^2(4, n = 173) = 22.27, p < .01$, compared to the low-risk group. However, no substantial differences were noted regarding children's age or children's gender at preintervention or postintervention specifically related to attention problems and therefore, these variables were not included as covariates (see Table 1).

Table 1*Frequency Distribution for the Characteristics of the Sample Population*

Characteristic	DEF intervention (<i>n</i> = 58)	ABC-T intervention (<i>n</i> = 63)	Low-risk group (<i>n</i> = 52)
Age in months, mean (<i>SD</i>)			
At intervention	31.8 (8.7)	29.9 (9.5)	--
At postintervention	48.0 (8.8)	48.6 (9.0)	45.5 (6.2)
Gender, number (%)			
Female	30 (51.7)	27 (42.9)	27 (51.9)
Male	28 (48.3)	36 (57.1)	25 (48.1)
Race/ethnicity, number (%)			
African American	34 (58.6)	34 (54.0)	11 (21.2)
Asian American	1 (1.7)	0 (0.0)	3 (5.8)
Caucasian	13 (22.4)	18 (28.6)	27 (51.9)
Hispanic	3 (5.2)	5 (7.9)	6 (11.5)
Biracial	7 (12.1)	6 (9.5)	5 (9.6)

Descriptive Characteristics of the Independent Variable

The data set from the RTC (Lind et al., 2017) included children from foster families and from a low-risk group without history of child separation. 121 children from foster families were randomly assigned to receive either the experimental intervention (ABC-T), consisting of *n* = 63 (36.4%) children, or the control intervention (DEF), consisting of *n* = 58 (33.5%) children. The low-risk comparison group consisted of *n* = 52 (30.1%) children. No notable differences were identified within the foster families and respective intervention groups (e.g., number of foster placements, placement types, age when first removed, duration of time with foster family at post-assessment, and reason for removal; see Table 2, Figures 1 & 2).

As part of this study's analysis, due to the original data set demarcating the group variable into only two group variables (i.e., DEF and ABC-T), a new group variable labeled "Ess groups" was created to demarcate the three groups being compared (i.e.,

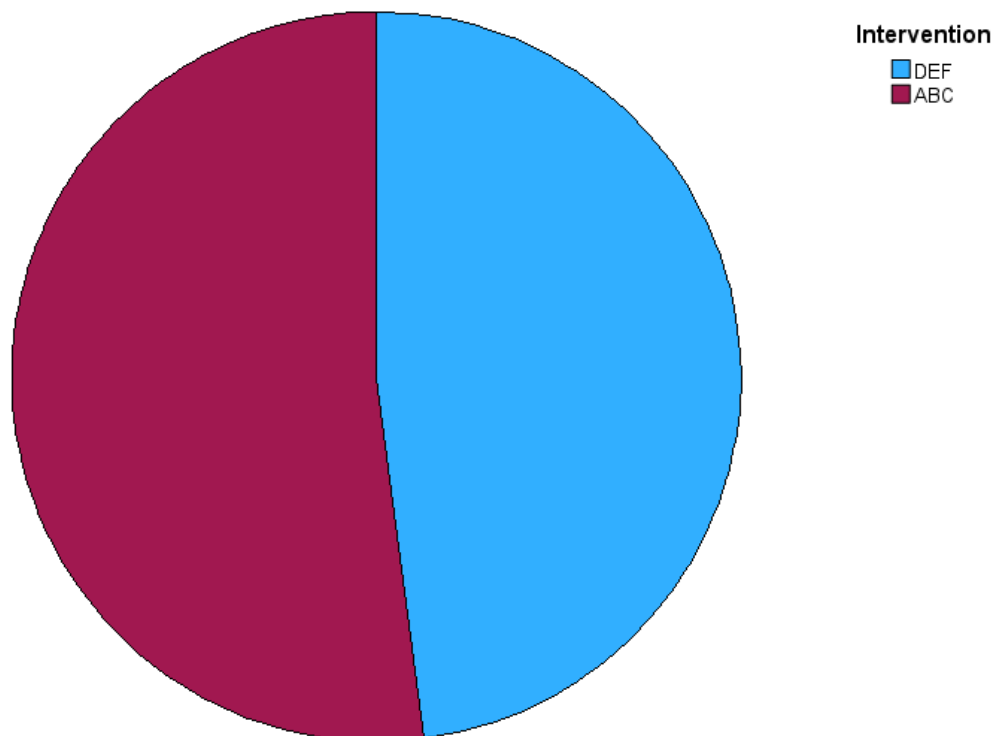
DEF, ABC-T, and low-risk comparison). The variable Ess groups was created by utilizing the SPSS 29 function “Transform” and subsequently recoding the original data set’s intervention variable into a different variable (i.e., Ess groups) by changing the old value of 0 into the new value of 1 (DEF), changing the old value of 1 into the new value of 2 (ABC-T), and changing the old value of “Systems-missing” into the new value of 3 (low-risk comparison). The creation of this new variable, Ess groups, assigned a new code (i.e., 1, 2, and 3) which enabled the ability to compare and contrast differences across the three groups.

Table 2

Frequency Distribution for Independent Variable (Intervention and Low-Risk Groups)

Variable	Frequency	Percent	Valid percent
DEF	58	33.5	47.9
ABC-T	63	36.4	52.1
Low-Risk	52	30.1	--
Total	173	100.0	100.0

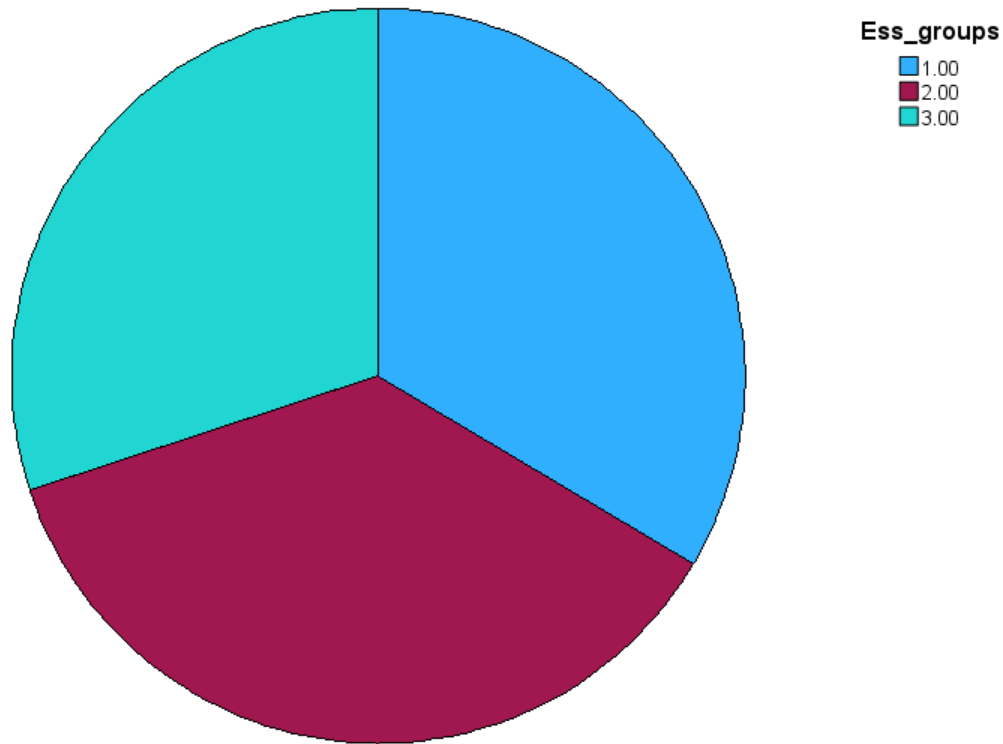
Note. DEF = control group; ABC-T = experimental group; Low-Risk = low-risk comparison group.

Figure 1*Participation in Interventions*

Note. This pie chart represents the percentage of respondents participating in the control intervention (DEF) 47.9% and the attachment-based experimental intervention (ABC-T) 52.1%.

Figure 2

Participation in Intervention and Low-Risk Group Comparison



Note. This pie chart represents the percentage of respondents participating in the control intervention (DEF), Ess Group 1, 33.5% and the attachment-based experimental intervention (ABC-T), Ess Group 2, 36.4% compared to the low-risk comparison group respondents, Ess Group 3, 30.1%.

Descriptive Characteristics of the Dependent Variable

The dependent variable for the study was attention problems which was measured by both the attention problems scale and ADHD problems scale of the preschool CBCL. Attention problem and ADHD problem scores were collected at the preintervention and postintervention stages. CBCL scores were collected for $N = 129$ children at the preintervention stage (i.e., 45 DEF, 45 ABC-T, and 38 low-risk comparison group) and

for $N = 165$ children at the postintervention stage (i.e., 53 DEF, 61 ABC-T, and 49 low-risk comparison group). The differences in numbers were due to missing data resulting from parents not completing or submitting the CBCL questionnaires.

Both attention problems and ADHD problems of the CBCL preschool version measure behaviors related to inattention, hyperactivity, and other attention-related issues including impulsivity in young children and therefore, scores from both scales were analyzed. At the preintervention stage, the total mean scores from the attention problems scale and ADHD scale were 2.98 and 5.29, respectively. At the postintervention stage, the total mean scores from the attention problems scale and ADHD scale were 2.84 and 4.75, respectively. Specific to the attention problems scale, both mean scores (2.98 and 2.84) suggest that attention problems were present at the preintervention and postintervention stage; however, a mean score of 2.98 at the preintervention stage indicates slightly more attention issues albeit relatively low, but still present on a scale of 0 to 9, than at the postintervention stage. Furthermore, specific to the ADHD problems scale, a mean score of 5.29 indicates that at the preintervention stage, children were exhibiting a moderate level of ADHD-related symptoms and while a mean score of 4.75 at the postintervention stage suggests that these children continued to show signs of ADHD symptoms, these symptoms were slightly less marked than at preintervention (see Table 3).

Table 3*Frequency Distribution for the Dependent Variable (Attention Problems)*

Variable	<i>n</i>	Minimum	Maximum	<i>M</i>	<i>SD</i>	Skewness		Kurtosis	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>
Attention Problems PI	129	0	9	2.98	2.226	.828	.213	.203	.423
Attention Problems Post	165	0	9	2.84	2.165	.590	.189	.006	.376
ADHD Problems PI	129	0	12	5.29	2.878	.309	.213	-.458	.423
ADHD Problems Post	165	0	12	4.75	3.080	.329	.189	-.450	.376
Valid <i>N</i> (listwise)	123								

Multivariate Statistics***Research Question 1***

The focus of my research question was to assess if there were statistically significant differences in inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention.

A one-way between-groups ANOVA was conducted to compare the differences in inattention, hyperactivity, and impulsivity as measured by the attention problems scale and ADHD problems scale of the preschool version of the CBCL. Participants were divided into three groups according to intervention (Group 1: DEF, control group; Group 2: ABC-T, attachment-based intervention; Group 3: low-risk comparison group). There was a statistically significant difference at the $p < .05$ level in attention problems for the three groups: $F(2, 162) = 7.0, p = .001$ and for ADHD problems $F(2, 162) = 6.0, p = .003$. Therefore, the null hypothesis that there are no statistically significant differences in

inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention was rejected (see Table 4).

Table 4

Tests of Between-Subject Effects for the Dependent Variable (Attention Problems)

Variable	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	Sig.
Attention Problems Post					
Between Groups	61.161	2	30.580	7.003	.001
Within Groups	707.421	162	4.367		
Total	768.582	164			
ADHD Problems Post					
Between Groups	107.220	2	53.610	5.997	.003
Within Groups	1448.089	162	8.939		
Total	1555.309	164			

Note. * Significant at the 0.05 level.

Furthermore, at postintervention, for the DEF group (Group 1) attention problems ($M = 3.63$, $SD = 2.13$) and ADHD problems ($M = 5.61$, $SD = 3.05$) indicated that on average, this group was exhibiting more attention problems and ADHD problems. The ABC-T group (Group 2) at postintervention exhibited an attention problems score ($M = 2.73$, $SD = 2.11$) indicating fewer attention problems on average, but specific to ADHD problems ($M = 4.90$, $SD = 3.03$) scores demonstrated a relatively high level of ADHD problems on average. Within the low-risk comparison group (Group 3), postintervention scores of attention problems ($M = 2.10$, $SD = 2.02$) and ADHD problems ($M = 3.59$, $SD = 2.86$) indicated fewer attention problems and ADHD problems on average.

Regarding overall attention problems at postintervention, the DEF group (Group 1) had the highest mean attention problems score ($M = 3.63$), whereas the low-risk

comparison group (Group 3) had the lowest ($M = 2.10$). This suggests that the level of attention problems decreased across the three groups. The total mean for attention problems was 2.84 and the confidence intervals across groups suggested a statistically meaningful difference between the groups. Similarly to attention problems, the DEF group (Group 1) had the highest mean ADHD problems score ($M = 5.61$), and the low-risk comparison group (Group 3) had the lowest ($M = 3.59$). The total mean for ADHD problems was 4.75 indicating moderate ADHD problems overall with confidence intervals suggesting that the differences between groups were likely meaningful (see Table 5).

Table 5

ANOVA Descriptive Statistics for the Dependent Variable (Attention Problems)

Ess groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	95% confidence interval	Minimum	Maximum
Attention problems post							
1.0	54	3.63	2.131	.290	[3.05, 4.21]	0	9
2.0	62	2.73	2.105	.267	[2.19, 3.26]	0	9
3.0	49	2.10	2.023	.289	[1.52, 2.68]	0	8
Total	165	2.84	2.165	.169	[2.50, 3.17]	0	9
ADHD problems post							
1.0	54	5.61	3.049	.415	[4.78, 6.44]	0	12
2.0	62	4.90	3.034	.385	[4.13, 5.67]	0	12
3.0	49	3.59	2.864	.409	[2.77, 4.41]	0	12
Total	165	4.75	3.080	.240	[4.27, 5.22]	0	12

Note. Group 1 = DEF; Group 2 = ABC-T; Group 3 = Low-Risk.

Post-hoc comparisons utilizing the Bonferroni test indicated that the mean difference in attention problems between the DEF group (Group 1) and the ABC-T group (Group 2) was .904, but this difference was not statistically significant ($p = .064$) at

postintervention. The mean difference in attention problems between the DEF group (Group 1) and the low-risk comparison group was 1.528, and this difference was statistically significant ($p < .001$), indicating that children in the DEF control group had significantly more attention problems compared to those in the low-risk comparison group. The mean difference in attention problems between the ABC-T group (Group 2) and the low-risk comparison group (Group 3) was 0.624, but this difference was not statistically significant ($p = .361$), suggesting that there were no significant differences between the attachment-based intervention (Group 2) and the low-risk comparison group (Group 3) in terms of attention problems.

When comparing ADHD problems among the three groups, the Bonferroni post-hoc test indicated statistically significant differences between the DEF group (Group 1) and the low-risk comparison group (Group 3), but they were no statistically significant differences between the DEF group (Group 1) and the ABC-T group (Group 2) or the ABC-T group (Group 2) and the low-risk comparison group (Group 3). The mean difference in ADHD problems between the DEF group (Group 1) and the ABC-T group (Group 2) was .708, but this was not statistically significant ($p = .616$), indicating that there were no significant differences between these two groups in terms of ADHD problems at postintervention. The mean difference in ADHD problems between the DEF group (Group 1) and the low-risk comparison group (Group 3) was 2.019, and this difference was statistically significant ($p = .002$), which suggested that children in the DEF control group had significantly more ADHD problems compared to the children in the low-risk comparison group. Moreover, the mean difference in ADHD problems

between the ABC-T group (Group 2) and the low-risk comparison group (Group 3) was 1.311, and this was not statistically significant ($p = .069$; see Table 6).

Table 6

Bonferroni Post-Hoc Test on Comparison of Attention and ADHD Problems Between an Attachment-Based Intervention Group, Control Group, and Low-Risk Group Not Requiring Intervention

Dependent variable	(I)Ess Groups	(J)Ess Groups	Mean difference (I-J)	SE	Sig.	95% confidence interval
Attention Problems Post	1.00	2.00	.904	.389	.064	[-.04, 1.84]
		3.00	1.528*	.412	<.001	[.53, 2.52]
	2.00	1.00	-.904	.389	.064	[-1.84, .04]
		3.00	.624	.399	.361	[-.34, 1.59]
	3.00	1.00	-1.528*	.412	<.001	[-2.52, -.53]
		2.00	-.624	.399	.361	[-1.59, .34]
ADHD Problems Post	1.00	2.00	.708	.557	.616	[-.64, 2.05]
		3.00	2.019*	.590	.002	[.59, 3.45]
	2.00	1.00	-.708	.557	.616	[-2.05, .64]
		3.00	1.311	.571	.069	[-.07, 2.69]
	3.00	1.00	-2.019*	.590	.002	[-3.45, -.59]
		2.00	-1.311	.571	.069	[-2.69, .07]

Note. Group 1 = DEF; Group 2 = ABC-T; Group 3 = Low-Risk.

* The mean difference is significant at the 0.05 level.

Summary

The research question for this quantitative, comparative study was: What are the differences in inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention? This research question was addressed through a one-way ANOVA, which examined the impact of the independent variable (intervention group) on the dependent variable (attention problems). The analysis compared three groups: children in an

attachment-based intervention, a control group, and a low-risk group. Results of the ANOVA indicated a statistically significant difference at the $p < .05$ level and therefore, the null hypothesis was rejected. A post-hoc comparison using the Bonferroni test was completed to determine which groups differed from one another.

The analysis provided in this chapter included descriptive as well as inferential statistics. Descriptive statistics were utilized to characterize the study's sample and the independent and dependent variables and were represented through tables and figures. The inferential analysis was completed at the multivariate level to compare a continuous dependent variable across three intervention groups and results were represented through tables.

The implications of the data analysis and interpretation of findings are described in the next chapter.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The aim of this quantitative, comparative study was to explore differences in ADHD symptoms among children who received an attachment-based intervention versus those who received a control intervention and compared to a low-risk group. The study focused on assessing inattention, impulsivity, and hyperactivity across the different groups to evaluate whether the attachment-based intervention group showed significant improvements compared to the control and low-risk groups and thus support attachment-based interventions as an alternative effective treatment strategy in addressing ADHD symptoms in children.

This study employed a nonexperimental, comparative research design utilizing preexisting secondary data to address the research question. It examined the differences between the dependent variable (inattention, impulsivity, and hyperactivity problems) and the independent variable (group intervention) in a sample of toddlers. A one-way ANOVA was used to analyze the data.

Although the extant research literature is replete with neuropsychological and cognitive impairments as etiological explanations for the development of ADHD, recent research has expanded past these etiological demarcations to include family factors, particularly the parent–child relationship, as influencing the pathogenesis of ADHD in children. This evolution in the research literature notwithstanding, public perceptions continue to understand ADHD as a sole outcome of genetics. Ergo, treatment preferences are biased to heavily favor stimulant medications and behavioral approaches neglecting

the potential for family-centered approaches, such as attachment-based interventions, to mitigate ADHD symptoms in children.

Key Findings

The study's results indicated that the control group had the highest mean attention problems score (3.63), while the low-risk comparison group had the lowest (2.10) at postintervention. Moreover, the attachment-based intervention group did not differ significantly with attention problems from the low-risk comparison group and exhibited fewer attention problems on average from the control group. The total mean for attention problems was 2.84, and the confidence intervals across groups suggested a statistically meaningful difference between the groups. This finding suggests that the level of attention problems decreased across the three groups. Similar to attention problems, the control group had the highest mean ADHD problems score (5.61), and the low-risk comparison group had the lowest (3.59) with the attachment-based intervention group not differing significantly from either the control group or the low-risk comparison group but exhibited fewer ADHD problems from the control group. The total mean for ADHD problems was 4.75, which indicated moderate ADHD problems overall and the confidence intervals also suggested that the differences between the three groups were meaningful. Overall, results indicated that there were clear differences in both attention and ADHD problems scores across the three groups with the control group consistently showing the highest mean scores for both types of problems, while the low-risk comparison group consistently showed the lowest.

My research question for this study was: What are the differences in inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention? The outcome of the one-way between-groups ANOVA showed that there was a statistically significant difference at the $p < .05$ level in attention problems $F(2, 162) = 7.0, p = .001$ and for ADHD problems $F(2, 162) = 6.0, p = .003$ among the three groups. The null hypothesis that there are no statistically significant differences in inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention was, therefore, rejected.

Bonferroni post-hoc results for attention problems postintervention indicated that there was a statistically significant difference ($p < .001$) between the control group and the low-risk comparison group in terms of the control group showing higher attention problems. Results additionally indicated that there were no significant differences in attention problems between the attachment-based intervention group and the control and low-risk comparison groups. These findings showed that the low-risk comparison group consistently exhibited statistically significant fewer attention problems compared to the control group suggesting the negative impact of the control group not receiving the intervention. Although the attachment-based intervention group results did not significantly differ from either the control group or the low-risk comparison group, receiving the attachment-based intervention nevertheless did not culminate into a statistically significant difference with the low-risk comparison group as it did with the control group. This finding might suggest that while the attachment-based intervention

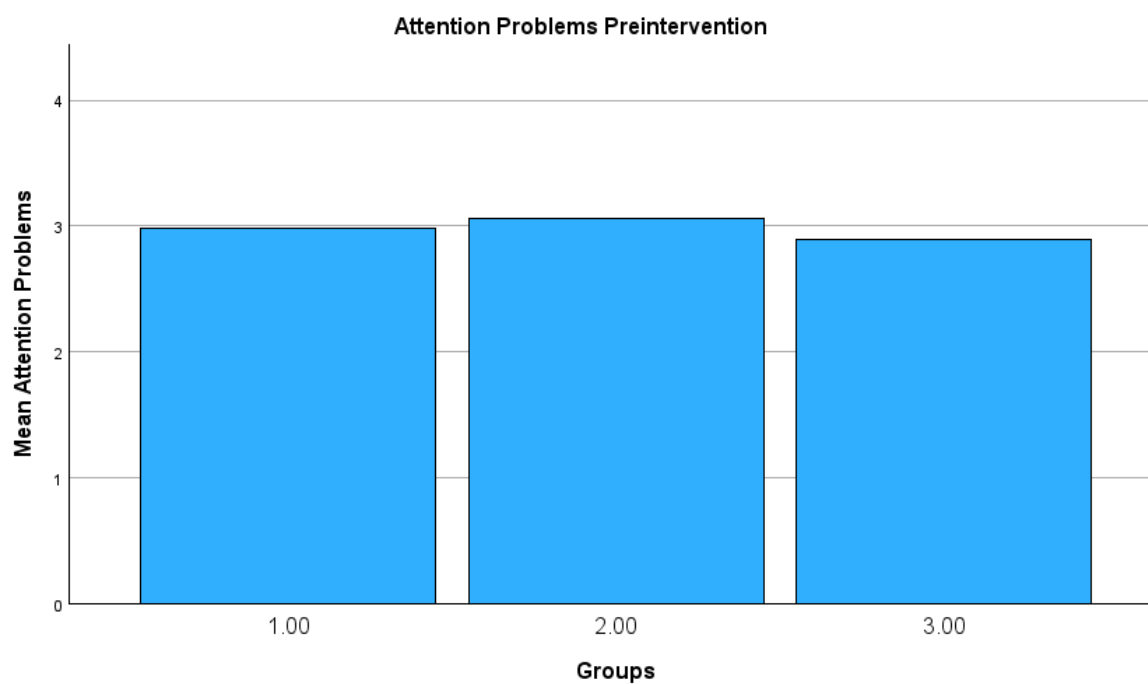
was somewhat effective in reducing attention problems, it was not as impactful as the low-risk environment in reducing these symptoms.

Bonferroni post-hoc results for ADHD problems postintervention showed that there was a statistically significant difference in ADHD problems ($p = .002$) between the control group and the low-risk comparison group, with the control group exhibiting significantly higher ADHD problems than the low-risk comparison group. Similar to attention problems, results additionally indicated that there were no significant differences in ADHD problems between the attachment-based intervention group and the control and low-risk comparison groups. This finding suggests that the low-risk comparison group consistently showed fewer ADHD problems compared the control group, indicating a positive effect of experiencing a low-risk environment and the negative effect of experiencing high-risk environments without subsequent attachment-based intervention as the attachment-based intervention group did not exhibit a significant difference in ADHD problems compared to the low-risk comparison group.

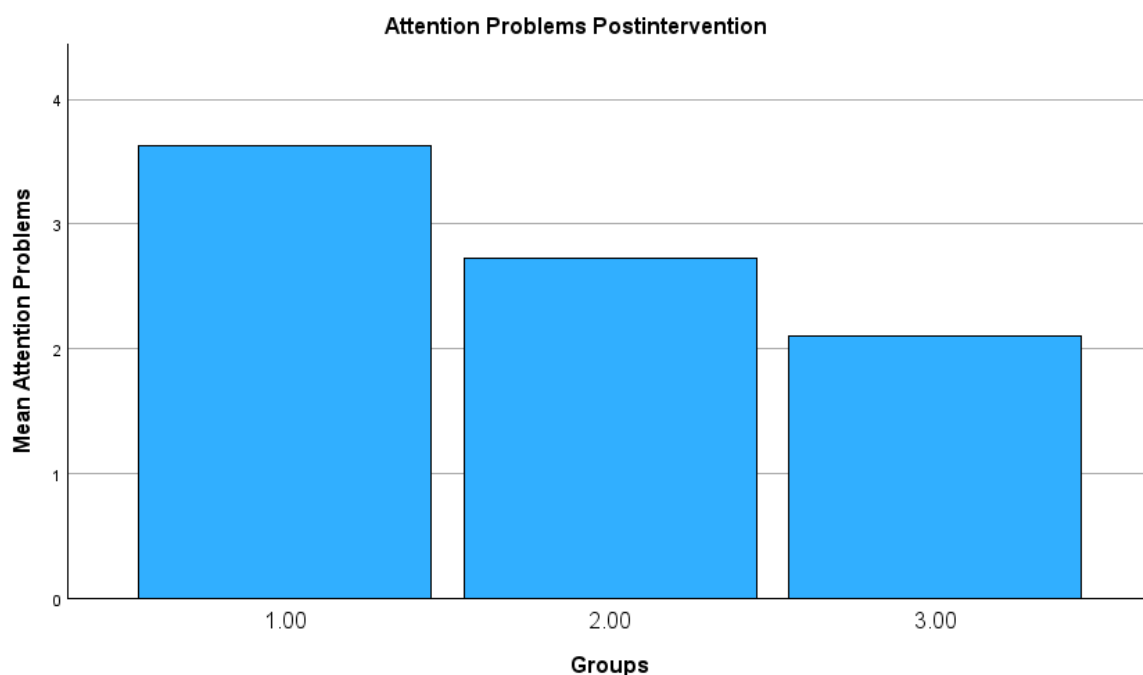
Furthermore, to gain an increased understanding of the differences between inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention, I analyzed descriptive and inferential statistics specifically for the differences between preintervention and postintervention results for attention and ADHD problems across the three groups. A one-way between-groups ANOVA was conducted to compare the differences between preintervention and postintervention scores in inattention, hyperactivity, and impulsivity as measured by the attention problems scale and ADHD

problems scale of the preschool version of the CBCL. Dissimilar from the ANOVA results for postintervention, there was not a statistically significant difference at the $p < .05$ level in attention problems $F(2, 126) = .060, p = .941$ nor ADHD problems $F(2, 126) = .213, p = .808$ among the three groups at the preintervention stage. However, there was a statistically significant difference at the $p < .05$ level when comparing the differences between preintervention and postintervention scores in attention problems $F(2, 120) = 6.2, p = .003$ and ADHD problems $F(2, 120) = 8.8, p < .001$ among the three groups.

When comparing the differences between the preintervention and postintervention attention problems across the three groups the results indicated, on average, attention problems increased for the control group (Group 1; $M = 7.1, SD = 2.21$) while the attachment-based intervention group (Group 2) exhibited a small decrease ($M = -0.15, SD = 1.75$) and the low-risk comparison group showed a substantial reduction ($M = -0.89, SD = 2.04$). These findings suggest the beneficial impact of a low-risk environment and attachment-based intervention for children with histories of experiencing high-risk environments on reducing attention problems (see Figures 3 & 4).

Figure 3*Attention Problems Preintervention*

Note. This bar graph represents the mean scores for attention problems at the preintervention stage for the DEF group (Group 1; $M = 2.98$, $SD = 2.33$), ABC-T group (Group 2; $M = 3.07$, $SD = 2.31$), and the low-risk comparison group (Group 3; $M = 2.89$, $SD = 2.03$).

Figure 4*Attention Problems Postintervention*

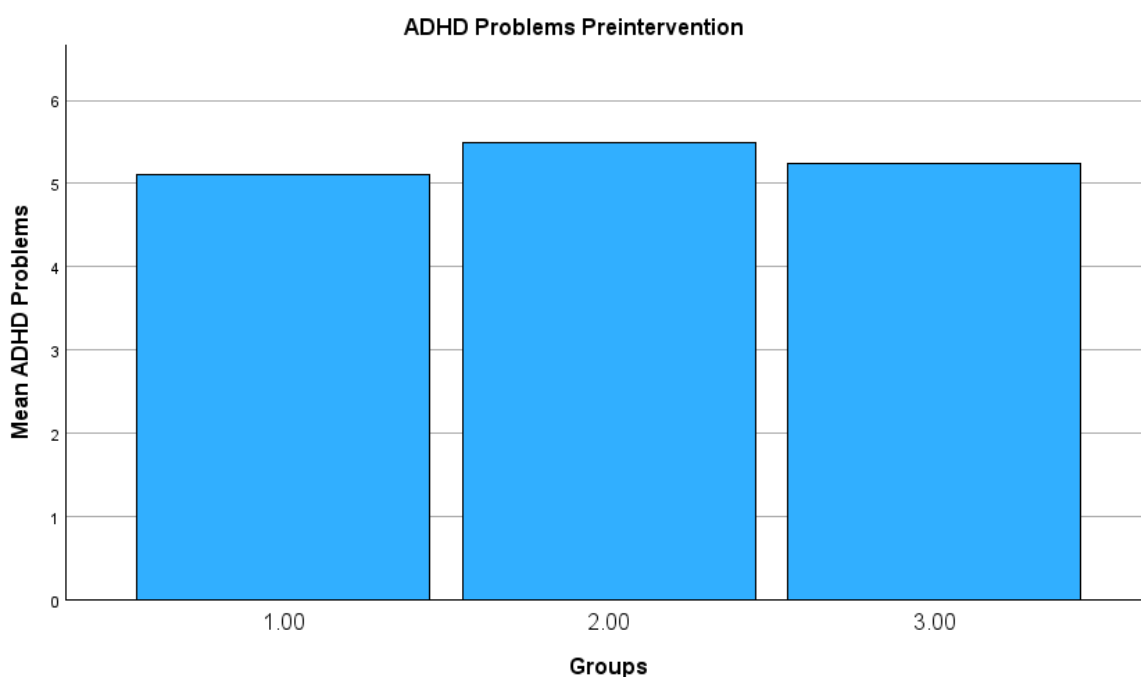
Note. This bar graph represents the mean scores for attention problems at the postintervention stage for the DEF group (Group 1; $M = 3.63$, $SD = 2.13$, ABC-T group (Group 2; $M = 2.73$, $SD = 2.10$), and the low-risk comparison group (Group 3; $M = 2.10$, $SD = 2.02$).

Results based on the comparison of differences between the preintervention and postintervention ADHD problems across the three groups indicated, on average, ADHD problems increased for the control group (Group 1; $M = .66$, $SD = 3.13$), decreased for the attachment-based intervention group (Group 2; $M = -.33$, $SD = 2.51$), and decreased the most for the low-risk comparison group (Group 3; $M = -1.94$, $SD = 2.49$). The low-risk comparison group (Group 3) showed the largest and most meaningful reduction in

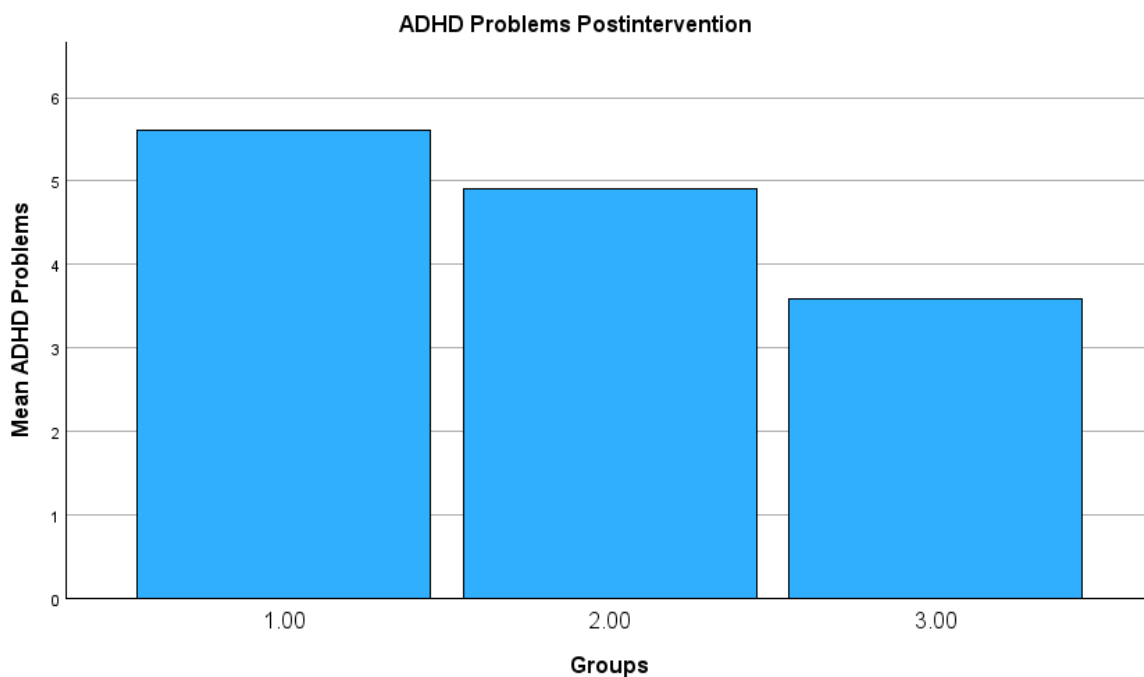
ADHD problems among the three groups; this finding indicates that children in a stable, low-risk environment experience significant improvements in inattention, hyperactivity, and impulsivity symptoms while children with histories of high-risk environments exhibit more reduction in these symptoms following participation in an attention-based intervention compared to those in a control group who experienced an increase in symptoms (see Figures 5 & 6).

Figure 5

ADHD Problems Preintervention



Note. This bar graph represents the mean scores for ADHD problems at the preintervention stage for the DEF group (Group 1; $M = 5.11$, $SD = 2.80$), ABC-T group (Group 2; $M = 5.50$, $SD = 3.17$), and the low-risk comparison group (Group 3; $M = 5.24$, $SD = 2.63$).

Figure 6*ADHD Problems Postintervention*

Note. This bar graph represents the mean scores for ADHD problems at the postintervention stage for the DEF group (Group 1; $M = 5.61$, $SD = 3.04$), ABC-T group (Group 2; $M = 4.90$, $SD = 3.03$), and the low-risk comparison group (Group 3; $M = 3.59$, $SD = 2.86$).

Bonferroni post-hoc results comparing changes in attention problems and ADHD problems from preintervention to postintervention among the three groups showed similar outcomes to the comparison of attention and ADHD problems among the three groups at postintervention. Specifically stated, the low-risk comparison group exhibited significantly fewer attention and ADHD problems compared to the control group, and the attachment-based intervention group exhibited no significant difference in attention

problems between the control group and the low-risk comparison group suggesting that an attachment-based intervention has albeit not a significant impact on reducing attention problems but does show a modest reduction. An exemption to the similarity in Bonferroni post-hoc results between postintervention comparison of differences in attention and ADHD problems among the three groups and the comparison of changes in attention and ADHD problems from the preintervention and postintervention occurred when comparing preintervention and postintervention changes between the attachment-based intervention group ADHD problems and the low-risk comparison group. There was a statistically significant difference in ADHD problems ($p = .026$), with the attachment-based intervention group exhibiting significantly higher ADHD problems compared to the low-risk comparison group when comparing changes in ADHD problems from the preintervention to the postintervention. This suggests, similar to Bonferroni post-hoc results postintervention, the beneficial impact of a low-risk environment as compared to high-risk environments on reducing ADHD problems. Overall, however, findings consistently indicated that the control group exhibited increased attention and ADHD problems compared to the low-risk comparison group while the attachment-based intervention group did not exhibit general statistical group differences when compared to the low-risk comparison group. This indicates that attachment-based intervention as an effective alternative treatment strategy to address inattention, hyperactivity, and impulsivity is trending in the right direction.

Interpretation of the Findings

The findings of the study indicate that there were differences in inattention, hyperactivity, and impulsivity among children in a low-risk sample and children with histories of high-risk environments. Children from the low-risk sample consistently exhibited lower attention and ADHD problems scores in comparison to the foster placement children, and importantly, showed statistically significant differences in reduced attention and ADHD problems compared to the foster placement children in the control group. While there were no statistically significant differences between the foster placement children in the control group and attachment-based intervention group, foster placement children in the attachment-based intervention group also did not exhibit statistically significant differences with the low-risk comparison group. Furthermore, attention and ADHD problem scores increased for foster placement children in the control group but scores of attention and ADHD problems decreased for foster placement children in the attachment-based intervention group. These findings confirm and extend the research literature described in Chapter 2, particularly underscoring the influence of biopsychosocial factors involved in ADHD development and its crucial importance when considering treatment strategies that address contextual components, such as the parent–child attachment relationship, to prevent or reduce ADHD symptoms. Additionally, this study’s findings extend the parent study’s results demonstrating the ABC-T intervention as an effective treatment strategy for enhancing foster placement children’s executive functioning and reducing attention and ADHD problems (Lind et al., 2017).

The biomedical model has been the prevailing framework for understanding ADHD, attributing its cause to genetic risk. Research, however, has increasingly emphasized the critical role of interpersonal dynamics, particularly the parent–child relationship, to the development and continuation of ADHD symptoms. The study’s findings demonstrating consistent statistically significant differences between the control group involving foster placement children and the low-risk group in which the control group exhibited the highest attention and ADHD problems scores and the low-risk group exhibiting the lowest attention and ADHD problems scores confirms and extends research investigations into the mediating role of early experiences in the development of ADHD. Humphreys and Zeanah’s (2015) investigation of early childhood adverse experiences and emerging psychopathology highlighted how adverse experiences such as severe early childhood neglect (e.g., institutional care) contributes to high rates of ADHD symptoms. Additionally, ADHD was shown to occur at a significantly higher rate among adolescents aged 12–17 involved in child welfare investigations (Humphreys & Zeanah, 2015). Their findings revealed that 19% of these youth met the criteria for ADHD, compared to just 5% of their peers in the general population (Humphreys & Zeanah, 2015).

Further support of the study’s findings specific to contextual factors influencing the development and continuation of ADHD symptoms, such as the parent–child relationship, Roskam et al.’s (2014) study with 641 adopted adolescents, found that longer periods of early attachment deprivation were linked to higher levels of ADHD symptoms, even after accounting for key variables. The researchers, therefore, concluded

that infants who lack consistent and nurturing care during critical early stages of development may experience long-lasting developmental consequences (Roskam et al., 2014). Carlson et al.'s (1995) earlier study buttresses the findings of other studies demonstrating the impact of the early caregiving experiences with future onset of ADHD symptoms. Their findings highlighted the significant role of caregiving behaviors and contextual factors in predicting future hyperactivity, with early distractibility emerging as a key early indicator (Carlson et al., 1995). Distractibility, closely linked to the quality of caregiving, was found to be a stronger predictor of hyperactivity than biological or temperament factors (Carlson et al., 1995). Additionally, Carlson et al. emphasized the importance of family dynamics in both the onset and persistence of ADHD. Variables such as parental relationship status at birth, social support for parents, and levels of parental overstimulation were identified as contributing factors to ADHD development (Carlson et al., 1995). This study underscores the complex interplay between caregiving quality and family environment in shaping the developmental trajectory of ADHD beyond purely genetic or temperamental influences, and is confirmed by this study's findings in which foster placement children assigned to the control group exhibited consistently statistically significant higher scores in attention and ADHD problems compared to the low-risk group children.

While not exhibiting statistically significant differences in attention and ADHD problems from either the control or low-risk groups postintervention, foster placement children assigned to the attachment-based intervention consistently exhibited lower attention and ADHD problems than the control group at postintervention as well as lower

attention and ADHD problems from the preintervention to the postintervention and notably, did not show group differences with attention and ADHD problems with the low-risk group at postintervention. These findings confirm and extend prior findings regarding the influence of attachment on the development of ADHD symptoms in children. The current study's findings highlighting the attachment-based intervention group's attention and ADHD problems trending in the right direction (i.e., reduced attention and ADHD problems) and opposite of the control group's increased results, advances Storebø et al.'s (2016) conclusion following their review of 29 studies that effective treatment strategies of ADHD should target relational dynamics to improve attachment security and address emotional dysregulation. By prioritizing the parent-child relationship and implementing early interventions for ADHD, Storebø et al. suggested that there is potential to prevent the onset or worsening of both ADHD and attachment disturbances. This emphasizes the critical role of early identification and attachment intervention in mitigating ADHD symptoms which is supported by this study's findings.

The current study's findings further advance additional research investigating the association between attachment and ADHD. Specific to attachment theory's proposition that caregiver sensitive responses, accurate interpretation of children's cues, and providing psychological and physical availability to promote self-regulation capacities, Mazzeschi et al.'s (2019) study results provided key support by demonstrating a link between parents' reflective functioning and their children's subsequent attachment patterns in conjunction with the development of ADHD, corresponding with attachment theory. Their study identified depression symptoms, low maternal perceptions of co-

parenting support, and diminished PRF as significant risk factors for children being in an ADHD clinical group (Mazzeschi et al., 2019). These findings underscore the importance of sensitive, attuned, and supportive parenting in the development of ADHD. Mazzeschi et al. further emphasized the need for future treatment strategies to focus on enhancing PRF as a potential method for reducing ADHD symptoms in children which was confirmed by this study's findings.

Moreover, Darling Rasmussen et al.'s (2021) follow-up study on children diagnosed with ADHD initially indicating that 85% of these children exhibited insecure attachment and upon three years later, the follow-up results showing not only persistently high rates of insecure attachment but also a 10% increase, bringing the total to 90%, underscores the significant limitations in current ADHD treatment strategies. Darling Rasmussen et al.'s view regarding current ADHD treatment approaches lacking focus on parental mental health, personality traits, and ability to provide sensitive, responsive caregiving that fosters secure attachment and therefore, contributes to the persistence of insecure attachment, potentially may be playing a significant role in the limited progress and outcomes for children with ADHD, is supported by this study's findings in which the control group exhibited increased attention and ADHD problems at postintervention compared to the attachment-based intervention group which exhibited decreased attention and ADHD problems. Additionally, Darling Rasmussen et al. highlighted that emotional dysregulation, a common factor in both attachment issues and ADHD, is not adequately addressed by current treatment methods, potentially contributing to the stagnation in

symptom improvement which also appears supported by the control group's increased attention and ADHD problems scores indicated by this study's findings.

Supporting the perspective that effective treatment strategies of ADHD should prioritize the parent–child relationship to prevent the onset or worsening of both ADHD and attachment difficulties, Erdman (1998) emphasized the importance of conceptualizing ADHD through a systems and attachment framework. Erdman proposed that treatment should focus on strengthening the parent–child relationship rather than concentrating solely on the child's behavior. Erdman's suggestion that ADHD treatments grounded in attachment theory could help reduce ADHD symptoms and enhance the parent–child relationship also appears to be supported by this study's findings.

The study's findings indicating a positive trend of reduced attention and ADHD problems at postintervention for the attachment-based intervention group supports the notion in the research literature of the potential for attachment-based interventions to effectively address the self-regulation disturbances at the core of ADHD. The current study also extends prior studies whose aim was to underscore the critical role of targeting relational dynamics, particularly the attachment relationship between children and their caregivers, in developing more effective ADHD interventions.

Theoretical Foundation

Bowlby's attachment theory provided the theoretical foundation for this study which emphasizes the importance of sensitive, responsive, and consistent caregiving during times of stress, distress or separation as key determinants in fostering a child's sense of security (Bowlby, 1969). This secure attachment pattern, developing in infancy,

shapes the child's future expectations of relationships as trustworthy and positive through the development of internal working models (Bowlby, 1973). These mental representations of self and others influence the child's relationship strategies (i.e., secure or insecure attachment patterns) and are central to the child's ability to self-regulate. According to Bowlby, a secure attachment supports the development of self-regulation and positive relationship expectations across the lifespan (Bowlby, 1980).

The findings of this study align with Bowlby's theory by illustrating the impact of the parent-child relationship on attention and ADHD symptoms. Bonferroni post-hoc results indicated that children in the low-risk comparison group exhibited statistically significantly fewer attention and ADHD problems compared to the control group involving foster placement children, suggesting the beneficial impact of growing up in a low-risk environment, which can be extrapolated to suggest an increased likelihood of secure attachment. These results align with Bowlby's predictions that stable and secure early relationships foster enhanced self-regulation and subsequently improved attention outcomes.

The study findings also revealed that the attachment-based intervention group involving foster placement children did not statistically significantly differ from either the control group or the low-risk comparison group in terms of attention and ADHD problems postintervention. However, considering that the foster placement children in the control group, who received an intervention targeting the enhancement of motor, cognitive, and language skills (i.e., behavioral approach), exhibited increased attention and ADHD problems postintervention compared to the foster placement children in the

attachment-based intervention who exhibited reduced attention and ADHD problems, while not showing statistically significant differences, aligns with attachment theory's prediction that an increased sense of security experienced through the parent–child relationship enhances self-regulation and is demonstrated by improved attention and ADHD outcomes. Also, while the low-risk comparison group consistently showed fewer attention and ADHD problems, the attachment-based intervention group's outcomes did not statistically significantly differ and this could suggest that while the attachment-based intervention may not have exhibited significant differences in attention and ADHD problems postintervention, it nevertheless had some positive effects and trended in the direction of the low-risk group in reducing attention and ADHD symptoms.

These findings highlight the importance of early caregiving environments and the development of self-regulation, as Bowlby suggested, and further highlights the impact of intervention in reducing attention and ADHD problems compared to naturally low-risk settings. These findings underscore the potential long-term benefits of secure, nurturing environments for self-regulation and attention, reinforcing the importance of focusing on early attachment and family dynamics in treatment approaches.

Conceptual Framework

While Bowlby's attachment theory provided the theoretical foundation for this study, the principles of developmental psychopathology undergirded the conceptual framework which focused on the biopsychosocial perspective of psychopathology. A core tenet of developmental psychopathology is that disorders arise from complex developmental processes, where neurophysiological factors are seen as indicators rather

than direct causes (Labella & Cicchetti, 2017). This discipline also emphasizes the importance of early experiences, gene-environment interactions, and developmental pathways in shaping outcomes like ADHD. This framework, therefore, views disorders such as ADHD as a multifactorial phenomenon, shaped by genes, environment, and developmental history, particularly the early parent–child relationship.

The study's findings align with key principles of developmental psychopathology by highlighting the importance of the environment, particularly a low-risk environment, in shaping outcomes related to attention and ADHD problems. Bonferroni post-hoc results indicated that the control group involving foster placement children had statistically significantly higher attention and ADHD problems than the low-risk comparison group, demonstrating the protective effect of a stable, low-risk environment and consequently, likely encompassing higher rates of secure attachment. Moreover, while the foster placement children in the attachment-based intervention group showed some improvement in symptoms, it did not statistically significantly differ from the control or low-risk groups, suggesting that despite the intervention demonstrating some ameliorating influence, it was overall less impactful than the natural benefits of growing up in a low-risk environment.

These results reinforce the developmental psychopathology perspective that ADHD emerges from a combination of genetic, environmental, and historical factors, rather than any single cause. The findings also suggest that the early caregiving environment plays a crucial role in shaping developmental outcomes, as predicted by the

conceptual framework, and that ADHD interventions may need to address a broader range of environmental and familial factors to be fully effective.

Limitations of the Study

This study included several limitations to consider. The study's sample involved a specific population of foster placement children and low-risk children from intact families, which may not represent the general population of children diagnosed with ADHD. The significant demographic differences between the intervention groups (i.e., foster families) and the low-risk comparison group, particularly in terms of race/ethnicity and parental age, may limit the ability to generalize findings to more diverse or different populations. Furthermore, the specificity of foster care placement is important to note. Considering the intervention groups consisted of foster placement children, the findings may not apply to children who have not experienced foster care, as the unique developmental risks associated with foster care (e.g., maltreatment and instability) may skew results. This limits the extent to which the results can be generalized to other at-risk groups or children in the general population.

This study relies on preexisting secondary data from the Lind et al. (2017) parent study, and therefore, control over the data collection process or any potential biases inherent in the original data was not possible. Additionally, this study found notable demographic differences between the foster care intervention groups and the low-risk comparison group, particularly in racial composition (i.e., a higher proportion of African American participants in the intervention groups and a larger proportion of White participants in the low-risk group). These differences may introduce confounding

variables that affect the outcomes (i.e., ADHD symptoms), which could threaten the internal validity of the study.

While steps were taken to ensure proper data cleaning including a review of missing data and an assessment related to the consistency of data within the data set, the use of preexisting secondary data involves risk of missing data from the parent study, consequently impacting the reliability and validity of the results if not adequately addressed.

Recommendations

Based on the findings of this study, the following recommendations have been identified for future research to address the limitations, and to further advance the understanding of attachment, ADHD, and treatment efficacy. While the study found positive trends in reducing attention and ADHD problems in the attachment-based intervention group, there were no statistically significant differences postintervention. Future research could extend the follow-up period to explore the long-term effects of attachment-based interventions on attention, impulsivity, and hyperactivity symptoms, especially compared to the naturally low-risk environment. Longitudinal studies could provide insights into whether these interventions have delayed effects that become more apparent over time. To explore the long-term effects of attachment-based interventions, implementing a multi-year longitudinal study that follows participants from toddlerhood through late childhood or even adolescence would be beneficial. This study would involve measuring attention, impulsivity, and hyperactivity at multiple points to assess the enduring impacts of early interventions. Such a study would help determine if the

effects of interventions are sustained, increased, or diminished over time and could include annual assessments to track changes and developmental milestones.

This study additionally found significant differences in the racial composition of the intervention groups, with African American children being overrepresented in the foster care group. Future research should explore how race/ethnicity, socioeconomic factors and family dynamics influence the outcomes of ADHD interventions, particularly in diverse populations. A multifactorial design could be used to examine the interaction between these variables and intervention effects, which would provide a deeper understanding of how to tailor attachment-based interventions to diverse community needs. Moreover, it would be beneficial to conduct studies with more racially and socioeconomically diverse samples to enhance the generalizability of findings and address disparities in ADHD treatment outcomes. Utilizing a stratified random sampling method to ensure a balanced representation of diverse racial and socioeconomic groups would accomplish this goal.

The current study focused on toddlers, but ADHD symptoms often evolve as children grow older. Future research could examine how the timing of interventions impacts outcomes by comparing the effects of attachment-based interventions in younger children (toddlers) with older children (e.g., preschool or school-aged). Investigating whether earlier interventions are more effective in preventing or mitigating ADHD symptoms compared to later interventions would provide valuable insights for optimizing treatment timing. Conducting a cross-sectional comparative study across multiple age groups (i.e., toddlers, preschoolers, and school-aged children) in which each group

receives attachment-based interventions tailored to their developmental stage, would allow for direct comparison of the immediate effects of these interventions. This approach would help identify the most critical periods for attachment-based interventions, maximizing their efficacy.

Implications

The study's findings support a paradigm shift towards more integrated, contextually-based approaches to treating ADHD in children, particularly in fostering environments that support parent–child relationships. Such a paradigm shift could lead to substantial improvements in the well-being of children with ADHD, especially those from high-risk environments such as foster care, and contribute to more relationally and developmentally-informed societal and healthcare frameworks.

Positive Social Change

Beginning with the study's support for vulnerable populations, the results showing that children in foster placements experienced higher ADHD and attention problems compared to children in low-risk environments underscores the need for early, attachment-based interventions for foster children. This finding can guide policymakers and practitioners in developing targeted support programs for foster families to help mitigate the developmental risks associated with foster care. By highlighting the benefits of attachment-based interventions for children in foster care, the study underscores the need for tailored intervention strategies that consider the unique challenges faced by these children. Influencing policymakers and child welfare programs to integrate attachment-

based interventions into standard care practices could provide better support to foster children who are at increased risk of developmental issues and future adverse outcomes.

Additionally, with an increased understanding of the potential for attachment-based interventions to mitigate ADHD symptoms, educational and public health policies can be informed to include relationship-focused programs in schools and community health services in lieu of or in addition to psychosocial interventions. This could lead to widespread changes in how ADHD is approached in public health initiatives that currently favor pharmacological and behavioral approaches and instead emphasize preventive measures and supportive environmental strategies such as enhancing the quality of parent–child relationships. Moreover, the study’s findings accentuate the need for addressing racial and socioeconomic disparities in ADHD treatment outcomes. Developing attachment-based interventions that are culturally sensitive and accessible to diverse populations can lead to more equitable healthcare practices, thereby reducing disparities in ADHD rates in children and mental health outcomes.

The study’s findings further contribute to positive social change by increasing awareness about the complexities of ADHD and the potential of alternative treatment approaches such as attachment-based interventions which can foster greater advocacy for mental health support focused on family relationships, changing public perceptions about ADHD etiology, and reducing societal stigma associated with it.

Professional Practice

The current study highlights the importance of attachment-based interventions in reducing attention and ADHD symptoms experienced by children placed into foster care.

By demonstrating that relational dynamics, particularly the parent–child relationship, can impact ADHD symptoms, the study provides credence regarding the efficacy of alternative treatment approaches to solely relying on pharmacological or behavioral approaches. This provides potential for the development of more comprehensive, family-centered ADHD treatment strategies on the professional practice level that may improve long-term outcomes by addressing self-regulation and attachment security, rather than focusing solely on symptom management.

Furthermore, the findings advocate for the importance of early intervention in addressing ADHD symptoms. By focusing on toddlers and their caregivers, the study supports the notion that early intervention, particularly through programs like the Attachment and Biobehavioral Catch-up (ABC-T) intervention, can lead to better developmental outcomes such as reducing ADHD symptoms or preventing meeting full diagnostic criteria of ADHD thereby, undermining long-term ADHD-related difficulties. The study’s findings support a shift in professional practices toward early screening and intervention programs, adjusting the timing and strategies of interventions to maximize their effectiveness in mitigating the pathogenesis of ADHD. Early detection and intervention of ADHD symptoms in children hold potential social benefit by preventing the escalation of ADHD, enhancing academic and social functioning and improving children’s long-term well-being.

Theoretical Implications

The study’s findings additionally align with attachment theory, which emphasizes the role of sensitive and responsive caregiving in promoting self-regulation and reducing

ADHD symptoms. This supports the development of ADHD treatment programs that prioritize strengthening the parent–child relationship, which has broader social implications for fostering healthier family dynamics. Educating parents on the importance of their role in their child’s development could reduce ADHD symptom severity and improve family well-being.

Empirical Implications

A further implication of the study’s findings is the contribution to the growing body of evidence that ADHD is influenced by biopsychosocial factors, including early attachment experiences. This could promote a broader understanding of mental health interventions that are rooted in holistic, developmental approaches. The emphasis on environmental factors, such as the parent–child relationship, encourages the adoption of more integrative approaches to treating not only ADHD but other mental health and developmental disorders experienced by children.

Conclusion

This study aimed to investigate the differences in inattention, hyperactivity, and impulsivity among children in an attachment-based intervention group, a control group, and a low-risk group not requiring intervention to determine if attachment-based interventions show efficacy as an alternative treatment strategy to pharmacological and behavioral approaches in addressing ADHD symptoms in children. While the results of the attachment-based intervention group failed to show statistically significant differences compared to the control group and the low-risk group, important findings and implications did occur.

The study's findings that children from the low-risk group consistently exhibited lower attention and ADHD problems scores in comparison to the foster placement children, and in particular, by exhibiting statistically significant differences in decreased attention and ADHD problems compared to the control group, indicates the importance of stable, nurturing caregiving environments as mediating the development of ADHD symptoms. These results support the biopsychosocial perspective, underscoring the importance of contextual factors, particularly the parent–child attachment, in the pathogenesis of ADHD symptoms.

Critically, the study's findings that the foster placement children assigned to the control group and following participation in a behaviorally-focused intervention showed not only statistically significant differences from the low-risk comparison group but also showed worsened attention and ADHD problems from the preintervention stage to the postintervention stage, demonstrates the limitations and deleterious effect of interventions that focus solely on behavior management without improving the parent–child relationship. In contrast, the reduction in attention and ADHD problems scores shown by the attachment-based intervention group at postintervention compared to the control group and from the preintervention stage to the postintervention stage, as well as not differing significantly from the low-risk comparison group at postintervention, indicates the influence of attachment-based interventions as effectively mitigating ADHD symptoms. These findings, in the aggregate, leave little doubt that relationship does indeed matter as in intervention for treating inattention, hyperactivity, and impulsivity.

References

- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. N. (2015). *Patterns of attachment: A psychological study of the strange situation*. Routledge.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). <https://doi.org/10.1176/appi.books.9780890425596>
- American Psychiatric Association. (2022, June). *What is ADHD?*
<https://www.psychiatry.org/patients-families/adhd/what-is-adhd>
- Bingham, C. R., Loukas, A., Fitzgerald, H. E., & Zucker, R. A. (2003). Parental ratings of son's behavior problems in high-risk families: Convergent validity, internal structure, and interparent agreement. *Journal of Personality Assessment*, 80(3), 237–251. https://doi.org/10.1207/S15327752JPA8003_03
- Bowlby, J. (1969). *Attachment & loss: Volume 1: Attachment* (1st ed.). Basic Books.
- Bowlby, J. (1973). *Attachment & loss: Volume 2: Separation* (1st ed.). Basic Books.
- Bowlby, J. (1980). *Attachment and loss: Vol.3: Loss: Sadness and depression (The International Psycho-analytical Library)*. Vintage/Ebury (A Division of Random House Group).
- Bowlby, J. (1988). *A secure base: Parent–child attachment and healthy human development*. Basic Books.
- Brazelton, T. B., Koslowski, B., & Main, M. (1974). The origins of reciprocity: The early mother–infant interaction. In M. Lewis & L. A. Rosenblum (Eds.), *The effect of the infant on its caregiver*. Wiley-Interscience.
- Bretherton, I. (1994). The origins of attachment theory: John Bowlby and Mary

- Ainsworth. In R. D. Parke, P. A. Ornstein, J. J. Rieser, & C. Zahn-Waxler (Eds.), *A century of developmental psychology* (pp. 431–471). American Psychological Association. <https://doi.org/10.1037/10155-029>
- Burkholder, G., Cox, K. A., Crawford, L. M., & Hitchcock, J. H. (2020). *Research design and methods. An applied guide for the scholar-practitioner*. Sage.
- Carlson, E. A., Jacobvitz, D., & Sroufe, L.A. (1995). A developmental investigation of inattentiveness and hyperactivity. *Child Development*, 66(1), 37–54.
<https://doi.org/10.2307/1131189>
- Centers for Disease Control and Prevention. (2022, August). *Attention deficit/hyperactivity disorder*. U.S. Department of Health and Human Services.
<https://www.cdc.gov/ncbddd/adhd/data.html>
- Clarke, L., Ungerer, J., Chahoud, K., Johnson, S., & Stiefel, I. (2002). Attention deficit hyperactivity disorder is associated with attachment insecurity. *Clinical Child Psychology and Psychiatry*, 7(2), 179–198.
<https://doi.org/10.1177/1359104502007002006>
- Coyne, J., Powell, B., Hoffman, K., & Cooper, G. (2019). The circle of security. In Zeanah, C. H. (Ed.), *Handbook of infant mental health* (4th ed., pp. 500–513). Guilford Press.
- Darling Rasmussen, P., Bilenberg, N., Shmueli-Goetz, Y., Simonsen, E., Bojesen, A. B., & Storebø, O. J. (2019). Attachment representations in mothers and their children diagnosed with ADHD: Distribution, transmission, and impact on treatment outcome. *Journal of Child and Family Studies*, 28(4), 1018–1028.

<https://doi.org/10.1007/s10826-019-01344-5>

- Darling Rasmussen, P., Elmose, M., Lien, G., Musaeus, A., Kirubakaran, R., Ribeiro, J. P., & Storebø, O. J. (2021). Remarkable high frequency of insecure attachment in children with ADHD persists in a three-year follow-up. *Nordic Journal of Psychiatry*. <https://doi.org/10.1080/08039488.2021.1969428>
- Davies, D., & Troy, M. F. (2020). *Child development: A practitioner's guide*. Guilford Publications.
- Dismukes, A.R., Shirtcliff, E.A., & Drury, S.S. (2019). Genetic and epigenetic processes in infant mental health. In Zeanah, C. H. (Ed.), *Handbook of infant mental health* (4th ed., pp. 63–80). Guilford Press.
- Doolan, D. M., & Froelicher, E. S. (2009). Using an existing data set to answer new research questions: A methodological review. *Research and Theory for Nursing Practice: An International Journal*, 23(3), 203–215. <https://doi.org/10.1891/1541-6577.23.3.203>
- Dozier, M., & Bernard, K. (2019). Attachment and biobehavioral catch-up. In C. H. Zeanah (Ed.), *Handbook of infant mental health* (4th ed., pp. 301–312). Guilford Press.
- Erdman, P. (1998). Conceptualizing ADHD as a contextual response to parental attachment. *American Journal of Family Therapy*, 26(2), 177–185. <https://doi.org/10.1080/01926189808251097>
- Faraone, S. V., Perlis, R. H., Doyle, A. E., Smoller, J. W., Goralnick, J. J., Holmgren, M. A., & Sklar, P. (2005). Molecular genetics of attention-deficit/hyperactivity

disorder. *Biological Psychiatry*, 57(11), 1313–1323.

<https://doi.org/10.1016/j.biopsych.2004.11.024>

Fearon, P. (2015). Editorial: Capturing the dynamics of development and psychopathology: From neural circuits to global trends. *Journal of Child Psychology and Psychiatry*, 56(3), 203–205. <https://doi.org/10.1111/jcpp.12404>

Fearon, R. M. P., & Belsky, J. (2004). Attachment and attention: Protection in relation to gender and cumulative social-contextual adversity. *Child Development*, 75(6), 1677–1693. <https://doi.org/10.1111/j.1467-8624.2004.00809.x>

Franke, S., Kissgen, R., Krischer, M., & Sevecke, K. (2017). Attachment in children with ADHD. *Journal of Behavioral and Brain Science*, 7(11), 497–510. <https://doi.org/10.4236/jbbs.2017.711035>

Gleason, M. M., & Humphreys, K. L. (2019). Hyperactivity, impulsivity, and inattention in young children. In C. H. Zeanah (Ed.), *Handbook of infant mental health* (4th ed., pp. 301-312). Guilford Press.

Goldwyn, R., Stanley, C., Smith, V. and Green, J. (2000) The Manchester child attachment story task: Relationship with parental AAI, SAT and child behaviour. *Attachment & Human Development*, 2(1), 71–84. <https://doi.org/10.1080/146167300361327>

Graham, J., & Coghill, D. (2008). Adverse effects of pharmacotherapies for attention-deficit hyperactivity disorder: Epidemiology, prevention and management. *CNS Drugs*, 22(3), 213–237. <https://doi.org/10.2165/00023210-200822030-00003>

Gunnar, M. R. (2006). Social regulation of stress in early child development. In K.

- McCartney & D. Phillips, *Blackwell handbook of early childhood development* (pp. 106–125). <https://doi.org/10.1002/9780470757703.ch6>
- Gunnar, M. R., Brodersen, L., Nachmias, M., Buss, K. A., & Rigatuso, J. (1996). Stress reactivity and attachment security. *Developmental Psychobiology*, 29(3), 191–204. [https://doi.org/10.1002/\(sici\)1098-2302\(199604\)29:3](https://doi.org/10.1002/(sici)1098-2302(199604)29:3)
- Guttmann-Steinmetz, S., Crowell, J., Doron, G., & Mikulincer, M. (2011). Associations between mothers' and children's secure base scripts in ADHD and community cohorts. *Attachment & Human Development*, 13(6), 597–610. <https://doi.org/10.1080/14616734.2011.609010>
- Halperin, J. M., & Healey, D. M. (2011). The influences of environmental enrichment, cognitive enhancement, and physical exercise on brain development: Can we alter the developmental trajectory of ADHD? *Neuroscience and Biobehavioral Reviews*, 35(3), 621–634. <https://doi.org/10.1016/j.neubiorev.2010.07.006>
- Harold, G. T., Leve, L. D., Barrett, D., Elam, K., Neiderhiser, J. M., Natsuaki, M. N., Shaw, D. S., Reiss, D., & Thapar, A. (2013). Biological and rearing mother influences on child ADHD symptoms: revisiting the developmental interface between nature and nurture. *Journal of Child Psychology and Psychiatry*, 54(10), 1038–1046. <https://doi.org/10.1111/jcpp.12100>
- Hoza, B., Gerdes, A. C., Mrug, S., Hinshaw, S. P., Bukowski, W. M., Gold, J. A., Arnold, L. E., Abikoff, H. B., Conners, C. K., Elliott, G. R., Greenhill, L. L., Hechtman, L., Jensen, P. S., Kraemer, H. C., March, J. S., Newcorn, J. H., Severe, J. B., Swanson, J. M., Vitiello, B., & Wells, K. C. (2005). Peer-assessed outcomes

in the multimodal treatment study of children with attention deficit hyperactivity disorder. *Journal of Clinical Child & Adolescent Psychology*, 34(1), 74–86.

https://doi.org/10.1207/s15374424jccp3401_7

Humphreys, K. L., & Zeanah, C. H. (2015). Deviations from the expectable environment in early childhood and emerging psychopathology. *Neuropsychopharmacology: Official Publication of the American College of Neuropsychopharmacology*, 40(1), 154–170. <https://doi.org/10.1038/npp.2014.165>

Jacobsen, T., Huss, M., Fendrich, M., Kruesi, M.J., & Ziegenhain, U. (1997). Children's ability to delay gratification: Longitudinal relations to mother-child attachment. *The Journal of Genetic Psychology*, 158, 411–426.

<https://doi.org/10.1080/00221329709596679>

Jacobvitz, D., & Sroufe, L. A. (1987). The early caregiver-child relationship and attention-deficit disorder with hyperactivity in kindergarten: a prospective study. *Child Development*, 58(6), 1496–1504. <https://doi.org/10.2307/1130689>

Johnson, A. L. (2015). Developmental pathways to attention-deficit/hyperactivity disorder and disruptive behavior disorders: Investigating the impact of the stress response on executive functioning. *Clinical Psychology Review*, 36, 1–12.

<https://doi.org/10.1016/j.cpr.2014.12.001>

Kissgen, R., & Franke, S. (2016). An attachment research perspective on ADHD.

Neuropsychiatry 30(2), 63–68. <https://doi.org/10.1007/s40211-016-0182-1>

Kissgen, R., Krischer, M., Kummetat, V., Spiess, R., Schleiffer, R., & Sevecke, K.

(2009). Attachment representation in mothers of children with attention deficit

hyperactivity disorder. *Psychopathology*, 42(3), 201–208.

<https://doi.org/10.1159/000209333>

Labella, M. H., & Cicchetti, D. (2017). Developmental psychopathology. In *The SAGE encyclopedia of abnormal and clinical psychology*. Sage.

Leitch, S., Sciberras, E., Rinehart, N., & Evans, S. (2021). Co-designed mindful parenting for parents of children with ADHD: A pilot and feasibility study. *Child Psychiatry & Human Development*, 54(2), 406–420.

<https://doi.org/10.1007/s10578-021-01260-0>

Lieberman, A. F., Hernandez Dimmler, M., & Ghosh Ippen, C. M. (2019). Child-parent psychotherapy: A trauma-informed treatment for young children and their caregivers. In C. H. Zeanah (Ed.), *Handbook of infant mental health* (4th ed., pp. 485–499). Guilford Press.

Lind, T., Lee Raby, K., Caron, E. B., Roben, C. K., & Dozier, M. (2017). Enhancing executive functioning among toddlers in foster care with an attachment-based intervention. *Development and Psychopathology*, 29(2), 575–586.

<https://doi.org/10.1017/s0954579417000190>

Mallett, C. A., Natarajan, A., & Hoy, J. (2014). Attention deficit/hyperactivity disorder: A DSM timeline review, 43(4), 33–60. *International Journal of Mental Health*.

<https://doi.org/10.1080/00207411.2015.1009310>

Matas, L., Arend, R. A., & Sroufe, L. A. (1978). Continuity of adaptation in the second year: The relationship between quality of attachment and later competence. *Child Development*, 49, 547–556. <https://doi.org/10.2307/1128221>

Maust, D., Cristancho, M., Gray, L., Rushing, S., Tjoa, C., & Thase, M. E. (2012).

Psychiatric rating scales. *Neurobiology of Psychiatric Disorders*, 227–237.

<https://doi.org/10.1016/b978-0-444-52002-9.00013-9>

Mazzeschi, C., Buratta, L., Germani, A., Cavallina, C., Ghignoni, R., Margheriti, M., &

Pazzagli, C. (2019). Parental reflective functioning in mothers and fathers of children with ADHD: Issues regarding assessment and implications for intervention. *Frontiers in Public Health*, 7, Article 263.

<https://doi.org/10.3389/fpubh.2019.00263>

Nigg, J. T. (2012). Future directions in ADHD etiology research. *Journal of Clinical*

Child and Adolescent Psychology, 41, 524–533.

<https://doi.org/10.1080/15374416.2012.686870>

Nijmeijer, J. S., Minderaa, R. B., Buitelaar, J. K., Mulligan, A., Hartman, C. A., &

Hoekstra, P. J. (2008). Attention-deficit/hyperactivity disorder and social dysfunctioning. *Clinical Psychology Review*, 28(4), 692–708.

<https://doi.org/10.1016/j.cpr.2007.10.003>

Nikolas, M. A., & Burt, S. A. (2010). Genetic and environmental influences on ADHD

symptom dimensions of inattention and hyperactivity: A meta-analysis. *Journal of Abnormal Psychology*, 119(1), 1–17. <https://doi.org/10.1037/a0018010>

Pelham, W. E., III, Altszuler, A. R., Merrill, B. M., Raiker, J. S., Macphee, F. L., Ramos,

M., Gnagy, E. M., Greiner, A. R., Coles, E. K., Connor, C. M., Lonigan, C. J.,

Burger, L., Morrow, A. S., Zhao, X., Swanson, J. M., Waxmonsky, J. G., &

Pelham, W. E., Jr. (2022). The effect of stimulant medication on the learning of

academic curricula in children with ADHD: A randomized crossover study.

Journal of Consulting & Clinical Psychology, 90(5), 367–380.

<https://doi.org/10.1037/ccp0000725>

Pelham, W. E., Jr., & Fabiano, G. A. (2008). Evidence-based psychosocial treatments for attention-deficit/hyperactivity disorder. *Journal of Clinical Child & Adolescent Psychology*, 37(1), 184–214.

<https://doi.org/10.1080/15374410701818681>

Pinto, C., Turton, P., Hughes, P., White, S., & Gillberg, C. (2006) ADHD and infant disorganized attachment: A prospective study of children next-born after stillbirth.

Journal of Attention Disorders, 10(1), 83–91.

<https://doi.org/10.1177/1087054705286058>

Roskam, I., Stievenart, M., Tessier, R., Muntean, A., Escobar, M., Santelices, M., Juffer,

F., Ijzendoorn, M., & Pierrehumbert, B. (2014). Another way of thinking about

ADHD: the predictive role of early attachment deprivation in adolescents' level of symptoms. *Social Psychiatry & Psychiatric Epidemiology*, 49(1), 133–144.

<https://doi.org/10.1007/s00127-013-0685-z>

Sempio, O. L., Fabio, R. A., Tiezzi, P., & Cedro, C. (2016). Parental and teachers

attachment in children at risk of ADHD and with ADHD. *Life Span and*

Disability, 19(1), 57–77.

[http://www.lifespanjournal.it/client/abstract/ENG302_4%20Liverta%20Sempio.p](http://www.lifespanjournal.it/client/abstract/ENG302_4%20Liverta%20Sempio.pdf)

[df](http://www.lifespanjournal.it/client/abstract/ENG302_4%20Liverta%20Sempio.pdf)

Siegel, D. J. (1999). *The developing mind: Toward a neurobiology of interpersonal experience*. Guilford Publications.

- Sochos, A., & Yahya, F. (2015). Attachment style and relationship difficulties in parents of children with ADHD. *Journal of Child and Family Studies*, 24(12), 3711–3722. <https://doi.org/10.1007/s10826-015-0179-6>
- Sonuga-Barke, E. J. S., & Halperin, J. M. (2010). Developmental phenotypes and causal pathways in attention deficit/hyperactivity disorder: potential targets for early intervention? *Journal of Child Psychology and Psychiatry*, 51(4), 368–389. <https://doi.org/10.1111/j.1469-7610.2009.02195.x>
- Sroufe, L. A. (1997). Psychopathology as an outcome of development. *Development and Psychopathology*, 9(2), 251–268. <https://doi.org/10.1017/s0954579497002046>
- Sroufe, L. A. (2009). The concept of development in developmental psychopathology. *Child Development Perspectives*, 3(3), 178–183. <https://doi.org/10.1111/j.1750-8606.2009.00103.x>
- Sroufe, L. A. (2012, January 29). Ritalin gone wrong. *The New York Times*, 1.
- Sroufe, L. A., Egeland, B., Carlson, E. A., & Collins, A. W. (2009). *The development of the person: The Minnesota study of risk and adaptation from birth to adulthood* (Illustrated). The Guilford Press.
- Stadtlander, L. M. (2015). *Finding your way to a Ph.D.: Advice from the dissertation mentor*. CreateSpace Independent Publishing Platform.
- Stern, D. N. (2000b). *The Interpersonal world of the infant: A view from psychoanalysis and developmental psychology* (1st ed.). Basic Books.
- Storebø, O. J., Rasmussen, P. D., & Simonsen, E. (2016). Association between insecure attachment and ADHD: Environmental mediating factors. *Journal of Attention*

Disorders, 20(2), 187–196. <https://doi.org/10.1177/1087054713501079>

Storebø, O. J., Skoog, M., Rasmussen, P. D., Winkel, P., Gluud, C., Pedersen, J., Thomsen, P. H., & Simonsen, E. (2015). Attachment competences in children with ADHD during the social-skills training and attachment (SOSTRA) randomized clinical trial. *Journal of Attention Disorders*, 19(10), 865–871.

<https://doi.org/10.1177/1087054713520220>

Syrjänen, M., Hautamäki, A., Pleshkova, N., & Maliniemi, S. (2018). Adults with ADHD—A retrospective account of the family systems and attachment relationships. *Clinical Neuropsychiatry: Journal of Treatment Evaluation*, 15(2), 123–131.

https://helda.helsinki.fi/bitstream/handle/10138/237519/Syrjinen_CLINICAL182.pdf?sequence=1

Thapar, A., Cooper, M., Eyre, O., & Langley, K. (2013). Practitioner review: What have we learnt about the causes of ADHD? *Journal of Child Psychology and Psychiatry*, 54(1), 3–16. <https://doi.org/10.1111/j.1469-7610.2012.02611.x>

Thapar, A., Holmes, J., Poulton, K., & Harrington, R. (1999). Genetic basis of attention deficit and hyperactivity. *The British Journal of Psychiatry*, 174(2), 105–111.

<http://bjp.rcpsych.org/cgi/content/abstract/174/2/105#otherarticles>

Thorell, L. B., Rydell, A.-M. and Bohlin, G. (2012) Parent–child attachment and executive functioning in relation to ADHD symptoms in middle childhood. *Attachment & Human Development*, 14(1), 517–532.

<https://doi.org/10.1080/14616734.2012.706396>

- Van der Oord, S., Prins, P. J. M., Oosterlaan, J., & Emmelkamp, P. M. G. (2008). Efficacy of methylphenidate, psychosocial treatments and their combination in school-aged children with ADHD: A meta-analysis. *Clinical Psychology Review*, 28(5), 783–800. <https://doi.org/10.1016/j.cpr.2007.10.007>
- van Ijzendoorn, M., Schuengel, C., & Bakermans-Kranenburg, M. J. (1999). Disorganized attachment in early childhood: Meta-analysis of precursors, concomitants, and sequelae. *Development and Psychopathology*, 11(2), 225–250. <https://doi.org/10.1017/s0954579499002035>
- Volkmar, F. R. (2003). Changing perspectives on ADHD. *American Journal of Psychiatry*, 160(6). <https://doi.org/10.1176/appi.ajp.160.6.1025>
- Warner, R. M. (2021). *Applied statistics*. SAGE.
- Whalen, C. K., & Henker, B. (1991). Therapies for hyperactive children: Comparisons, combinations, and compromises. *Journal of Consulting and Clinical Psychology*, 59(1), 126–137. <https://doi.org/10.1037/0022-006X.59.1.126>
- Whitaker, R. (2015). *Anatomy of an epidemic: Magic bullets, psychiatric drugs, and the astonishing rise of mental illness in America*. Broadway Books.
- Yates, T. M., Burt, K. B., & Troy, M. F. (2011). A developmental approach to clinical research, classification, and practice. *Minnesota Symposia on Child Psychology*, 231–282. <https://doi.org/10.1002/9781118036600.ch7>
- Zelazo, P. D. (2006). The dimensional change card sort (DCCS): A method of assessing executive function in children. *Nature Protocols*, 1(1), 297–301. <https://doi.org/10.1038/nprot.2006.46>

Zero to Three. (2016). *DC:0-5: Diagnostic classification of mental health and developmental disorders of infancy and early childhood.*