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Autism and Externalizing Behaviors: Attachment as a Protective Factor

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Autism and Externalizing Behaviors: Attachment as a Protective Factor

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Dedication

If I had a time machine I would go back and ask Emily Dickenson or some prolific writer to help

me write the perfect dedication to you mom. The truth is, I love you so much that trying to

express it in the confines of the English language is just not going to cut it!

For now, I'll stick with our tried-and-true:

I love you forever and ever-ness.

ATTACHMENT AS A PROTECTIVE FACTOR

Table of Contents

ATTACHMENT AS A PROTECTIVE FACTOR

List of Tables

ATTACHMENT AS A PROTECTIVE FACTOR

List of Figures

ATTACHMENT AS A PROTECTIVE FACTOR

Rebecca Kramer
Word Count: 332

Abstract

Children with autism spectrum disorder (ASD) exhibit externalizing behaviors at a higher rate when compared to their typically developing (TD) counterparts (Bauminger, Solomon, & Rogers, 2010; Gray, Keating, Taffe, & Brereton, 2012). Numerous longitudinal and cross-sectional studies assert that attachment is one of the most salient predictors of childhood externalizing behaviors (e.g., Green and Goldwyn, 2002). Despite this, little research has examined the relation between attachment and externalizing behaviors in children with ASD. This study investigated the extent to which high levels of attachment buffer the symptoms of externalizing behaviors in children with ASD, potentially informing future interventions. In addition, this study examined the relation between attachment and child externalizing behaviors. Participants included 10 TD children and 7 children with ASD (52.9% male; 47.1% female) between the ages of 3 years and 6 years 11 months (Mean age =61.53 months, SD = 16.28 months). Parent self-reports were used to evaluate the level of parent-child attachment and child externalizing behaviors. Parents of children with ASD had significantly greater reported overall child externalizing behaviors ($p = .027$). No significant differences were observed in parent reported attachment levels and attachment was not significantly associated with externalizing behavior. Attachment did not significantly moderate the relation between diagnostic status and externalizing behaviors. Given the small sample size and low statistical power of this study, these results may under-estimate the relation between attachment and externalizing behavior in children with ASD. While the results of this study did not support attachment as a protective factor for parents of children with ASD, attachment x diagnostic status did account for 17% of additional variation in externalizing behavior. Plotting of regression slopes depicted a visible inverse trend between attachment and externalizing behavior among parents with ASD children but not TD children. These findings suggest the relation between parent-child attachment and externalizing behaviors is more evident among ASD participants. Therefore, children with high levels of externalizing behaviors, particularly those with ASD, could benefit from interventions aimed at strengthening attachment within the parent-child dyad.

Keywords: autism spectrum disorder; neurodevelopmental disorders; externalizing behaviors; attachment

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CHAPTER I

Introduction and Literature Review

Autism spectrum disorder (ASD), as defined by the *Diagnostic and Statistical Manual of Mental Disorders* -5, is a neurodevelopmental condition characterized by impairments in social interactions and communication in the presence of restricted and repetitive patterns of behavior (American Psychiatric Association, [*DSM*-5], 2013). The prevalence of ASD has increased dramatically in recent years, culminating in a 120% increase in diagnoses since 2002. Approximately 1 in 68 children are diagnosed with ASD each year (U.S. Centers for Disease Control [CDC], 2013). These increasing rates are of concern as decades of research maintain that ASD has a profound impact on a child's social, psychological, and cognitive development (Howlin, 2005). While many evidence-based interventions exist and continue to be developed for individuals with ASD, support for the parent-child dyad is needed and is only beginning to gain traction.

The challenges involved in parenting a child with ASD have been well established in the literature for several decades. Parents of children with ASD report higher levels of stress when compared to parents of typical developing (TD) children and parents of children with other developmental disabilities (e.g., Hayes & Watson, 2013). While the literature suggests that core ASD symptoms are indeed sources of parenting stress, other symptoms not pertinent to the diagnosis also constitute significant stressors for parents. Multiple studies assert that externalizing behaviors, often exhibited in children with ASD (Bauminger, Solomon, & Rogers, 2010; Gray, Keating, Taffe, & Brereton, 2012), are the most salient predictor of parenting stress (e.g., Hastings 2003; Lecavalier et al., 2006). Given this, interventions informed by attachment theory may be particularly beneficial for this population.

ATTACHMENT AS A PROTECTIVE FACTOR

A substantial body of research asserts that attachment predicts child externalizing behaviors for both clinical and TD populations (Green and Goldwyn, 2002). However, little research has examined this relation in children with ASD. Given the inherent social difficulties of this disorder, it was once assumed that children with ASD were incapable of forming discrete attachment relationships (APA, 1980). Current research indicates that approximately half of children (53%) with ASD are able to form attachments with their primary caregivers in the absence of intervention (Rutgers et al., 2004). Examining attachment as a potential protective factor for this population may help inform future interventions to better support families. The following sections provide an overview of ASD, child externalizing behavior, and attachment as well as provide rationale for examining attachment as a possible protective factor for children with ASD.

Autism Spectrum Disorder

Overview

Diagnostic Criteria

Autism spectrum disorder is a chronic neurodevelopmental disorder characterized by deficits in social interaction and communication in the presence of restricted, repetitive behaviors or interests (American Psychiatric Association, [*DSM*-5], 2013). Before the inception of the DSM-5 in 2012, three subgroups of autism symptoms were recognized: autistic disorder, Asperger syndrome, and pervasive developmental disorder-not otherwise specified. In an attempt to consolidate the classification of these cluster of symptoms, the DSM-5 combined all three subtypes into what is now called ASD. To diagnose ASD, the DSM-5 indicates that six (or more) symptoms must be present, with two or more being impairments in social interactions and

at least one symptom in both communication and restricted/repetitive behaviors. In short, all three domains of ASD must be present for a diagnosis, culminating in six or more symptoms.

A clinical diagnosis of ASD requires expert discernment, as these individuals often present with considerable variability. The DSM-5 provides three diagnostic specifiers: (a) with or without accompanying intellectual disability, (b) with or without accompanying language impairment, and (c) severity level. Severity levels range from Level 1: requiring support, Level 2: requiring substantial support, and Level 3: requiring very substantial support (American Psychiatric Association, 2013). These diagnostic specifiers offer clinical utility across treatment settings and clinicians as they seek to precisely capture intellectual abilities, level of impairment, and symptom severity in individuals with ASD.

Clinical Presentation

While the core symptoms of ASD may not fully manifest until school age, typical onset occurs within the first few years of life. Early observable social deficits may include a distinct lack of shared interest, comfort seeking, and/or eye contact with their primary caregiver. Young children with ASD also exhibit significant language delays and their speech patterns often involve stereotypies, echolalia, and/or atypical inflections and intonations. Restricted and repetitive behaviors are also observable in the early years. Toddlers may exhibit motor stereotypies such as hand flapping, rocking, and spinning. During play, a child with ASD may line up, sort, or fixate on toys (e.g., spinning wheels of a car) in the absence of functional or imaginative play (e.g. feeding a baby doll). As the child develops, these restrictive and repetitive rituals often become increasingly inflexible which can result in various challenging behaviors (Dawson et al., 2010; Miles, 2011).

Behavioral difficulties not core to the diagnosis are frequently reported in children with ASD. For instance, externalizing behaviors such as noncompliance, tantrums, aggression, and self-injurious behaviors are typical (e.g., Horner et al, 2002). These behavioral outbursts are commonly triggered by a sudden change in routine (e.g., bedtime ritual) and/or sensory overload. Sensory processing difficulties in children with ASD are well documented (e.g., Ben-Sasson et al., 2009). Symptoms include hypersensitivity to loud sounds, bright lights, and/or skin contact (e.g., uncomfortable clothing). These sensory sensitivities often result in food refusal due to appearance, odor, texture, or taste (Miles, 2011). Additionally, children with ASD may also experience internalizing symptoms such as anxiety and depression (Solomon et al., 2012).

History

The zeitgeist surrounding autism symptomatology has evolved over the years. Leo Kanner, an American psychiatrist, was the first to formally document this cluster of symptoms in 1943 as "infantile autism." A year later, Austrian pediatrician Hans Asperger independently termed a similar group of children with milder autism symptoms as having "Asperger syndrome." Public awareness surrounding symptoms of ASD became evident in the 1960s, but an unfortunate result was the blaming of mothers. The term "refrigerator mothers" was used to describe the common notion that a child's social impairments were due to cold and distant mothers. By the late 1980s research confirmed that ASD was a highly genetic disorder, not the result of a parenting style (Wolff, 2004). With the inception of the DSM-5 in 2012, autism symptoms are understood to exist on a spectrum from low to high functioning. Despite ongoing developments in the field of ASD, prevalence has risen to the forefront as a primary concern in recent years.

Prevalence

The prevalence of ASD has increased dramatically in the past decade culminating in a 120% increase in diagnoses since 2002 (Christensen et al., 2016). As a result, some researchers in the field consider ASD to have reached epidemic proportions (e.g., Liu, King, & Bearman, 2010). This significant increase in prevalence rates is likely due to changes in diagnostic criteria to include younger children and milder symptom presentations, community awareness, and improved diagnostic tools (Kirby, 2015). While ASD is reported across all racial, ethnic, and socioeconomic groups, ASD impacts boys at a disproportionate rate. Approximately 1 in 68 children (1 in 42 boys and 1 in 189 girls) are diagnosed with ASD each year (U.S. Centers for Disease Control [CDC], 2016).

Epidemiology

Seminal epidemiological research confirms that prenatal and perinatal risk factors for ASD exist. Several systematic reviews and meta-analyses indicate that advanced maternal age during pregnancy puts women at risk for giving birth to a child with ASD (e.g., Bilder et al., 2009). Some possible explanations are that advanced maternal age is linked to elevated levels of chromosomal abnormalities as well as pregnancy complications (Kolevzon, Gross, & Reichenberg, 2007). Additionally, exposure to various environmental teratogens, such as air pollution (Roberts et al., 2013), have been indicated as potential risk factors. A remarkable and recent study indicates pregnant mothers taking antidepressants, specifically selective serotonin reuptake inhibitors (SSRIs), during the second and third trimester were 87% more likely to give birth to a child with ASD (Boukhris, Sheehy, Mottron, & Bérard, 2016). While the aforementioned risk factors yield promising epidemiological results, they are not yet firmly established and ought to be considered with caution. What the field can be certain about,

however, is that vaccines are not a legitimate risk factor for ASD (e.g., Flaherty, 2011). While

environmental factors are of importance, ASDs are believed to be mainly genetic in origin.

Etiology

The cause of ASD is largely unknown. However, through chromosomal microarray

analysis and exome sequencing, researchers are beginning to unpack several hundred genes and

gene combinations related to ASD (O'Roak, et al., 2012; Sanders et al., 2012). Seminal research

confirmed that the heritability of ASD can be as high as 90% in twins (Bailey et al., 1995) and

20% in siblings (Ozonoff et al., 2011). Siblings who do not receive a diagnosis of ASD may still

demonstrate a broader autism phenotype, further indicating genetic predispositions to ASD

(Gerdts & Bernier, 2011). It is important to note, however, that a subset of children develop ASD

in the absence of a genetic loading due to spontaneous gene mutations (Neale et al., 2012).

Researchers have detected genetic mutations in approximately 20% of individuals with ASD

(Jeste & Geschwind, 2014). While continued research in this area is warranted, it is well

understood that interactions between genes and environment appear to be involved in most cases

of ASD.

Externalizing Behavior

Overview

A significant distinction in the field of child psychology is internalizing and externalizing

behaviors. Externalizing behavior is a group of problematic behaviors including aggression,

oppositionality, conduct problems, inattention, and hyperactivity. These problem behaviors are

directed toward the child's external environment, in contrast to the child's self (i.e.,

internalizing) which involves symptoms of depression and/or anxiety (Achenbach & Edelbrock,

1978). Externalizing behaviors are a typical part of child development (Tremblay, 2000),

appearing as early as the first year of life, peaking during toddlerhood, and optimally declining as language emerges (Gimenez & Blatier, 2004). Externalizing behaviors that remain stable, however, are associated with a host of negative outcomes for the child as well as for their family and community at large (Gardner & Ward, 2000). The following sections will provide a more detailed description of the subtypes of externalizing behaviors often observed in childhood: (a) inattentive/hyperactive behavior and (b) disruptive behavior.

Inattention and Hyperactivity

While often consolidated in the psychological literature, inattention and hyperactivity are distinct clusters of symptoms. Hyperactivity refers to excessive motor movement or restlessness and inattention refers to low levels of concentration or distractibility (Liu, 2004). The combination of these symptoms is evidenced in the DSM-5 as attention-deficit hyperactivity disorder (ADHD). Attention deficit hyperactivity disorder is a neurodevelopmental disorder characterized by symptoms of inattention and/or hyperactivity resulting in impairment in functioning (American Psychiatric Association, [*DSM*-5], 2013). A diagnosis of ADHD requires six or more symptoms of inattention, hyperactivity/impulsivity, or both. As such, there are three diagnostic specifiers of ADHD: inattentive type, hyperactive/impulsive type, or combined type.

Disruptive Behaviors

Aggression and conduct problems are often referred to as disruptive behaviors (Bloomquist & Schnell, 2002). These cluster of symptoms are evidenced in the DSM-5 as oppositional defiant disorder (ODD) and conduct disorder (CD). Disruptive behavior disorders are of concern as the prevalence rate is an estimated 2%-16% and is associated with an overall poor prognosis (Loeber, Burke, Lahey, Winters, & Zera, 2000).

Aggression. Aggression is a group of interpersonal actions, comprised of physical or verbal behaviors, that are used with the intent to harm or threaten others (APA, 2013). Decades of research indicates two types of childhood aggression: proactive and reactive (Dodge, 1991). Children with proactive aggression are unprovoked and purposeful. Proactive aggression can be object-oriented (e.g., purposely breaking a toy) or person-oriented (e.g., bullying to get a toy), both of which are used to achieve a positive outcome. Reactive aggression, in contrast, involves angry outbursts from interpreting ambiguous provocations as vitriolic; a defense mechanism in a sense. Childhood aggression is a crucial area of intervention as studies consistently indicate that it is a significant predictor of adult crime and violence (Loeber & Farrington, 2001).

Conduct Problems. Conduct problems in childhood are evidenced by delinquent or antisocial acts (Webster-Stratton & Hammond, 1997). Juvenile delinquency is a legal term used to describe children and adolescents who engage in illegal behaviors. In the field of clinical psychology, however, delinquency is often conceptualized as nonviolent antisocial behaviors such as lying, cheating, stealing, and committing problematic acts with peers, as seen in the widely used Child Behavior Checklist (CBCL; Achenbach, 1978). An extensive body of research indicates that adolescents are far more likely to engage in delinquent behaviors within a peer group rather than independently (Lacourse, Nagin, Tremblay, Vitaro, & Claes, 2003).

General Theory

A prominent theory, Social Interaction Learning theory, postulates ineffective parenting as the most salient mechanism underlying child externalizing behaviors (Forgatch, Bullock, & Patterson, 2004). Ineffective parenting includes harsh and/or inconsistent discipline, substandard monitoring and supervision, and/or lack of positive involvement (Cunningham & Boyle, 2002). Through consistent reinforcement of antisocial acts, parents maintain overt externalizing

problems exhibited by their child. These coercive processes within the family usually become

instinctive and with little insight involved (Snyder & Patterson, 1995).

Externalizing Behaviors and ASD

Research indicates that children with ASD exhibit elevated levels of externalizing

behaviors when compared to their TD peers and children with other developmental disabilities

(Gray, Keating, Taffe, & Brereton, 2012). While not crucial to the diagnosis, externalizing

behaviors in children with ASD are linked to a range of negative outcomes, such as increased

rates of bullying (Cappadocia, Weiss, & Pepler, 2012), and overall decreased quality of life

(Kuhlthau et al., 2010). Not only do these problematic behaviors interfere with the child's daily

functioning, but they also exacerbate parent stress beyond core ASD symptoms (Estes et al.

2013). Research indicates that interventions focusing on strengthening the parent-child

attachment via parent responsivity training can help negate these negative outcomes (Siller &

Sigman, 2002).

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Attachment

</div>

Overview

Bowlby's (1969) theory of attachment revolutionized the way researchers examine the

parent child relationship, integrating aspects of biology, evolution, development, and cognition.

Presently, attachment is a widely studied and accepted neurobiological mechanism through

which the parent child relationship develops (Ainsworth, Blehar, Waters, & Wall, 1978).   This

complex evolutionary system is crucial for survival, establishing an early sense of safety and

security for the child. In infants, attachment behaviors largely involve physical proximity to their

caregiver such as staying close and demonstrating wariness of strangers. In toddlerhood, the

attachment relationship becomes more of a safe base to return to as the child begins to explore

their environment. In school years and beyond, attachment behaviors are less about physical proximity and more about the caregiver serving as a "confidante" to the adolescent (Kobak, Rosenthal, & Serwik, 2005).

The quality of the parent-child attachment varies considerably. Decades of research indicates four types of attachment: secure, insecure, disorganized, and disturbed. Securely attached children seek proximity with their caregiver when distressed and feel safe to engage in exploratory behaviors. In contrast, children who display considerable variance of proximity-seeking and exploratory behaviors are considered insecurely attached (Ainsworth et al., 1978). Disorganized attachment results in the child perceiving their primary caregiver as both a source of security and fear (Main & Hesse, 1990). Lastly, disturbed attachment involves inhibited, disinhibited, and controlling behaviors (Zeanah & Smyke, 2008). Decades of longitudinal and cross-sectional studies demonstrate the significant impact of attachment style on the developmental trajectories of children. A child who presents with insecure attachment, for instance, is at high risk for psychopathology and other adverse outcomes (Sroufe, 2005).

Attachment and ASD

It was once believed children with ASD were unable to form attachment relationships with their caregiver (American Psychiatric Association, 1980). As previously outlined, the preconceived notions of ASD (i.e., cold mothers) influenced how researchers examined the etiology at the time. Classic social impairments found in individuals with ASD such as little to no eye contact, joint attention, or interpersonal relatedness seemed to strengthen this theory. Later research concluded that non-human primates are able to form attachments without the advanced social communication and reciprocity evident in humans (Wolff, 2004)—why not individuals with ASD?

ATTACHMENT AS A PROTECTIVE FACTOR

Various theoretical models have been proposed regarding ASD and the capability to form attachment relationships. One theory describes ASD as an issue with arousal in social interactions. According to this model, children with ASD become highly aroused in social situations resulting in an aversion to interact with others. As a result, children with ASD are likely to form insecure attachment relationships (Dawson & Lewy, 1989). Another theory, more in line with current research, is based on developmental delays observed in a high percentage of children with ASD. These delays likely contribute to difficulties in understanding and relating to others. Despite developmental delays and social deficits often observed in children with ASD, research indicates that about half of children (53%) with ASD formed secure attachments with their primary caregivers without intervention (Rutgers et al., 2004). However, it is important to note that Rutgers et al. (2004) also found that when compared to TD children, secure attachments are significantly underrepresented in ASD. Thus, children with ASD are capable of developing an attachment with their caregiver, albeit more challenging when compared to their TD counterparts (e.g., Rogers, Ozonoff, & Maslin-Cole, 1993).

Attachment as a Potential Buffer for Externalizing Behaviors in Children with ASD

It is well established within the literature that TD children with insecure or disorganized attachment are at a higher risk for developing externalizing behavior problems when compared to their securely attached peers (see Green & Goldwyn [2002] for a comprehensive review). As previously mentioned, children with ASD exhibit elevated levels of externalizing problems when compared to both their TD peers (Mahan & Matson, 2011) which causes significant parental stress (Lecavalier et al., 2006). Given this, research examining the relation between attachment and externalizing behaviors in children with ASD is warranted (Teague, Gray, Tonge, & Newman, 2017). Despite nearly 30 years of research, a science-to-service gap continues to exist.

However, a recent intervention study demonstrates promising results for attachment as a protective factor in this population. Focused Playtime Intervention (FPI), an eight-session training course on responsive parental behaviors, demonstrated increased attachment-related behaviors in children with ASD and subsequent reduction in externalizing behaviors (Siller, Swanson, Gerber, Hutman, & Sigman, 2014). While results are promising, more research must be done in order to move the field forward.

Hypotheses

The current study examined parent-child attachment levels in relation to child diagnostic status (ASD versus TD) and child externalizing behaviors. Based on previous research, the following hypotheses were made:

Hypothesis 1

There will be a direct effect of diagnostic status (ASD =1 vs. TD = 0) on externalizing behaviors. Research consistently demonstrates that children with ASD exhibit externalizing behaviors at a higher rate when compared to TD children and children with other disabilities (Gray, Keating, Taffe, & Brereton, 2012). Therefore, I expected that parents of children with ASD would report higher levels of child externalizing behaviors than parents of children who are TD.

Hypothesis 2

Child diagnostic status (ASD versus TD) will predict level of parent-child attachment, such that a child with ASD would have lower parent-reported attachment levels than children who are TD. This hypothesis aligns with previous research indicating that, when compared to TD children, secure attachments are significantly underrepresented in children with ASD (Rutgers et al., 2004).

ATTACHMENT AS A PROTECTIVE FACTOR

Hypothesis 3

Parent-child attachment will predict total child externalizing behaviors levels. Specifically, it was hypothesized that low levels of parent-reported attachment would predict higher levels of child externalizing behaviors, regardless of diagnostic status. Extensive research has documented that children with insecure or disorganized attachment are at a higher risk for developing externalizing behavior problems when compared to their securely attached peers (Green & Goldwyn, 2002).

Hypothesis 4

The relation between developmental status (ASD vs. TD) and externalizing behaviors will vary at levels of attachment. Specifically, it is hypothesized that when parents report low levels of attachment, there will be a stronger relation between status and externalizing behaviors. However, at higher levels of attachment the relation between diagnostic status and externalizing behaviors will be weaker. As such, attachment will buffer the relation between diagnostic status and externalizing behaviors. Presently, little research has examined the relation between attachment and externalizing behaviors in children with ASD despite numerous longitudinal and cross-sectional studies asserting that attachment predicts childhood externalizing behaviors in both TD and clinical populations (e.g., Green and Goldwyn, 2002).

ATTACHMENT AS A PROTECTIVE FACTOR

Figure 1. Proposed moderation model of the effects of attachment on the relation between

diagnostic status and child externalizing behaviors.
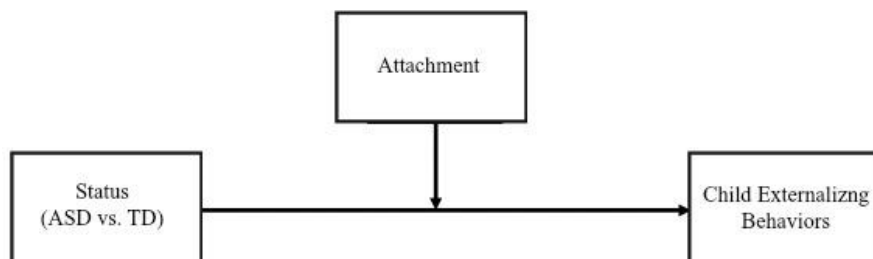
CHAPTER II

Method

Participants

This study was conducted as a part of a larger ongoing research project which examines self-regulation in young children with ASD and those who are TD. To be eligible for the study, participants were required to: (a) be between age range of 3.0 years to 6.11, (b) have sufficient receptive and expressive language skills as measured by a score of 85 or higher on the Differential Abilities Scales- Version II (DAS-II; Elliot, 2007) as well as the ability to follow short oral directions, (c) confirm diagnosis of ASD via a medical release form, if not a TD participant, and (d) score lower than 15 the Social Communication Questionnaire –Current Form (SCQ; Rutter, Bailey, & Lord, 2003) to avoid TD participants who exhibit high levels of behaviors characteristic of ASD. The sample consisted of 7 children with ASD and 10 children with TD between the ages of 3 years 3 months and 6 years 11 months (*Mean* age = 61.53 months, *SD* = 16.28 months).

Demographic information is presented in Table 1. The current sample included predominantly well-educated and upper middle-class families with the majority of parent participants being mothers (70.6%). Fifteen parent guardians (98.2%) identified as married or having a domestic partner and two caregivers (11.8%) identified as having never been married or being single. Parental level of education was reported as follows: 17.6% some college coursework, 29.4% bachelor's degree, 47.1% master's degree, and 5.9% professional degree beyond master's degree. Annual household income ranged from $32,480 to $300,000 with an average of $143,499 (SD = $90,317). There were no significant group differences on family demographic variables or for parent gender, Fisher's Exact test, *p* = .338, annual household

income, $t(56) = 1.45$, p = .154, parent relationship status, Fisher's Exact test, $p = .485$, or parent

education, Fisher's Exact test, $p = .196$.

Table 1
Demographic Characteristics by Group

Variable	ASD (N=7)	TD (N=10)	*Statistic(df)*	*Effect Size*
Child Variables				
Gender N (%)			$\chi^2(1)=0.08$	$\Phi = .07$
Female	42.9%	50.0%		
Male	57.1%	50.0%		
Mean age in months (*SD*) [range]	66.71 (12.46) [48.00-82.00]	57.90 (18.23) [39.00-83.00]	$t(15)=-1.11$	$d = .56$
Average Verbal Ability (*SD*) [range]	101.86 (18.78) [77.00-136.00]	111.90 (16.21) [79.00-140.00]	$t(15)=1.18$	$d = 5.12$
Ethnicity, N (%)			$\chi^2(4)=3.74$	$V = .23$
White/Caucasian	57.1%	70.0%		
African American	0.0%	10.0%		
Hispanic/Latino	14.3%	0.0%		
Native American/Alaskan Native	0.0%	0.0%		
Asian American/Pacific Islander	14.3%	20.0%		
Multiethnic	14.3%	0.0%		
Family Variables				
Parent Gender, N (%)			$\chi^2(1)=1.31$	$\Phi = .28$
Female	85.7%	60.0%		
Male	14.3%	40.0%		
Marital Status, N (% married)	100.0%	80.0%	$\chi^2(1)=1.59$	$\Phi = .30$
Parent Education, N (%)			$\chi^2(3)=1.55$	$V = .15$
High School	0.0%	0.0%		
Some college	14.3%	20.0%		
Bachelor's degree	42.9%	20.0%		
Some master's	0.0%	0.0%		
Master's degree	42.9%	50.0%		
Some professional	0.0%	0.0%		
Professional degree	0.0%	10.0%		
Average annual income (*SD*)	$140,400 ($103,850)	$145,048 ($88,813)		

Note. $N = 17$. Verbal ability = Verbal Reasoning Cluster Standard Score from DAS-II. *$p < .05$, **$p < 0.1$

ATTACHMENT AS A PROTECTIVE FACTOR

Procedure

Recruitment

Participants were recruited locally throughout a moderately large city in the US utilizing multiple methods. The majority of participants were recruited through schools, autism treatment clinics, autism-focused events, and posting boards. Additionally, graduate and undergraduate members of the research team often set up information tables at various events to offer families informational flyers about the study, which included a QR barcode offering more information about the study as well as contact information. Undergraduate research assistants also posted pull-tab flyers at public spaces throughout the greater Seattle area. Finally, the research team paid for advertisement space on a popular social media platform. If parents indicated that they would like to take part in the study, research assistants called or emailed the parents (depending on their preferred mode of communication) to explain the study in more detail, answer any questions, and schedule the enrollment visit. Participating families received $50 in cash and a $5 coffee card for their participation in the study. Data collection occurred across two sessions, the enrollment visit and university visit.

Enrollment visit

The first part of the study was the enrollment visit, led by a graduate student assessor with the assistance of an undergraduate researcher. This visit is, on average, about 60-90 minutes and was conducted in the family's home, a local library, or at the university (depending on the family's preference). If the participant had ASD, parents were also asked to sign a medical release of information to obtain a confirmation of diagnosis. To determine if the child reached the criteria to continue in the study, the child's verbal ability was tested via the DAS-II (Elliot, 2007), a verbal score of 85 or higher was required to continue in the study.

If the child was deemed eligible for the study, parents were asked to complete various questionnaires. Questionnaires specific to this dissertation include a family demographics form, the Behavioral Assessment System for Children, Second Edition, Parent Rating Scales (BASC-2; Reynolds & Kamphaus, 2004), and the BASC-3 Parent Relationship Questionnaire (BASC-3 PRQ; Kamphaus & Reynolds, 2015). Parents also completed the SCQ (Rutter et al., 2003) to corroborate ASD symptoms with clinical diagnosis and to screen for ASD symptomatology in TD children. Children with TD scored 15 or below to qualify for the study.

University visit

Children and their parents also participated in the 120-180 minute university visit at the developmental research lab. This second visit consists of a battery of self-regulation, theory of mind, emotion knowledge, and parent-child interaction tasks relevant to the larger study. For completing the research procedures, parents receive a $50 and a $5 coffee card and children receive a small toy worth approximately $5 and behavioral rewards throughout the visit (i.e., stickers). No data relevant to this dissertation were collected during this visit.

Measures

Demographic information

Parents completed demographic information via questionnaire as part of the larger study. Within this questionnaire, parents were asked to indicate family income, education, and marital status as well as child demographic variables such as gender, ethnicity, and date of birth. Family demographic information were collected as potential control variables.

Diagnostic status

For participants with ASD, diagnostic status was confirmed by obtaining a medical release of information in order to obtain records directly from the diagnosing provider. In

ATTACHMENT AS A PROTECTIVE FACTOR

addition to diagnostic records, ASD symptomology was screened via the SCQ (Rutter et al.,

2003). This parent-report 40-item questionnaire assesses for the three specific domains of ASD:

communication, social interaction, and restricted, repetitive, and stereotyped patterns. This

measure has been validated for use with children ages 3 to 5 (Allen, Silove, Williams, &

Hutchins, 2007). Items are scored as a 1 or 0 based on the forced choice format of "yes" or "no"

and takes approximately 10 minutes to complete. The SCQ is considered psychometrically sound

with internal reliability coefficients ranging from .84 to .93 (Rutter et al., 2003) and a

discriminant validity of .088, when differentiating from other disorders. Additionally, the SCQ's

sensitivity is 85% and specificity is 75% (Berument, Rutter, Lord, Pickles, & Bailey, 1999).

Verbal ability

The Verbal Cluster within the Early Years core battery of the Differential Ability Scale –

Version II (DAS –II) was used as a measure of children's verbal language abilities (Elliott,

2007). The DAS-II is a measure of cognitive abilities in children ages 2:6 to 17:11. The Verbal

Cluster of the DAS-II is comprised of two subtests: Verbal Comprehension and Naming

Vocabulary which were used to assess children's expressive and receptive language abilities.

The two subtests of the Verbal Cluster contain 42 and 34 items respectively. The internal

reliability for the Verbal Cluster was acceptable with coefficients ranging from .86 to .93 for

ages 3:0 to 6:11 (Elliot, 2007). The test-retest reliability coefficients of the Verbal Cluster were

also high at .90 for ages 3:6 to 4:11 and .89 for ages 5:0 to 9:11 (Elliot, 2007).

Attachment

Attachment was measured using the Behavioral Assessment System for Children, Third

Edition, Parenting Relationship Questionnaire, Preschool and Child/Adolescent Versions

(BASC-3 PRQ; Kamphaus & Reynolds, 2015). It is important to note that the BASC-3 PRQ

does not assign an attachment style, as is common in the literature, but instead looks at parent-reported levels of closeness, empathy, and understanding within the parent-child dyad. However, Kamphaus and colleagues (2015) stated within the BASC-3 PRQ manual that a low attachment score may indicate an insecure attachment, as perceived by the parent or caregiver. However, further investigation, such as a parent interview is needed to confirm attachment style.

The BASC-3 PRQ is an 87 item self-report assessment of parents' perceptions of the quality of the parent-child relationship normed by a sample of parents with same-age youth. The questionnaire has seven subscales: attachment, communication, discipline practices, involvement, parenting confidence, satisfaction with school, and relational frustration. For the purposes of this study, the attachment scale was the only subscale used. The attachment subscale has 15 items in total. Personal pilot testing revealed that the attachment subscale took about 3.5 minutes to complete ($n = 3$). Parents were presented with statements that require a response of: never, sometimes, often, and almost always. Sample statements include: "I know when my child wants to be left alone" and "I know how my child will react in most situations". The BASC-3 PRQ also assesses the parent-child relationship across a variety of ages. The questionnaire was found to be psychometrically sound, including validity, sound internal consistency, test-retest reliability, scale inter-correlations, correlations with other parent-child relationship measures, correlations with child behavior measures, correlations between male-rater and female-rater ratings, and score profiles in populations of children identified with learning or behavior problems (Kamphaus, & Reynolds, 2015).

Externalizing behaviors

Child externalizing behaviors was measured using the Behavioral Assessment System for Children, Second Edition, Preschool and Elementary Versions, Parent Rating Scales (BASC-2;

Reynolds & Kamphaus, 2004). The BASC-2 is designed to categorize disorders related to emotions and behaviors. Parents report on adaptive and problem behaviors in preschool children aged 2:0-5:11 and elementary school children aged 6:0-11:11. The preschool parent report form contains 134 items and the elementary school version contains 160 items. Both questionnaires have a 4-point Likert scale where the parent endorses responses of 1 (*never*), 2 (*sometimes*), 3 (*often*), 4 *(almost always)*. Each questionnaire takes approximately 10-20 minutes to administer. Tests of internal consistency yielded .80 to .84 for the Parent Rating Scale across ages 2 to 7.

CHAPTER III:

Results

Power Analysis

An a priori power analysis was conducted using statistical calculator software, G*Power

(Faul, Erdfelder, Lang, & Buchner, 2007) to determine the appropriate number of participants

needed to have adequate power for the current analyses. No covariates were detected, therefore

using the standard parameters of 80% power with alpha = .05, the power analysis indicated for

two predictors (Hypotheses #3 and #4) to detect a medium effect size (Cohen's F2 of .15) would

require a minimum of 55 participants. Due to the impacts of COVID-19, data collection was

stopped to best practice social distancing. As a result, the sample size of the current study ($N =$

17) is underpowered to find statistical significance.

Data Entry

Data were entered and analyzed using the Statistical Package for the Social Sciences

(SPSS) Version 26 software. In terms of parent variables, parent income level was entered as a

continuous variable and parent education level and marital status were entered as categorical

variables. Child participant's age in months and verbal ability were entered as continuous values.

Child participant's gender and ethnicity were entered as categorical variables. Diagnostic status

was dummy coded (0 = typically developing and 1 = ASD). Parents completed the BASC-3 PRQ

(Kamphaus & Reynolds, 2015) as a report for parent-child attachment. Standardized *T*-scores

were entered for the Total Attachment Composite. Parents also completed the BASC-2

(Reynolds & Hamphaus, 2004) as a report for child externalizing behaviors. Standardized *T*-

scores were entered for the Externalizing Behaviors composite. In order to prepare the data for

ATTACHMENT AS A PROTECTIVE FACTOR

the moderation analysis, an interaction term was created by multiplying the dummy coded

independent variable (diagnostic status) with the moderator variable (attachment).

Data Screening Prior to Analysis

Data were screened for missing data and outliers and examined for parametric multiple

regression assumptions prior to analyses. The only missing data were for parental income with

two participants (11.7%) not providing a response. Prior to analyses, continuous variables were

examined to test the assumptions for analyses utilizing multiple linear regression. Kolmogorav-

Smirnov test (K-S test) was conducted to examine normal distribution of study variables.

Skewness and kutosis values and z-scores were then examined to provide further information

regarding distribution with estimates ≥ 1.96 considered significant (Field, 2009). These results

are presented in Table 2.

Table 2
Normality of Continuous Variables

Variable	K-S Test of Normality			Kurtosis		Skewness	
	D	*df*	*P*	kurtosis	*z*	skewness	*z*
Attachment	*0.13*	*17*	*.200*	-0.23	*-0.21*	-0.39	*-0.71*
Externalizing Behaviors	*0.23*	*17*	*.016*	1.42	*1.34*	1.17	2.14

Note. N = 17. Attachment = parent report from BASC-3 PRQ; Externalizing Behaviors = parent report BASC-2

Levene's Test for equality of variances was utilized to investigate homoscedasticity

among variables. As seen in Table 3, Levene's test yielded significant values for externalizing

problems, indicating that the variances between parent reports for this variable were significantly

different.

Table 3
Homogeneity of Variance in Continuous Variables

Variable	Levene Statistic
Chronological age	3.60
Verbal ability	0.27
Annual Salary	0.11
Externalizing Problems Composite	**9.88****
Attachment Composite	0.12

Note. N = 17. Verbal ability = Verbal Reasoning Cluster Score from DAS-II; Attachment = parent report from BASC-3 PRQ; Externalizing Behaviors = parent report BASC-2; **p<.05, **p<.01,*

Data were also screened for multicollinearity by examining correlations between study variables as presented in Table 4. Following recommendations of Field (2009) correlations exceeding *r* = .80 where considered highly correlated. No multicollinearity was observed as all correlations were less than *r* = .60.

Table 4
Correlations for Study Variables

Variable	1	2	3	4	5	6	7	8
1. Status								
2. Age (months)	.27							
3. Gender	-.07	.30						
4. Verbal ability	-.29	.08	.11					
5. Parent education	-.12	-.11	.24	.19				
6. Parent income	-.02	.08	.22	.34	.53*			
7. Externalizing	.54*	.39	.15	-.18	.06	-.03		
8. Attachment	-.27	-.57*	-.11	.11	.29	.03	-.45	

Note. N = 17. Verbal ability = Verbal Reasoning Cluster Score from DAS-II; Attachment = parent report from BASC-3 PRQ; Externalizing Behaviors = parent report BASC-2; **p<.05, **p<.01*

Descriptive Analyses

Descriptive statistics, including means, standard deviations, t-tests, and effect sizes for all study variables based on group are presented in Table 5. Significant group differences were found for one measure. The ASD group had significantly higher scores on the BASC-2

ATTACHMENT AS A PROTECTIVE FACTOR

externalizing behaviors as compared to the TD group with very large effect sizes of this

difference between groups.

Table 5
Descriptive Statistics for Study Variables by Group

Variable	Means (SD) [Range]				
	Total	TD (n = 10)	ASD (n = 7)	t	d
Verbal ability	107.76 (17.49) [77.00-140.00]	111.90 (16.21) [79.00-140.00]	101.86 (18.78) [77.00-136.00]	1.18	0.57
Externalizing	54.76 (9.58) [39.00-73.00]	50.60 (4.45) [39.00-55.0]	60.71 (12.02) [45.00-73.00]	-2.46*	1.11
Attachment	50.88 (10.71) [30.00-69.00]	53.20 (10.06) [32.00-69.00]	47.57 (11.50) [30.00-65.00]	1.07	0.52

Note. N = 17. Verbal ability = Verbal Reasoning Cluster Score from DAS-II; Attachment = parent report from BASC-3 PRQ; Externalizing Behaviors = parent report BASC-2; *$p < .05$, **$p < .01$

Test of Hypotheses

Hypothesis 1: Diagnostic Status is positively related to child externalizing behaviors

In order to examine the relation between diagnostic status and child externalizing

behaviors, I conducted simple linear regression analyses for the score composite of externalizing

behaviors. Diagnostic status was significantly related to externalizing behaviors, $F(1,15) = 6.04$,

p=.027. As can be seen in Table 6, diagnostic status was a significant predictor of externalizing

behaviors ($\beta = .54$, $p = .049$), accounting for 29% of the variance. Analysis of residual statistics

revealed no outliers (e.g., standardized residuals were within + 3.0 standard deviations) or

influential cases that exerted undue influence over the parameters of the model (Cook's distance

< 1.0).

ATTACHMENT AS A PROTECTIVE FACTOR

Table 6
Hierarchical Regression: Child Externalizing Behaviors Composite Regressed on Diagnostic Status

Variable	B	$SE\ B$	β	R^2	F	ΔR^2	ΔF
Diagnostic Status	10.11	4.11	.54*	.29	6.04	.29	6.04*

Note. $N = 17$. Externalizing Behaviors = parent report BASC-2; *$p < .05$, **$p < .01$

Hypothesis 2: Diagnostic status is negatively related to attachment

I used a similar regression to examine the relation between diagnostic status and attachment. Results revealed that although diagnostic status was inversely related to parent reported attachment ($\beta = -.27$), this relationship did not reach statistical significance, $F(1,15) = 1.15$, $p = .301$ (Table 7).

Table 7
Hierarchical Regression: Attachment Composite Regressed on Diagnostic Status

Variables	B	$SE\ B$	β	R^2	F	ΔR^2	ΔF
Diagnostic Status	-5.63	5.25	-.27	.07	1.15	.07	1.15

Note. $N = 17$. Attachment = parent report from BASC-3 PRQ; *$p < .05$, **$p < .01$

Hypothesis 3: Attachment will negatively predict child externalizing behaviors even after controlling for status

Hierarchical regression was used to examine the relation between attachment and externalizing behavior, while controlling for diagnostic status. After entering diagnostic status in to the first block, attachment was entered in the second block. The overall model was significant, $F(2,14) = 4.63$, $p=.029$, and attachment explained an additional 11% of variance beyond diagnostic status. Further, an inverse relation between attachment and externalizing behaviors was observed, albeit nonsignificant ($\beta = -.35$, $p = .130$) (Table 8).

Table 8

Hierarchical Regression: Child Externalizing Problems Composite Regressed on Attachment After Controlling for Diagnostic Status

Variables	B	SE B	β	R^2	F	ΔR^2	ΔF
Step 1				.24	6.04*		
Diagnostic Status	8.37	4.06	.44*				
Step 2				.31	4.63*	.11	2.58
Attachment	-0.31	0.19	-.35				

Note. *N* = 17. Verbal ability = Verbal Reasoning Cluster Score from DAS-II; Attachment = parent report from BASC-3 PRQ; Externalizing Behaviors = parent report BASC-2; *p < .05, **p < .01

Hypothesis 4: Attachment will moderate the relation between child diagnostic status and child externalizing behaviors

Moderated regression analyses were performed to examine if the relation between attachment and externalizing behaviors was influenced by diagnostic status. The interaction term was not significant, *F*(1,15)=3.00, *p* = .104. The interaction term accounted for 17% of the variance in externalizing behaviors (β = .41, *p* = .104) and suggests no statistically significant moderation (Table 9).

Table 9

Hierarchical Regression: Moderating Effects of Attachment on the Relation Between Diagnostic Status and Child Externalizing Behaviors

Variables	B	SE B	β	R^2	F	ΔR^2	ΔF
Diagnostic Status x Attachment	0.16	0.09	.41	.17	3.00	.17	3.00

Note. *N* = 17. Verbal ability = Verbal Reasoning Cluster Score from DAS-II; Attachment = parent report from BASC-3 PRQ; Externalizing Behaviors = parent report BASC-2; *p < .05, **p < .01
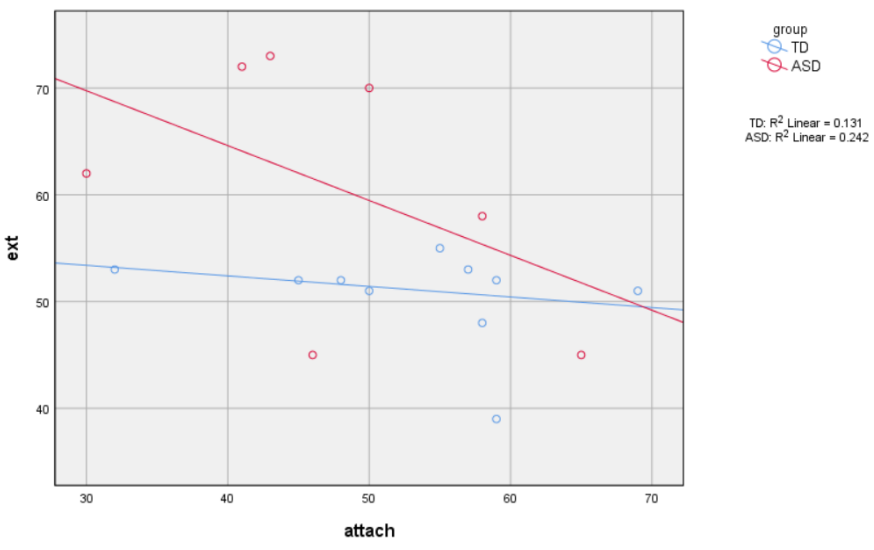
Auxiliary Statistics

Despite the moderation analyses being significantly underpowered, the interaction between attachment and diagnostic status explained 17% of child externalizing problems. To better understand the variance explained by this interaction, further analyses were conducted in

ATTACHMENT AS A PROTECTIVE FACTOR

line with recommendations of Cohen et al. (2003) in which separate regression slopes were

compared, specifically, diagnostic status in the relation between attachment and externalizing

behaviors. As can be seen in Figure 1, among TD children, parent report of externalizing

behavior did not vary by attachment. Conversely, for children with ASD, an inverse relation

between attachment and externalizing was visible.

Figure 2

Plot of attachment X diagnostic status in predicting externalizing behavior

CHAPTER IV:

Discussion

This study investigated the relation between externalizing behaviors and parent-child attachment in 3 to 6-year-old children with and without ASD. This study's primary hypothesis was that attachment would moderate the relation between diagnostic status and child externalizing behaviors. In the following sections, I will discuss results from my analyses, clinical implications, strengths and limitations of this study, and provide suggestions for future research.

Interpretation of Results

Despite the restricted sample size, the hypothesis that diagnostic status would positively predict child externalizing behaviors was supported. Significant group differences were found on externalizing behaviors. Parents of children with ASD reported significantly more child externalizing behaviors than parents of children with TD children. This finding is consistent with previous research indicating that parents of children with ASD reported more child externalizing behaviors when compared to their TD counterparts (Gray, Keating, Taffe, & Brereton, 2012). When interpreting these results, however, it is important to note that this study's sample of ASD children have average to high verbal ability, which is atypical in much of the literature.

While the strength of the correlation between verbal ability and externalizing behavior was not statistically significant, an inverse association was observed and ostensibly would likely have been significant if the current study was sufficiently powered. It is well established that children with ASD often exhibit difficulties with verbal ability and communication (American Psychiatric Association, [DSM-5], 2013). Prior research indicates that children with more

developed verbal abilities have fewer externalizing behaviors (e.g., Matson & Rivet 2008). This study's sample of ASD participants had, as determined by the DAS-II, an average or higher verbal ability, which may have contributed to the non-significant correlation between verbal ability and externalizing behavior in this study. Despite this, it would appear high verbal ability did not contraindicate the relation between diagnostic status and externalizing behaviors indicating a strong link between these two constructs.

The hypothesis that diagnostic status would negatively predict parent-child attachment levels was not supported. This does not coincide with previous research stating that children with ASD often exhibit difficulties in securing attachment with their primary caregivers when compared to their TD counterparts (Rutgers et al., 2004). A potential reason this hypothesis was not supported could be due to the higher than average socioeconomic status (SES) of parent participants within this study. In general, lower SES has been found to exacerbate parenting stress and decrease overall wellbeing (Belsky, 1984). Further, it is well-established within the ASD literature that higher SES serves as a significant protective factor for families, specifically in regard to accessing early intervention services (Matthew et al., 2019). As such, it may be likely that higher SES families have less difficulty gaining access to interventions that may foster the parent-child bond. Also, as previously mentioned, it is important to consider the highly verbal sample of this study. Previous research indicates that the social and communication impairments often observed in individuals with ASD are what likely hinders the child's ability to demonstrate attachment behaviors with their primary caregiver (Volkmar et al., 1987).

The hypothesis that parent-child attachment would predict child externalizing behaviors was supported. Parent reported attachment did not significantly predict child externalizing behaviors, after controlling for diagnostic status, attachment explained 11% unique variance in

children's externalizing behavior. This finding suggests that parents who report higher

attachment levels with their child, in turn, report less child externalizing behaviors. This is

consistent with the overarching literature indicating that children with insecure or disorganized

attachment are at a higher risk for developing externalizing behavior problems when compared

to their securely attached peers (see Green & Goldwyn, 2002).

Parent-child attachment was examined as a potential moderator of the relation between

diagnostic status and child externalizing behaviors. It is well established within the literature that

TD children with insecure or disorganized attachment are at a higher risk for developing

externalizing behavior problems when compared to their securely attached peers (Green &

Goldwyn, 2002). Children with ASD exhibit elevated levels of externalizing problems when

compared to their TD peers (Mahan & Matson, 2011) which causes significant parental stress

(Lecavalier et al., 2006). Given this, I believed that parent-child attachment would serve as a

buffer between diagnostic status and externalizing behaviors (Teague, Gray, Tonge, & Newman,

2017).

Although statistical support for the hypothesized moderation model was not found, there

was a clear difference between TD and ASD participants as indicated by the effect size $(R^2 =$

.17). In other words, with a larger sample size a statistically significant moderation would have

potentially been detected. These trends can be seen in Figure 2. There appears to be an inverse

relation between attachment and externalizing behaviors for the current highly verbal ASD

group, as opposed to the TD group for whom little to no relation was observed. While this model

was not significant in the currently underpowered study, there are still clinical implications to be

made.

ATTACHMENT AS A PROTECTIVE FACTOR

Clinical Implications

The results of this study have several important clinical implications for families with TD

children and children with ASD. This study's moderation results and corresponding figure

suggest the relation between parent-child attachment and externalizing behaviors is more evident

among ASD participants. Therefore, children with high levels of externalizing behaviors,

particularly those with ASD, could benefit from interventions aimed at strengthening attachment

within the parent-child dyad. As previously mentioned, research indicates that children with

insecure or disorganized attachment are at a higher risk for developing externalizing behavior

problems when compared to their securely attached peers (Green & Goldwyn, 2002). These

well-established findings translate well to ASD populations as evidenced by a recent clinical trial

by Siller and colleagues (2014) who found that an attachment-based intervention (focused

playtime therapy; FPI) resulted in a significant decrease in child behavioral problems, increased

parental competence, and increased sensitivity within the parent-child relationship in families

parenting a child with ASD.

The study's results also suggested that parent-reported externalizing behaviors were more

prominent in the ASD group versus the TD group. It is well documented that children with ASD

exhibit elevated levels of externalizing problems when compared to both their TD peers (Mahan

& Matson, 2011) which causes significant parental stress (Lecavalier et al., 2006). Therefore, it

is important to continue to examine these potentially buffering effects of attachment specifically

on families with a child with ASD. While the moderation model in this study was not significant,

trends in the data highlight the importance of parent-mediated interventions aimed at enhancing

attachment-related behaviors within the parent-child dyad, particularly for children who exhibit

high levels of externalizing behaviors. More research in this area is sorely needed to better inform future interventions for families.

Strengths and Limitations

There are strengths in this study that ought to be highlighted. First, this study examined a specific group of children with ASD with average to high verbal ability. To be eligible for this study, participants had to score an 85 or higher on the DAS-II. As such, this study contributes to the distinct lack of literature examining the ASD population with average to high verbal abilities. Further, this study attempted to close a science-to-service gap that continues to exist regarding autism and attachment despite ample research indicating attachment as a potential protective factor in this population. In terms of a methodological strengths of this study, it is important to mention the important inclusion of the TD control sample and measures that are validated and psychometrically sound.

It is critical to discuss the limitations of this study, particularly in its methodology. First, and foremost, this study was significantly underpowered. As mentioned previously, the power analysis indicated a minimum of 55 participants needed to detect moderation. Due to the impact of COVID-19, this study had a total of 17 participants. The small sample size of this study likely impacted my ability to find significant moderating effects of parent-child attachment. Also, this study utilized parent self-report measures to capture externalizing behaviors and attachment opening the possibility for rater-bias or halo effects. Furthermore, the findings in this study cannot be considered generalizable to the rest of the population as participants were primarily Caucasian, married, and upper-middle class. Also, as previously mentioned, the ASD sample in this study was comprised of participants with average to high verbal abilities. Lastly, because a cross-sectional design was used, we cannot infer causal relations between study variables.

ATTACHMENT AS A PROTECTIVE FACTOR

Future Research

Given the important clinical implications of this study and the science-to-service gap previously mentioned, future research should continue to investigate the potential buffering impacts of parent-child attachment on child externalizing behaviors in children with ASD. Specifically, these studies should include a larger sample size and utilize a longitudinal research design to better draw casual conclusions regarding relations between the constructs. These studies should also include greater heterogeneity in age, ethnicity, verbal abilities, and socio-economics status to better generalize results to the general population. Also, including variability in ASD symptom severity may allow for more targeted interventions in the future. Further, potential measures of attachment should be more robust and complex than the current measure. Within the attachment research literature, utilization and subsequent coding of the strange situation procedure (Ainsworth, Blehar, Waters, & Walls, 1978) is the most well-established method to measure child attachment. Future studies should utilize this procedure along with parent reports from the BASC-2 PRQ.

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