ASSOCIATIONS BETWEEN DETERMINANTS OF PARENTING AND CHILD EXTERNALIZING BEHAVIORS IN FAMILIES OF CHILDREN WITH AUTISM: THE MEDIATING ROLE OF PARENTING BEHAVIORS

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Associations between Determinants of Parenting and Child Externalizing Behaviors in Families of Children with Autism: The Mediating Role of Parenting Behaviors

Autism spectrum disorder (ASD) is a developmental disorder with core deficits in social communication and interactions (SC/I), in addition to the presence of restrictive repetitive behaviors (RRBs; American Psychological Association, 2013). Children with ASD have a wide range of symptoms and severity, ranging from lower to higher levels of functioning. Intelligence quotient (IQ) and adaptive behaviors are often used as markers to determine severity and level of functioning (Baio et al., 2018), with low functioning classified as having co-occurring intellectual disability (i.e., IQ ≤ 70) and high functioning classified as having an average to above-average IQ (i.e. IQ > 85). Current prevalence rates estimate that one in 59 children have a diagnosis of ASD (Baio et al., 2018), with males being four times as likely to receive a diagnosis compared to females (Cawthorpe, 2017).

While SC/I and RRBs are the core characteristics of ASD, many children often display additional symptoms or co-occurring conditions, such as seizures, psychiatric disorders, and mood disorders (e.g., Doshi-Velez et al., 2014). Further, children and adolescents with ASD may engage in externalizing behaviors, such as defiance, impulsivity, hyperactivity, and aggression (e.g., Maljaars et al., 2013; Zaidman-Zait et al., 2014). An estimated one-third of young children with ASD display these behaviors (Bauminger, Solomon, & Rogers, 2010; Hartley et al., 2008), which negatively impact their adaptive functioning (Yerys et al., 2009), family functioning (Baker et al., 2011), and leads to poor mental health outcomes for parents (Blacher & Baker, 2019). Understanding factors that impact these behaviors in children with ASD is essential in order to develop interventions that could improve outcomes for children and their families.

Prior research has suggested child externalizing behaviors may be directly affected by factors at the child-, parent-, and family-level (e.g. Benson et al., 2008; Webster-Stratton & Hammond, 1999). Further, Belsky (1984) proposed the determinants of parenting process model, suggesting that child-, parent-, and family-level factors affect the quality of parenting. Research of neurotypical (NT) children has shown that parenting quality can, in turn, have a significant impact on levels of child externalizing behaviors (e.g., Holtrop et al., 2015; Reitz et al., 2006). Therefore, the goal of the current study was to examine the extent to which parenting behaviors mediated associations between child-, parent-, and family-level factors and externalizing behaviors in children and adolescents with high-functioning ASD.

Externalizing Behaviors and Autism Spectrum Disorder

Externalizing behaviors are defined as expressions of underregulated behaviors and emotions, defiance, inattention, disruptiveness, anger, non-compliance, and hostility (Hinshaw, 1992; Liu, 2004; Mullin & Hinshaw, 2007; Sikora et al., 2013). These are commonly expressed in three primary behaviors: 1) hyperactivity or impulsivity, 2) aggression and anti-social behaviors, and 3) conduct disorders. First, hyperactivity and impulsivity behaviors are often diagnosed as attention-deficit hyperactive disorder (ADHD), which is one of the most common co-occurring disorders, with approximately 63% of children with ASD also having an ADHD diagnosis (Avni et al., 2018). The presence of ADHD and ASD together may lead to higher rates of attention problems and hyperactivity compared to those children with only ASD (Yerys et al., 2009). Yerys and colleagues (2009) found that when children with ASD displayed ADHD symptoms, impairments to executive control and adaptive behaviors were higher. Additionally, the presence of ADHD symptoms predicted more severe ASD symptoms and externalizing behaviors. In NT populations, hyperactivity and impulsivity is associated with academic

underachievement (Hinshaw, 1992), peer rejection (Mullins & Hinshaw, 2007), and family dysfunction (Henderson et al., 2006).

Aggression and anti-social behaviors are displayed through rule breaking, irritability, defiance, and hostile behaviors (e.g. Kanne & Mazurek, 2010; Mullins & Hinshaw, 2007; Zaidman-Zait et al., 2014). Children with ASD may display these behaviors through non-compliance with non-preferred activities, tantrums, escape behaviors, and property destruction (Mahan & Matson, 2011; Sikora et al., 2013). Kanne and Mazurek (2010) examined the prevalence rates of various forms of aggression in children with ASD and found 68% had acted aggressively toward a caregiver. While externalizing behaviors are common when the child was younger, research indicates that 56% of adolescents with ASD display aggressive behaviors towards caregivers (Kanne & Mazurek, 2010). Aggressive behaviors indicate a five times higher risk of psychiatric hospitalization for children with ASD than those who are not aggressive (Mandell, 2008).

Disruptive behavior disorders (DBD) are categorized as more severe anti-social behaviors, such as assault, violent behaviors, oppositional defiance disorder (ODD), and conduct disorders (CD) (Burke et al., 2002; Hinshaw, 1992; Mullins & Hinshaw, 2007). In the NT population, children with DBDs often struggle with academic performance and behavioral inhibition (Burke et al., 2002), which lead to rejection by their peers and involvement in delinquent activities (e.g., underage smoking and drinking). ODD (a DBD in which social functioning is impaired due to a pattern of irritability, argumentativeness, and vindictiveness) and CD (a DBD characterized by violations of major age-appropriate social norms, such as destruction of property, aggression, and theft; Center for Behavioral Health Statistics and Quality, 2016) are among the common co-occurring disorders in children with ASD with about

one in four children with ASD receiving an additional diagnosis of ODD or CD (Kaat & Lecavalier, 2013). Mattila and colleagues (2010) found significant functional impairment in children with ASD who received additional psychiatric diagnoses (including ODD), with the more co-occurring diagnoses predicting lower levels of functioning. For example, Gadow and colleagues (2008) found the combination of ODD and ADHD diagnoses in children with ASD had more severe presentation of symptom that required greater use of psychotropic medication treatments. Furthermore, the presence of DBDs and associated anti-social behaviors (e.g., physical and verbal aggression) are associated with negative impacts on the family, specifically increased parental stress and reduced family functioning (Lecavalier et al., 2006; Storch et al., 2012).

It is particularly important to examine predictors of externalizing problems in children with ASD, as these children are more likely to engage in externalizing behaviors compared to their NT peers (e.g. Bauminger et al., 2010; Hartley et al., 2008). Mahan and Matson (2011) found children with ASD scored higher on all measures of externalizing behavior (e.g., hyperactivity, conduct problems, and attention problems) and lower on measures of adaptive skills (e.g., functional communication and daily living skills) than NT children. Therefore, the presence of externalizing behaviors negatively impacts the ability of children with ASD to function throughout their daily lives and understanding the factors that exacerbate these behaviors may be particularly important for the development of intervention programs.

Predictors of Externalizing Problems in Children with ASD

Prior studies of families of NT children have examined the predictors of externalizing problems at several levels including the child, parent, and family (e.g. Benson et al., 2008; Webster-Stratton & Hammond, 1999), but research with families of children with ASD is sparse.

While understanding how each level of predictors individually affects the child is important, few studies have examined all three factors within the same model (e.g. Boonen et al., 2014). By examining child-, parent-, and family-level predictors together, researchers may be able to better identify which factors have a greater direct impact in predicting externalizing behaviors in children with ASD. Thus, future researchers may be able to target interventions to more specifically address the needs of the child and their families.

Child-Level Predictors

Child age and verbal ability have been identified as child-level factors directly associated with externalizing problems. With respect to age, the research is mixed as to whether it significantly predicts externalizing behaviors. Some researchers have found preschoolers with ASD often display more externalizing behaviors than older children (Zaidman-Zait et al., 2014), but these differences may be due to level of functioning (e.g., IQ, symptom severity), age at diagnosis, and treatment interventions. In middle childhood, Boonen and colleagues (2014) found no association between age and externalizing behaviors. Conversely, in older adolescents and adult children with ASD, Shattuck and colleagues (2007) examined the stability of ASD symptoms and maladaptive behaviors, including externalizing behaviors, over a period of 4.5 years. Result indicated that while symptoms and behaviors were generally stable over time, as individuals with ASD age, they reported fewer maladaptive behaviors and more overall improvement.

Receptive language ability, or language comprehension, predicts the level of externalizing behaviors in children with ASD (Bauminger et al., 2010). Children with higher receptive language ability engaged in more maladaptive behaviors. This contrasts with NT children, where greater externalizing behaviors are seen in children with lower receptive

language abilities. Bauminger and colleagues (2010) suggested that greater verbal ability in children with ASD is associated with higher levels of extraversion and sociability rather than the ability to display appropriate social functioning and adaptive behaviors. Pragmatic language, such as initiating and taking turns during conversations, also predicted higher rates of externalizing behaviors as children with ASD had more difficulty communicating their needs; thus, they display externalizing behaviors in order to receive the assistance they need (Boonen et al., 2014).

Parent-Level Predictors

In addition to child characteristics, there are aspects of the child's environment which may impact levels of externalizing behaviors. According to the Bioecological Systems Theory (Bronfenbrenner, 1979; 2005), the microsystem exerts a direct influence on children's development. The microsystem can include members of the child's immediate family (e.g., mother, father, siblings), peers, and classmates. There is a robust body of literature in families of NT children highlighting the importance of parent characteristics in predicting children's externalizing behaviors (e.g. Clark et al., 2018; Gartstein & Fagot, 2003; Seymour et al., 2013). In general, NT children whose parents display high levels of psychopathology (e.g., higher levels of anxiety or depression) are more likely to engage in externalizing behaviors (see McKee et al., 2008 for a review). For example, mothers and fathers with higher levels of depression reported higher levels of externalizing behaviors in NT preschoolers (Gartstein & Fagot, 2003), but in older NT children, only mothers' depression was predictive of child externalizing behaviors (Clark et al., 2018). Further, when examining the associations over time, chronic maternal depression may have a greater impact on child externalizing behaviors (e.g., Giles et al., 2011; Turney, 2012) compared to intermittent depressive episodes (Giles et al., 2011).

While the exact mechanism for intergenerational transmission of emotional and self-regulation is unknown, researchers have suggested a few mechanisms may contribute, including gene-environment interactions and parental fatigue. Clark and colleagues (2018) found the amount of genetic variance that explained the relationship between mother's depressive symptoms and NT children's externalizing behaviors increased at higher levels of depressive symptoms. However, when examining environmental factors, higher levels of maternal depression predicted a decrease in child externalizing behaviors. This suggests that genetic components of emotional regulation (i.e., depression, anxiety, or aggression) may put children at a higher risk for engaging in externalizing behaviors (Clark et al., 2018). Seymour and colleagues (2013) examined the relationship between parental stress and child externalizing behaviors mediated by parental fatigue. Their results indicated that when children with ASD engage in higher rates of externalizing behaviors, parents become fatigued and are more likely to use less effective coping strategies that increase their stress. However, few studies have examined these mechanisms longitudinally and future research needs to be conducted in order to determine the mechanisms behind this relationship.

Parents of children with ASD face unique challenges associated with their child's disability, including coping with their child's diagnosis (Oswald et al., 2017), lack of social support (Lu et al., 2018), financial difficulties related to the high cost of interventions (Horlin et al., 2014), and struggles with the school systems providing adequate accommodations for their child (Stoner & Angell, 2006). As a result, these parents report higher levels of stress (e.g. Benson, 2006; Teehee et al., 2008), and increased depression and anxiety (e.g. Hastings et al., 2005; Hastings and Brown, 2002), when compared to parents of NT children and parents of children with other disabilities (e.g. Baker-Ericzen et al., 2005; Lai et al., 2015). Much of this

research concentrates on mothers, as they are typically the primary caregiver; however, there is some research to suggest fathers also experience increased stress and mental health problems (e.g. Davis & Carter, 2008; Pisula & Porebowicz-Dorsmann, 2017). While fathers of children with ASD have reported negative mental health outcomes, mothers' stress and depression levels are often still significantly higher than fathers' (Davis & Carter, 2008; Falk et al., 2014). Hastings (2003) suggested that mothers have worse mental health outcomes as they spend more time in a caregiving role compared to fathers and, therefore, are more likely to be negatively affected by their child's symptoms severity and externalizing behaviors.

Several studies have examined the bidirectional relationship between parent mental health and child externalizing behaviors in families of children with ASD. Research has indicated that externalizing behaviors of children with ASD negatively impact parents' mental health outcomes and are associated with higher rates of maternal depression and stress (e.g. Blacher & Baker, 2019; Zaidman-Zait et al., 2014). Yet, Dieleman and colleagues (2016) examined the bidirectional relationship of parent mental health and child externalizing behaviors longitudinally. Child externalizing behaviors were measured at baseline to determine their relationship with parenting behaviors six years later. Researchers followed up again three years later to measure child externalizing behaviors. Results indicate child externalizing behaviors at Time 1 predicted negative parenting at Time 2 and lead to increased externalizing behaviors at Time 3. However, when parents engaged in positive parenting behaviors at Time 2, children displayed fewer externalizing behaviors at Time 3. A similar longitudinal study by Neece and colleagues (2016) support these findings, suggesting that the two variables are tied together, declining or increasing together over time. Unfortunately, most studies in this area focus on how

children impact parent mental health and further research is needed to examine parent-driven models.

A child's microsystem also consists of interactions between family members (e.g., parent-parent). In NT families, studies have consistently shown that the quality of the interparental relationship is a salient predictor of children's outcomes (e.g. Katz & Gottman, 1993; Zimet & Jacob, 2001). Lower levels of relationship satisfaction and higher rates of interparental conflict are associated with increased externalizing problems in NT children (O'brien et al., 1997).

The Emotional Security Theory (Davies & Cummings, 1994) states that increased interparental conflict impacts children's sense of security within their home, which, in turn, predicts more maladaptive child outcomes. Children exposed to higher rates of interparental conflict become more emotionally reactive, develop ineffective coping mechanisms, and develop negative internal representations of themselves and their families, all of which increase the child's vulnerability to psychopathology (Davies & Cummings, 1994; Davies & Martin, 2013). Compared to families of NT children, families of children with ASD report higher levels of interparental conflict children (Hartley et al., 2017) and lower levels of relationship satisfaction (e.g. Brobst et al., 2009; Gau et al., 2011; Goetz et al., 2019). Further, mothers of children with ASD display more dissatisfaction with their relationships compared to their partners (Gau et al., 2011), which may be associated with their role as the primary caregiver (Higgins et al., 2005). While exposure to marital conflict predicted higher levels of NT child externalizing behaviors (Gartstein & Fagot, 2003; Jenkins et al., 2005) and decreased social functioning (McCoy et al., 2013), there is a significant gap in the literature examining the impact of interparental conflict on outcomes for children with ASD. Preliminary results from an exploratory pilot study (Ekas &

Kouros, under review) suggests children with ASD displayed increased negative emotionality and higher physical reactivity when exposed to marital conflict. As results from the NT literature indicates children face negative outcomes as a result of decreased marital satisfaction and increased interparental conflict, further research is needed to determine how these factors may impact children with ASD.

Family-Level Predictors

According to the McMaster Model of Family Functioning (Epstein et al., 1978), family functioning is a spectrum where the interactions between each member of the family unit are rated on how well the family participates in various dimensions, such as affective responsiveness and involvement, effective interpersonal communication, and appropriate problem behaviors. In NT families, reduced family functioning was a risk factor for higher rates of child externalizing behaviors (e.g. Henderson et al., 2006; Resnick et al., 1997); however, Francisco and colleagues (2016) found children used more appropriate mechanisms to cope with stressors. Given the aforementioned challenges that families of children with ASD encounter, the quality of family-level interactions is also impaired, as families display decreased levels of family cohesion (i.e., warmth and connection) and adaptability (i.e., the ability to change and be flexible) compared to families of NT children (e.g. Higgins et al., 2005; Gau et al., 2011; Rao & Beidel, 2009). Sikora et al. (2013) also found a significant association between family functioning and child externalizing behaviors in families of children with ASD. Results of that study indicated that parents of children with high child externalizing behaviors often reported higher levels of negative feelings about parenting, negative impacts on the marriage and siblings, and poor social relationships. Researchers suggested that since parents of children with high externalizing

behaviors were on constant alert to assist with deescalating a behavior, family functioning domains were negatively impacted.

Lower family functioning is associated with negative outcomes for the child with ASD, such as higher rates of anxiety and depression (Kelly et al., 2008) and child externalizing behaviors (Baker et al., 2011). Baker and colleagues (2011) found that while child externalizing behaviors were generally stable over time, higher family adaptability (i.e., the family's ability to make adjustments) significantly predicted lower child externalizing behaviors over a period of three years. However, there is a significant gap in the literature exploring the impact family functioning has on child externalizing behaviors, as most studies examine how children with ASD impact family functioning or parenting outcomes (e.g. Bearss et al., 2015; Pisula & Porebowicz-Dorsmann, 2017).

Parenting Children with ASD

While research has shown that child-, parent-, and family-level factors are directly related to externalizing behaviors in children with ASD, it is possible that parenting quality may serve as mediator to help explain why these relationships occur. According to Belsky (1984), a parent's ability to appropriately respond to their child's developmental needs are influenced by the same set of factors that influence children's outcomes, namely child-, parent-, and family-level factors. These determinants of parenting may serve as buffer for the parenting system, with each factor serving an instrumental role in predicting how well parents can adequately and sensitively meet their child's needs. Parents, in turn, serve as models of self-regulation for their children and how they react and respond shapes their child's emotional, social, and behavioral development (Zaidman-Zait et al., 2014).

There is a long history of research examining determinants of parenting and how parenting, in turn, affects child outcomes in NT families. For example, child age plays a significant role in how parents interact and discipline their children (e.g. Collins et al., 2002; Grolnick et al., 1994; Steinberg & Silk, 2002); as children age, they spend less time interacting with their parents and more time interacting with outside social influences (e.g., peers and teachers; Rothbaum & Pott, 1991). As a result, when children engage in externalizing behaviors, it more accurately represents the quality of parenting behaviors. Additionally, parental depression significantly impacts the quality of parenting, as increased depressive symptoms were associated with more negative parenting practices, including hostility and intrusiveness (Parent et al., 2014), spanking (Davis et al., 2011), reduced responsiveness to child's cue (Shaw & Vondra, 1995), and being more critical of the child's behaviors (Inoff-Germain et al., 1992).

The quality of the interparental relationship is also a significant determinant of parenting quality, as marital conflict negatively impacts parental involvement, disciplinary practices, and consistency (see Krishnakumar & Buehler, 2008 for a review). Katz and Gottman (1996) proposed that the relationship between marital conflict and negative parenting quality could possible be explained by the spillover effect, which theorizes that parents have difficulty preventing the transfer of negative emotions from the marital relationship to the parent-child relationship. As child-, parent-, and family-level factors have been shown to impact the quality of parenting, exploring parenting as a mediator between these factors and child externalizing behaviors may provide greater insight into how to better address the needs of families struggling with higher rates of child externalizing behaviors.

Positive parenting behaviors, such as providing emotional support and scaffolding, are consistently shown to be associated with lower levels of externalizing behaviors in NT children

(Holtrop et al., 2015). Reitz and colleagues (2006) found that parental involvement (i.e., parental awareness of their child's daily activities and friendships) was associated with fewer externalizing behaviors. Further, when parents use positive parenting practices, adolescent children engage in fewer externalizing behaviors than parents who use harsh discipline or are overcontrolling (e.g. Fox et al., 1995; Steinberg & Silk, 2002). Parenting quality is especially important during early adolescence, as negative parenting during the pre-adolescence stage was associated with higher rates of child externalizing behaviors compared to late adolescence (Bosmans et al., 2006).

The impact of parenting on child externalizing behaviors is different for mothers and fathers (Gryczkowski et al., 2009). Mothers reported interacting with their children more than fathers, but only fathers' involvement in their sons' lives predicted lower child externalizing behaviors. Only mothers' positive parenting only predicted a decrease in externalizing behaviors for their sons, but not daughters. Additionally, when parents decreased the amount of time spent monitoring their daughters, girls exhibited higher rates of externalizing behaviors. In addition to finding direct associations, there is also evidence that parenting mediates the relationship between interparental conflict and child externalizing behaviors. For example, Turney (2012) found mothers' depression was negatively impacted parenting as they demonstrated fewer supportive parenting behaviors which was associated with an increased in child externalizing behaviors. Benson and colleagues (2008) found interparental hostility increased the likelihood that parents engaged in harsh parenting practices, which predicted higher rates of adolescent externalizing behaviors. Similarly, Webster-Stratton and Hammond (1999) found if parents' marital relationship stressed the parenting system and parents used more negative parenting practices, children often displayed higher rates of conduct and behavior problems.

Unfortunately, research that examines parenting in the context of ASD is lacking. Early hypotheses about the cause of ASD included the concept of *refrigerator mothers* (Kanner, 1943). It was thought that children with ASD were raised by mothers who were cold and rejecting. Thus, for decades, researchers were hesitant to discuss associations between parenting and child behaviors. In the last decade, however, researchers studying children with ASD have begun to explore these associations, as it is plausible to hypothesize that parenting matters, particularly in children with heightened developmental needs. To my knowledge, only parent-level factors (i.e., parental stress) have been explored in relation to their effect on parenting behaviors but mainly in comparison to parenting NT children (e.g., McStay et al., 2006; Zaidman-Zait et al., 2014). Maljaars et al., (2013) found parents of children with ASD engaged in harsh discipline at a similar rate to parents of NT children. However, unlike parents of NT children, parents of children with ASD spend more time trying to control their child's environment in order to prevent behaviors caused by sudden changes or overstimulation. Additionally, similar to parents of NT children, parental mental health and stress negatively impacted parenting behaviors of parents of children with ASD, as higher levels of parental stress were associated with decreased parental sensitivity (Zaidman-Zait et al., 2014) and limit setting (Falk et al., 2014). The child- and family-level variables are generally only explored in relation to parental stress (e.g., McStay et al., 2006; Rivard et al., 2014) and no studies have examined the direct relationship between these factors and parenting quality.

Studies examining the impact of parenting behaviors on the externalizing behaviors in children with ASD is limited. Many studies that have explored the relationship have generally explored the reverse association, namely, how child externalizing behaviors impact parenting practices. When parents engage in scaffolding and positive parenting behaviors, research

indicates children with ASD report a decrease in child aggression and non-compliance (Singh et al., 2006; Ting & Weiss, 2017). Some researchers have explored the bidirectional nature of this relationship (e.g. Dieleman, et al., 2016; Zaidman-Zait et al., 2014), but support for bidirectionality is limited and modest. Dieleman and colleagues (2016) found externalizing behaviors predicted a higher rate of negative control utilized by parents of children with ASD, which then predicted increased levels of child externalizing behaviors three years later. Given that little is known about the how child-, parent-, and family-level factors impact parenting practices, which have been shown to affect child externalizing behaviors, more research is needed in this area.

Current Study

The goal of the current study was to identify which determinants of parenting (i.e., child-, parent-, and family-level factors) were associated, directly and indirectly, with externalizing behaviors in children and adolescents with high functioning ASD. Based on research described above, parenting behaviors (positive and negative) were hypothesized as mediators in the association between child-, parent-, and family-level factors and child externalizing behaviors. In this study, the child-level factors were child age and verbal ability. Parental mental health and marital satisfaction were considered parent-level factors. Finally, quality of family relationships was the factor at the family level.

I examined the extent to which parenting behavior mediates the associations between each of the determinants of parenting (i.e., child-, parent-, and family-level) and child externalizing behaviors. For mothers, I expected that each of the mediation pathways would be significant. At the child-level, it was expected as child verbal ability and age increased, mothers' positive parenting behaviors would also increase which would be associated with a decrease in

child externalizing behaviors. At the parent-level, I hypothesized that as maternal mental health and relationship satisfaction decreased, there would be a decrease in positive parenting behaviors, which would be associated with an increase in child externalizing behaviors. At the family-level, lower levels of mother-reported family relationship quality would be associated with lower quality parenting behaviors, which would predict an increase in child externalizing behaviors. In addition to these indirect associations, I also hypothesized that there would be significant direct associations between each of the determinants of parenting and child externalizing behaviors. I predicted that younger children and children with lower verbal ability would have higher levels of externalizing behaviors. For parenting factors, I hypothesized that higher depressive symptoms and lower relationship satisfaction would be associated with increased child externalizing behaviors. Finally, I also predicted that low family cohesion and high family conflict would be associated with higher rates of child externalizing behaviors.

For fathers, I expected that each of the mediational pathways would be significant. At the child-level, it was expected as child verbal ability and age increased, fathers' positive parenting behaviors would also increase which would be associated with a decrease in child externalizing behaviors. At the parent-level, I hypothesized that as paternal mental health and relationship satisfaction decrease, there would be a decrease in positive parenting behaviors which would be associated with an increase in child externalizing behaviors. At the family-level, lower levels of father-reported family relationship quality would be associated with lower quality parenting behaviors, which would predict an increase in child externalizing behaviors. I also hypothesized that there would be significant direct associations between each of the determinants of parenting and child externalizing behaviors, which would be similar to that found for mothers.

Methods

Participants

The current study was part of a larger longitudinal study that took place at two private universities in a metropolitan area in the southern United States. Across the two sites, 119 families of children with ASD between the ages of 10 to 17 years participated in the study. All but two couples (98.2%) were heterosexual. Due to the nature of the research questions (mothers vs. fathers), these two couples were excluded from the analysis. Thus, the final sample for the current study was 117 families (mothers, fathers, and children).

Recruitment efforts targeted ASD community events, adolescent psychologists, pediatricians, centers providing ASD services, schools, and social media. In order to be eligible for the study, the parents must have been married or cohabitating for at least one year, living with their child at least 50% of the time, and be able to read and speak English. Families were screened by trained graduate research assistants to ensure families met the eligibility criteria prior to the first assessment visit. There were several eligibility criteria that children needed to meet. First, the child needed to have a community diagnosis of ASD (e.g., from a psychiatrist, diagnostician, school district, etc.). Next, children must not have a diagnosed co-morbid intellectual disability. The presence of visual or hearing impairments, serious medical or neurological conditions, and genetic or metabolic disorders excluded the child from participating in the study. The child was also excluded if they had previously received an official diagnosis of bipolar disorder, psychosis, or schizophrenia. As described below, children also participated in an in-person assessment to confirm further eligibility criteria which includes having an IQ score greater than or equal to 75 and a receptive vocabulary score exceeding 70. Most of the children were male (n = 94) and about 12-years old (M = 13.29, SD = 2.19). All the children were high functioning, in that they were

verbally fluent (*M* = 102.42, *SD* = 18.79, range = 72.00 to 147.00) with IQs above 70 (*M* = 104.53, *SD* = 16.77, range = 72.00 to 151.00).

Many parents were married (89.7%), with the remaining parents reporting cohabitating with their partner (10.3%). On average, mothers (*M*age = 42.23 years, *SD* = 6.40) were younger than fathers (*M*age = 45.12 years, *SD* = 6.93). Additionally, most of the families came from affluent backgrounds with a household income of more than $40,000 per year (90.5%). Parents were mostly white (mothers: 73.5%; fathers: 76.1%) and had completed a college degree (mothers: 65.0%; fathers: 61.5%).

Procedure

Family eligibility was initially assessed via phone screen by trained graduate research assistants. The phone screen asked questions based on the eligibility criteria for the study. Those who met the criteria were then scheduled for an in-person assessment to confirm eligibility. For the first visit only one parent and child were required to participate, but both parents were welcome to participate if they chose to do so. During the visit, the participants engaged in an informed consent procedure, during which the parent provided permission and the child assented to being part of the study.

The parent and child participated in assessments in different rooms. The Autism Diagnostic Interview–Revised (ADI-R; Rutter et al., 2003) and Vineland Adaptive Behavior Scales (Sparrow et al., 2016) were conducted with the parent. In a separate room, the child participated in the Differential Ability Scale-II (DAS-II; Elliott, 2017), Peabody Picture Vocabulary Test (PPVT; Dunn & Dunn, 2007), and the Autism Diagnostic Observation Schedule – Module 3 (Lord et al., 2012). Altogether, the visit lasted about three hours. Families were compensated with a $75 gift card and the child received a $10 gift card. After the in-person

assessment, if the child scored below a 75 on the DAS-II, below a 70 on the PPVT, or the ASD diagnosis was not confirmed on both the ADOS or the ADI the family became ineligible and would not continue in the study. Families that were not eligible to continue in the study were notified within a week of the study and could request a visit report that summarized how their child performed on the assessments.

If a family was eligible to continue in the study, a second in-person lab visit was scheduled about two weeks after their first visit. As the current study is part of a larger investigation, the parents and child engaged in additional tasks, but only those relevant to the current study are described. During this visit, both parents and the child participated in the study. If the second parent did not attend the first visit, informed consent was collected prior to starting. Then, the parents first completed a set of questionnaires regarding their demographic information, health, relationship, and their child. At the same time, the child answered questionnaires in a room separate from their parents. The questionnaires focused on the child's perceptions of their family environment, response to marital conflict, and their health.

Following the first set of questionnaires, the parents were brought into the same room where they were instructed to play a game (Jenga) together. In the room, the family sat at a rectangular table with the child seated at the head of the table and parents on opposite sides of the table. A card with the Jenga rules was placed on the table between the parents. The parents received instructions to read the rules and teach their child to play the game or refresh their memory of the rules. The family was then given 10 minutes to play just like they would at home. They were informed that they would be video recorded during this time, but the experimenters would not be watching.

Following the Jenga task, the parents and child completed a second set of questionnaires. Parents responded to information regarding their parenting behaviors, their child's behaviors, and mindfulness. The child answered questions about their perceptions of their parent's behaviors towards them, family environment, bullying, and sleep. At the conclusion of the study, the family was debriefed and given a $75 gift card. The child also received a $10 gift card.

Measures

Child Factors

IQ. The Differential Ability Scales-II (DAS-II; Elliott, 2017) is a clinical instrument used to assess the cognitive ability of children by identifying their strengths and weaknesses in the areas of Verbal Ability, Nonverbal Reasoning, and Spatial Ability. The instrument is administered individually to children by trained researchers and includes cognitive assessments such as, defining words, design recall, and pattern construction. The verbal subtest includes tasks such as word definitions (child describes word meanings) and similarities (child describes how a set of words are related). An individual's scores on the DAS are converted to standard scores, which are used for comparison to a normative sample. The DAS-II is approved for use in research for children in clinical populations and is a valid measure of a child's cognitive ability. In the current study, only the verbal ability score was used.

Parent Factors

Parent Well-Being. The Inventory of Depression and Anxiety Symptoms (IDAS; Watson et al., 2007) is a valid self-report measure aimed at determining an individual's level of depression, dysphoria, and well-being. A well-being subscale is also included. Participants rate 26 statements (e.g., "I felt depressed," "I felt discouraged about things," "I felt hopeful about the future") on a 5-point Likert scale (1 = not at all, 2 = a little bit, 3 = moderately, 4 = quite a bit, 5

= extremely) based on how much they experienced these feelings in the past two weeks. For the current study, only the general depression scale was used. The measure was reliable for the current sample (Mothers: α = .91; Fathers: α = .89).

Relationship Satisfaction. The Couples Satisfaction Index (CSI; Funk & Rogge, 2007) examines how satisfied an individual is with their romantic relationship. The scale is comprised of 16-items in which participants either rate how happy they are with their relationship on a 7-point Likert scale (0 = *extremely unhappy*; 3 = *happy*; 6 = perfect), how true statements about their relationships are (e.g., "My relationship with my partner makes me happy"; 1 = *not at all true*; 6 = *completely true*), or indicate which feelings best describe their relationship (e.g., 0 = *boring*; 5 = *interesting*). The scale was reliable for the current sample (Mothers: α = .97; Fathers: α = .97).

Family Factors

Family Environment. The Family Environment Scale (FES; Moos & Moos, 1987) contains 45-items that examined how individuals perceive their family environments. Statements about the family (e.g., "We fight a lot in our family" or "Family members really help and support on another") are marked either true or false. In the family relationship domain, there are three subscales (cohesion, expressiveness, and conflict) that are summed together to determine an individual's raw scores. For the current study, only the cohesion (Mothers: α = .64; Fathers: α = .72) and conflict (Mothers: α = .73; Fathers: α = .75) scales were used as the expressiveness subscale was not reliable (Mothers: α = .47; Fathers: α = .52).

Parenting

Parent Report of Parenting Warmth. The Parental Bonding Instrument (PBI; Parker, 1989) was designed to examine parenting behaviors and styles and is valid and reliable. Parents

rated themselves on 30 statements (e.g., “I am very strict with my child” and “I give my child a lot of care and attention”) based on how much the behavior is like how the participant behaves toward their child (1 = *not like*, 2 = *somewhat like*, 3 = *a lot like*). The measure included three subscales: warmth and acceptance (Mothers: α = .76; Fathers: α = .84), psychological control (Mothers: α = .67; Fathers: α = .68), and firm control (Mothers: α = .61; Fathers: α = .66).

Child Outcomes

Parent Report of Child Externalizing Behaviors. The Child Behavior Check List (CBCL; Achenbach, 1999) is a parent-report measure of child and adolescent emotional and behavioral difficulties. The scale included 73-behaviors that fall within Internalizing (e.g., feels worthless or inferior) or Externalizing (e.g., gets in many fights) Composite scales. There were eight subscales: anxious/depressed, withdrawn/depressed, somatic complaints, social problems, thought problems, attention problems, rule breaking behavior, and aggressive behaviors. Parents rated behaviors based on how true they were for their child over the past 6 months (0 = *Not True*; 1 = *Somewhat or Sometimes True*; 2 = *Very True or Often True*). For the current study, only the Externalizing subscale was used which was reliable for both mothers (α = .92) and fathers (α = .92).

Observed Child, Parent, and Family Behaviors

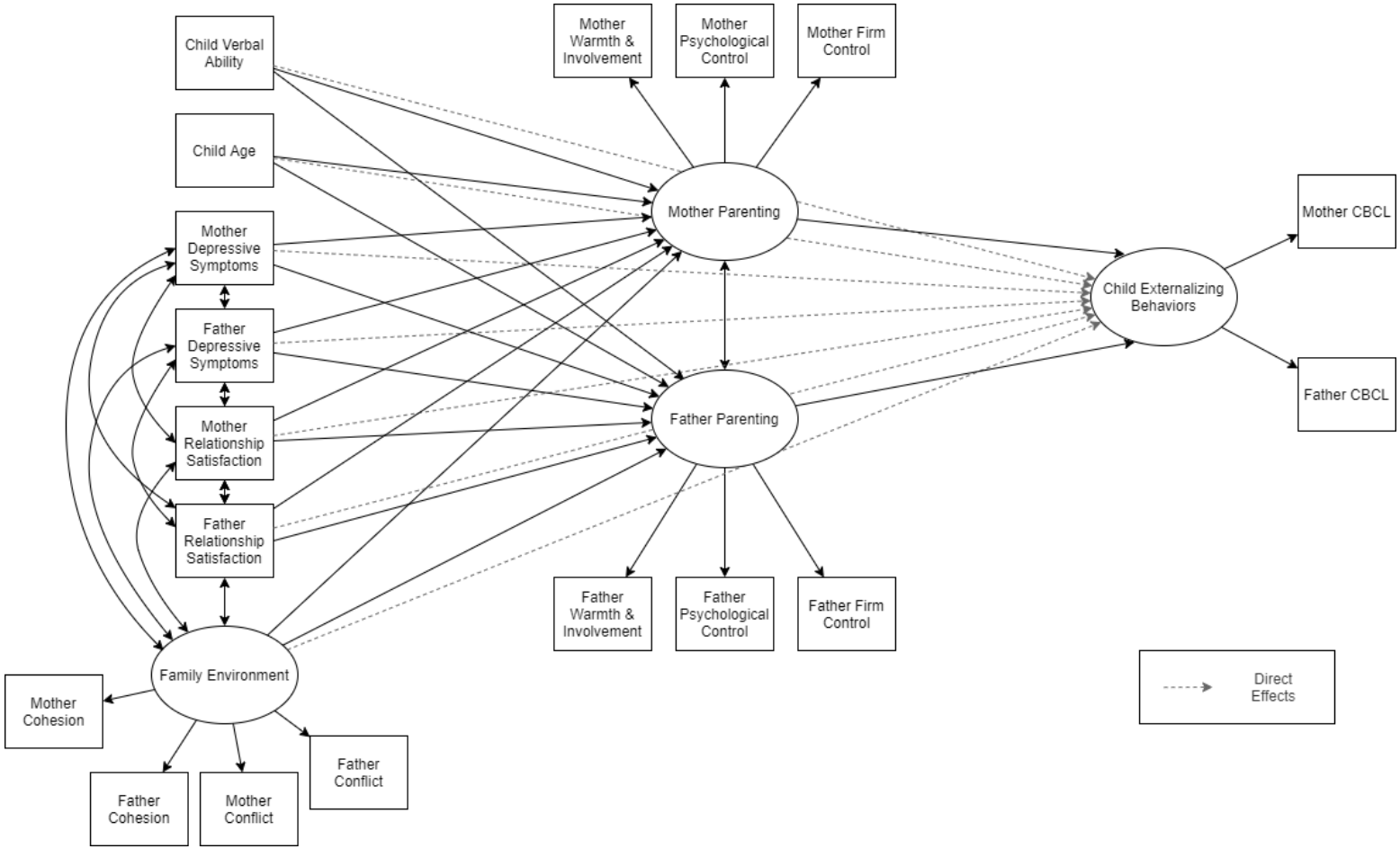
System for Coding Interaction and Family Functioning. The System for Coding Interaction and Family Functioning (SCIFF; Lindahl & Malik, 1996) is a behavioral coding system that examines family, parent, and child level factors. Of interest to the current study were the child-level (Anger and Frustration and Opposition/Defiance), parent-level (Rejecting and Invalidating, Coercion, and Emotional Support), and family-level (Negativity and Conflict, Positive Affect, and Cohesiveness). A team coding system was employed in which research

assistants were paired together to form coding teams. Each coder individually watched and scored the videos. The team pairs then came together to create a consensus code for the family. During training, the teams' consensus codes were then compared to master codes (videos that were scored by a graduate student and faculty advisor). During training, teams were considered reliable if they had 80% or higher agreement with the master codes. After reliability was established, each team and the master coder overlapped on 25% of the videos in order to ensure that the coders remain reliable throughout the coding process. However, coders were unable to obtain reliability and, therefore, the observational codes were removed from the study analyses.

Data Analysis Plan

The hypotheses and data analysis for the current study was preregistered on the Open Science Framework (https://osf.io/hxs89). The study tested the hypothesized structural equation model (see Figure 1). In order to accomplish this analysis, I performed a confirmatory factor analysis in *MPlus 7* (Muthen & Muthen, 2017) for the latent variables (family environment, mother parenting behaviors, father parenting behaviors, and child externalizing behaviors). Then, I ran the structural regression model examining the relationship between the determinants of parenting and child externalizing behaviors which was mediated by parenting behaviors. Adequate model fit for the measurement models was determined using the criteria set by Hu and Bentler (1999), $\chi^2 > .05$¸ RMSEA $\leq .05$; CFI $> .95$; SRMR $\leq .05$. Modification indices were used to determine changes needed in order to obtain adequate model fit. Only modifications that were theoretically justified were considered and were reported in the results. For the structural regression model, the significance of the indirect effects was examined by bootstrapping the 95% confidence intervals of the indirect effect with 10,000 bootstrapped repetitions. A confidence interval that does not include zero indicates a significant indirect effect.

Figure 1. Proposed theoretical structural equation model for examining the effect of the determinants of parenting (child-, parent-, and family-level factors) and child externalizing behaviors, which was hypothesized to be mediated by mother and father parenting behaviors.



However, as the results of the first model were insignificant, I hypothesized separate path models for mothers (see Figure 2) and fathers (see Figure 3). For both models, the independent variables included child- (child age and verbal ability), parent- (depressive symptoms and relationship satisfaction), and family-level factors (family cohesion and conflict). Instead of parenting behaviors as latent variables, the mediators were parent warmth and acceptance, psychological control, and firm control. Child externalizing behaviors remained the dependent variable. I ran each model separately, using Hu and Bentler's (1999) guidelines for adequate model fit (described above). Modification indices were used to determine changes to improve model fit, but only those that were theoretically based were made. Once adequate model fit was achieved, the indirect effects were examined using 10,000 bootstrapped iterations.

Results

Descriptives and Correlations

Test of normality were performed to determine whether the independent variables and mediators met the assumptions of structural equation modeling. Results of the Shapiro-Wilks found that all variables except for father parenting firm control (p = .235) and child verbal ability (p = .987) failed the test of normality. While the data for this sample was not normally distributed, the population of interest in the current study was considered a clinical population. Extreme values in many of the independent variables (such as parent depressive symptoms, relationship satisfaction, and family functioning) would provide better insight into what is occurring in these families instead of removing them from the sample. Further, the data was analyzed using *MPlus 7* (Muthen & Muthen, 2017) which allows for the use of maximum likelihood estimators that can account for non-normal and missing data (Muthen & Muthen, 2017).

Figure 2. Mother hypothesized model examining the determinants of parenting and child externalizing behaviors via parenting behaviors. Direct effects are dashed lines.

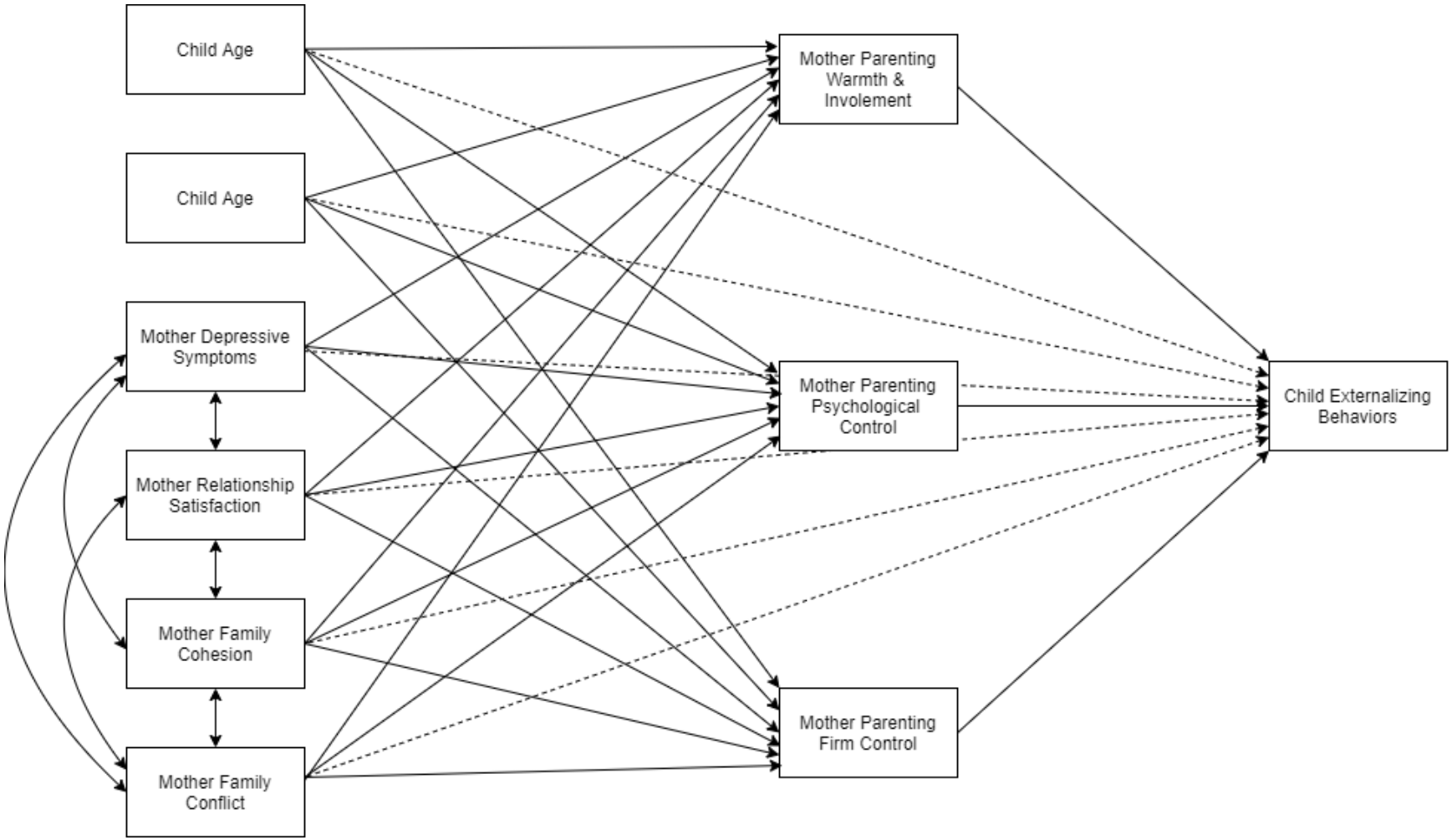
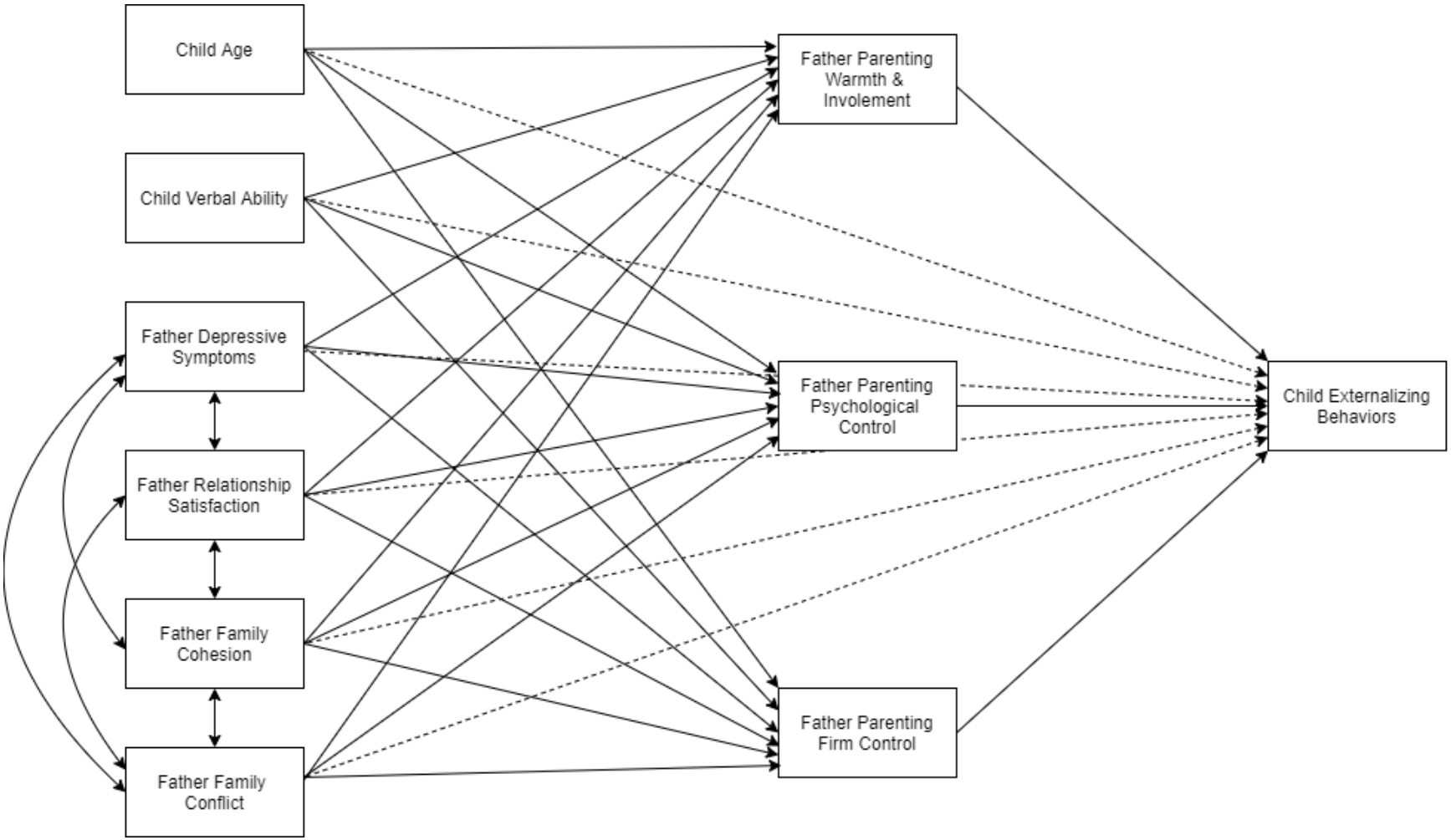


Figure 3. Father hypothesized model examining the determinants of parenting and child externalizing behaviors via parenting behaviors. Direct effects are dashed lines.



In order to examine differences between the means of the study variables for mothers and fathers, a paired-sample *t*-test was performed (see Table 1 for descriptive statistics). Results indicated no significant differences between mothers and fathers for all variables (*p*s ≥ .235) except for depressive symptoms, $t(113) = 2.11$ $p = .037$, $d = .24$, and parenting warmth, $t(112) = 5.21$, $p \leq .037$, $d = .65$. Mothers displayed higher levels of depressive symptoms ($M = 43.39$, $SD = 12.17$) and parental warmth ($M = 27.41$, $SD = 2.45$) compared to fathers (depressive symptoms: $M = 40.65$, $SD = 10.87$; parental warmth: $M = 25.53$, $SD = 3.28$).

A Pearson's correlation was performed separately for mothers and fathers to determine the strength and relationship between the independent variables (child age [in months], child verbal ability, parent depressive symptoms, parent relationship satisfaction, family functioning), mediators (parental warmth and control), and dependent variable (child externalizing behavior). See Table 2 for correlations. For mothers, child externalizing behavior had a small, positive relationship with mother psychological control, firm control, depressive symptoms and mother-report of family conflict, *p*s ≤ .016. Child externalizing behavior had a small, negative relationship with mother parental warmth and mother-report of family cohesion, *p*s ≤ .006. Mother parental warmth was positively correlated with mother relationship satisfaction and mother-report of family cohesion, *p*s ≤ .028. It was negatively correlated with child age and mother-report of family conflict, *p*s ≤ .010. Mother psychological control was negatively correlated with relationship satisfaction, $p = .006$, and positively correlated with mother-reported family conflict, $p = .041$. Mother firm control was not significantly correlated with any of the independent variables for this study, *p*s ≥ .126.

For fathers, child externalizing behaviors was positively correlated with father depressive symptoms and father-report family conflict, *p*s ≤ .009, and negatively correlated with father

Table 1. Means and standard deviations for child-, parent-, and family-level factors, mediators, and outcome variables, as well as the results of paired sample *t*-test comparing mother-report to father-report of all variables in the model.

	Mother Mean (SD)	Father Mean (SD)	df	*t*	*p*	*d*
Child Externalizing Behavior	12.08 (9.16)	12.62 (8.99)	109	.83	.410	.06
Parenting Behaviors						
Warmth	27.41 (2.45)	25.53 (3.28)	113	5.21	≤ .001	.65
Psychological Control	13.93 (2.53)	14.05 (2.68)	116	.41	.681	.05
Firm Control	22.56 (2.40)	22.20 (2.67)	113	1.19	.235	.14
Child Factors						
Age	13.10 (2.19)	13.10 (2.19)	-	-	-	-
Verbal Ability	103.46 (18.64)	103.46 (18.64)	-	-	-	-
Parent Factors						
Parent Depressive Symptoms	43.39 (12.17)	40.65 (10.87)	114	2.11	.037	.24
Parent Relationship Satisfaction	62.57 (16.34)	61.88 (16.15)	109	.52	.606	.04
Family Factors						
Family Cohesion	6.86 (1.90)	6.639 (2.11)	115	.94	.349	.11
Family Conflict	2.94 (2.17)	3.09 (2.29)	115	.79	.433	.07

Table 2. Results of the Pearson's correlations between child-, parent-, and family-level factors, mediators, and outcome variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Child Externalizing Behaviors	1	-.20*	.31**	.29**	-.13	.01	.25**	-.35**	-.38**	-.60**
2. Parenting Warmth & Acceptance	-.27**	1	-.05	-.06	-.27**	-.16	-.09	.20*	.23**	-.12
3. Parenting Psychological Control	.22*	-.12	1	.22*	-.19	.01	.05	-.10	-.19*	.39
4. Parenting Firm control	.21*	-.23*	.35**	1	-.11	.03	.07	-.09	-.13	.23
5. Child Age (months)	-.08	-.26**	.02	-.84	1	.01	-.14	.08	-.13	-.01
6. Child Verbal Ability	.03	-.12	.10	-.05	.01	1	.05	-.01	-.21*	.13
7. Parent Depressive Symptoms	.32*	.05	.10	.07	-.03	.02	1	-.35**	-.33**	.43**
8. Parent Relationship Satisfaction	-.18	.21*	-.25**	-.13	.20*	-.05	.19	1	.61**	-.46**
9. Family Cohesion	-.25**	.32**	-.12	-.04	-.07	-.01	-.39**	.54**	1	-.49**
10. Family Conflict	.53**	-.24**	.19*	.13	.07	.22*	.25**	-.38**	-.30**	1

Note: * $p \leq .05$, ** $p \leq .01$. Fathers above the diagonal, mothers below the diagonal.

relationship satisfaction and father-report family cohesion, *p*s ≤ .001. Father parental warmth was negatively correlated with child age, $p = .004$, and positively correlated with father-report family cohesion, $p = .004$. Father psychological control was positively correlated with father-report family conflict, $p \leq .001$, and negatively correlated with father-report family cohesion, $p = .044$. Father firm control was positively correlated with father-report family conflict, $p \leq .001$, and negatively correlated with father-report family cohesion, $p = .044$.

Several covariates (child gender, family size, parent relationship length, and family income) were also examined to determine if they needed to be controlled for in later analyses. Results of a Pearson's correlation determined that, for mothers, parental warmth had a significant negative relationship with parent relationship length, $r = -.23$, $p = .024$, $R^2 = .05$, and mother firm control was positively correlated with family size, $r = .26$, $p = .006$, $R^2 = .07$. For fathers, parent income was negatively correlated with father psychological control, $r = -.25$, $p = .007$, $R^2 = .05$. All other relationships were non-significant. As a result, relationship length, family size, and parent income were added as covariates for their respective variables for the remaining analyses.

Testing the Measurement Model

To create the latent variables for the hypothesized model (see Figure 1), a confirmatory factor analysis was performed in *MPlus* 7 (Muthen & Muthen, 2017) using the MLR estimator to account for missing and non-normal data. Mother- and father-report of family cohesion and conflict were used as indicators for the Family Environment latent variable. Mother parental warmth, psychological control, and firm control were used as factor loadings for Mother Parenting Behavior. To create the Father Parenting Behavior latent variable, father warmth, psychological control, and firm control were used as indicator variables. Mother- and father-

report of child externalizing behaviors were used for the Child Externalizing Behavior latent variable.

Initial model fit was poor, χ^2 (81) = 147.02, $p = \leq .001$, RMSEA = .08 [90% CI: .06, .11], CFI = .80, SRMR = .08. For Mother Parenting Behavior, none of the factor loadings were significant (mother parental warmth: B = .29 (*SE* = .19), *t* = 1.53, *p* = .125; mother psychological control: B = -.48 (*SE* = .34), *t* = 1.44, *p* = .149; mother firm control: B = -.77 (*SE* = .52), *t* = 1.48, *p* = .125). For Father Parenting Behavior, father parental warmth was a non-significant factor loading, B = .22 (*SE* = .12), *t* = 1.83, *p* = .07. None of the modification indices were theoretically supported. As a result, analyses with the model as hypothesized was concluded, as key latent variables were no longer statistically significant. Instead, results of a path model with mothers and fathers in different models were performed.

Path Model

A path analysis examining the relationship between the determinants of parenting and child externalizing behaviors mediated by parenting behaviors was performed in *MPlus 7* (Muthen & Muthen, 2017) using the MLR estimator to account for missing and non-normal data. The hypothesized model was tested separately for mothers and fathers.

Mother Model

For mothers, the initial model (see Figure 2) was poor, χ^2 (21) = 56.07, $p \leq .001$, RMSEA = .12 [90% CI: .08, .16], CFI = .69, SRMR = .06. Changes that were theoretically based were made to the model based on modification indices, such as adding covariances between mediators. However, the model fit continued to be poor. χ^2 (20) = 38.42, *p* = .008, RMSEA = .09 [90% CI: .04, .13], CFI = .84, SRMR = .05. As all associations with psychological control and firm control were non-significant (*p*s ≥ .079), these variables were removed from the model.

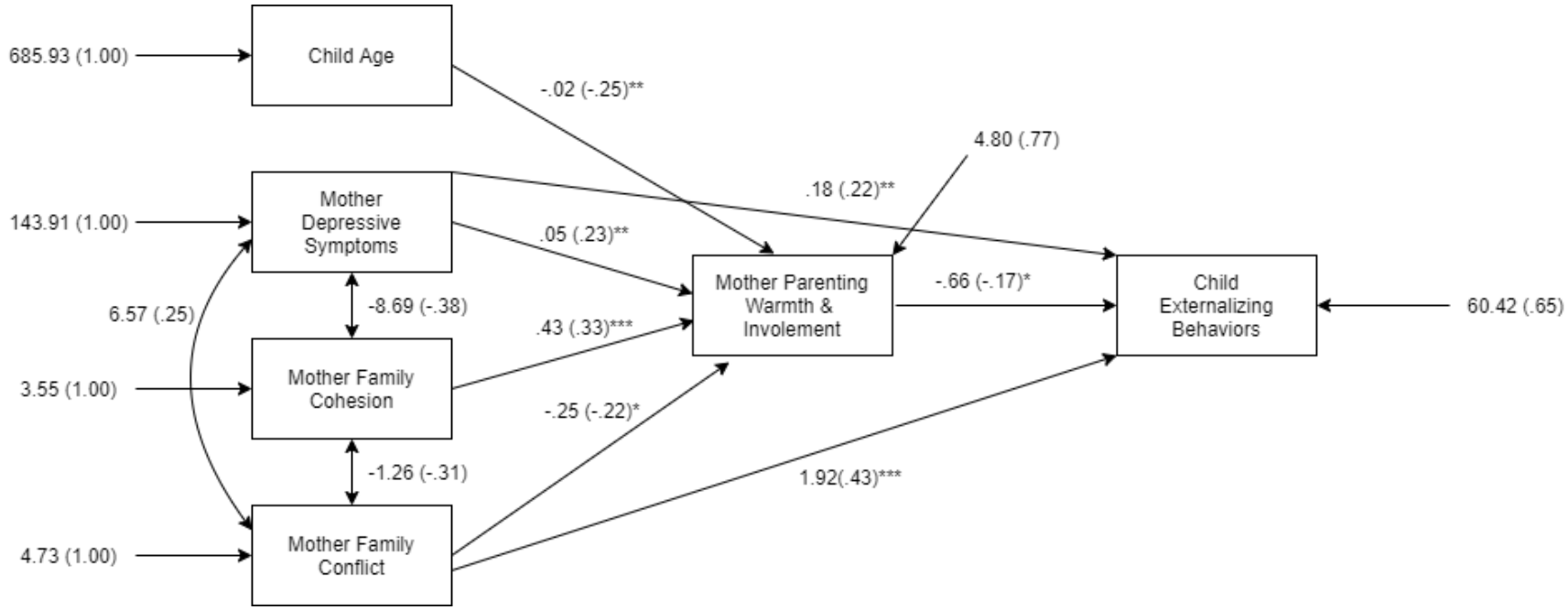
Additional non-significant paths were removed from the model and good model fit was achieved, χ^2 (5) = 3.34, p = .502, RMSEA ≤ .001 [90% CI: ≤ .001, .10], CFI = 1.00, SRMR = .02 (see Figure 4)

For mothers, results indicated positive significant direct effects of mother depressive symptoms, b = .18 p = .003, and mother-report family conflict, b = 1.92, $p \leq .001$, on child externalizing behaviors while controlling for the other variables in the model (see Table 3 for inferential statistics). While controlling for all other variables in the model, the effects of the determinants of parenting on parental warmth was examined. There were significant positive paths from mother depressive symptoms, b = .05, p = .008, mother-report family cohesion, b = .43, $p \leq .001$, to mother parenting warmth. There were significant negative paths from child age, b = -.02, p = .002, and mother-report family conflict, b = -.25, p = .013, to mother parenting warmth. Further, there was a positive significant effect of mother parenting warmth and child externalizing behaviors, b = -.66, p = .044. Each of the indirect effects of the model were also explored using 10,000 bootstraps. The indirect paths through mother parental warmth from child age (95% CI: [.003, .04]), mother depressive symptoms (95% CI: [-.07, -.01]), family cohesion (95% CI: [-.63, -.06]), and family conflict (95% CI: [.03, .45]), to child externalizing behaviors were all significant.

Father Model

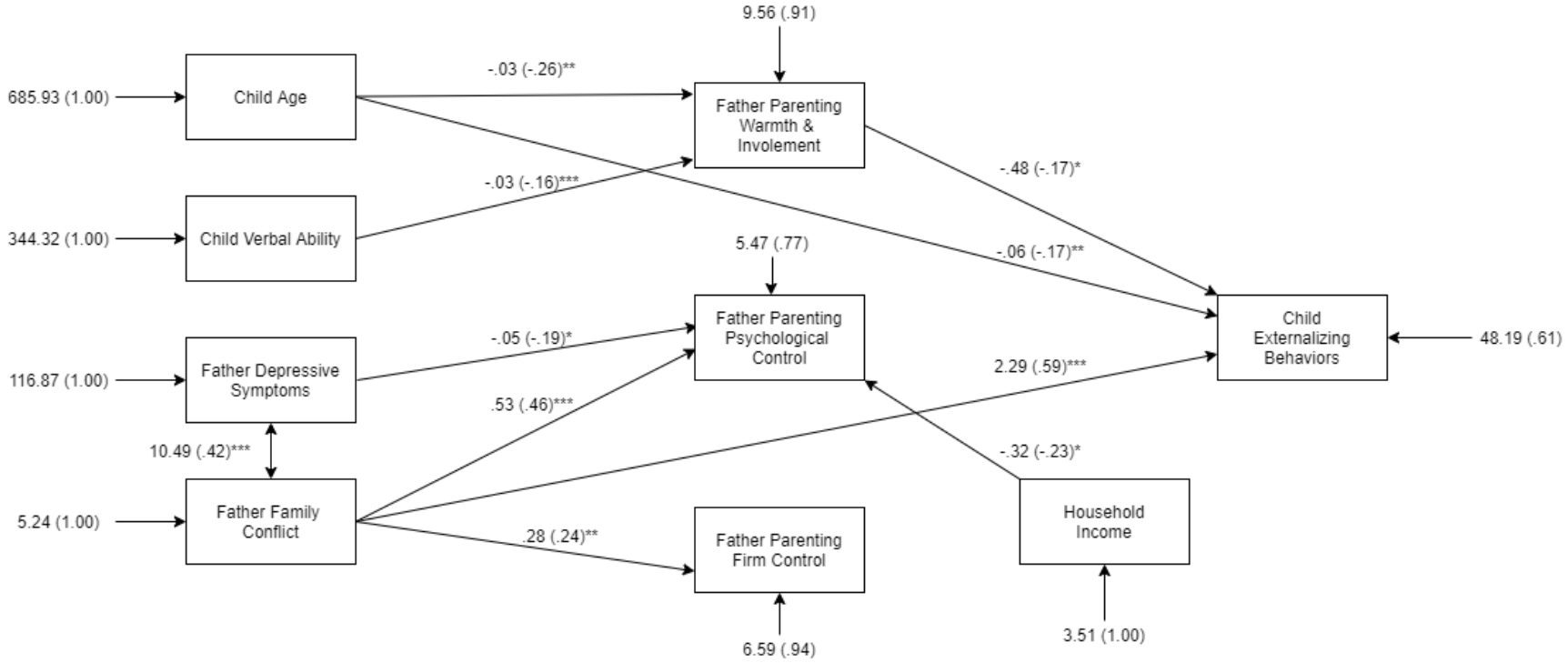
For fathers, the initial model (see Figure 3) achieved good model fit, χ^2 (12) = 13.60, p = .327, RMSEA = .34 [90% CI: ≤ .001, .10], CFI = .98, SRMR = .04. All non-significant paths were removed, and the final model achieved good fit, χ^2 (26) = 26.26, p = .449, RMSEA = .001 [90% CI: ≤ .001, .074], CFI = .99, SRMR = .06 (see Figure 6). There was a negative direct

Figure 4. Mother final model examining the determinants of parenting and child externalizing behaviors via parenting behaviors.



Note: * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$. Unstandardized betas reported outside the parentheses and standardized betas reported inside the parentheses.

Figure 5. Father final model examining the determinants of parenting and child externalizing behaviors via parenting behaviors.



Note: * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$. Unstandardized betas reported outside the parentheses and standardized betas reported inside the parentheses.

Table 3. Inferential statistics for the final mothers' model examining the determinants of parenting and child externalizing behaviors via parenting behaviors.

	Unstandardized	Standardized	SE	*t*	*p*
(X → Y)					
Mother Depressive Symptoms → Child Externalizing Behaviors	.18	.22	.06	2.93	.003
Mother Family Conflict → Child Externalizing Behaviors	1.92	.43	.35	5.48	≤ .001
(X → M)					
Child Age (months) → Mother Parenting Warmth	-.02	-.25	.01	3.05	.002
Mother Depressive Symptoms → Mother Parenting Warmth	.05	.23	.02	2.65	.008
Mother Family Cohesion → Mother Parenting Warmth	.43	.33	.12	3.68	≤ .001
Mother Family Conflict → Mother Parenting Warmth	-.25	-.22	.10	2.48	.013
(M → Y)					
Mother Parenting Warmth → Child Externalizing Behaviors	-.66	-.17	.33	2.20	.44

effect of child age, b = -.06, p = .009, and a positive direct effect of father-report family conflict, b = 2.29, $p \leq .001$, on father-report child externalizing behavior while controlling for all other variables in the model (see Table 4 for inferential statistics).

The effects of the determinants of parenting on parental warmth while controlling for all other variables in the model were examined. The paths from child age, b = -.03, p = .003, and child verbal ability, b = -.03, p = .018, to father parental warmth had a significant negative effect. The negative effect of father parental warmth on child externalizing behavior was also significant, b = -.48, p = .018. The indirect effects of the model were also explored for each of the significant paths using 10,000 bootstraps. The indirect paths from child age (95% CI: [.01, .03]) and child verbal ability (95% CI: [.003, .03]) to father parental warmth to child externalizing behavior were significant.

Discussion

The goal of the current study was to examine the direct and indirect associations between the determinants of parenting (child-, parent-, and family-level) and externalizing behaviors in high-functioning adolescents with ASD, with parenting behaviors as the proposed mediator. These associations were examined in mothers and fathers and while several of the study hypotheses were confirmed, others were not. For mothers, indirect associations between select child-, parent-, and family-level factors and child externalizing behaviors were found; however, for fathers only child-level factors were indirectly associated with child externalizing behaviors.

Belsky's (1984) determinants of parenting theory suggests that child-, parent-, and family-level factors are interconnected and influence parents' abilities to provide their child with quality parenting. Each of these factors may provide the parenting system with either a buffer

Table 4. Inferential statistics for the final fathers' model examining the determinants of parenting and child externalizing behaviors via parenting behaviors.

	Unstandardized	Standardized	SE	*t*	*p*
(X → Y)					
Child Age (months) → Child Externalizing Behaviors	-.06	-.17	.02	2.62	.009
Father Family Conflict → Child Externalizing Behaviors	2.29	.59	.33	7.03	≤ .001
($X \rightarrow M_1$)					
Child Age (months) → Father Parenting Warmth	-.03	-.26	.01	2.99	.003
Child Verbal Ability → Father Parenting Warmth	-.03	-.16	.01	2.37	≤ .001
($X \rightarrow M_2$)					
Father Depressive Symptoms → Father Psychological Control	-.05	-.19	.02	2.7	.038
Family Conflict → Father Psychological Control	.53	.46	.09	5.88	≤ .001
Household Income → Father Psychological Control	-.32	-.23	.17	1.92	.055
(X à M_3)					
Father Family Conflict → Father Firm Control	.28	.24	.09	2.80	.005
($M_1 \rightarrow$ Y)					
Mother Parenting Warmth → Child Externalizing Behaviors	-.48	-.17	.20	2.37	.018

against negative effects (e.g., lower mental health) or act as a risk factor for decreased parenting quality (e.g., family conflict). Parenting, thus, serves as a mediator between the determinants of parenting and child outcomes, as parents serve as models for their child's emotional, social and behavioral development (Zaidman-Zait et al., 2014).

Child-Level Predictors

The current study included child age and verbal ability as child-level determinants of parenting. For younger children, mothers and fathers reported engaging in greater parenting warmth which was then associated with lower levels of child externalizing behaviors. This finding does not support the hypothesis that older children would be associated with greater parenting warmth which would, in turn, be associated with lower child externalizing behaviors. However, the results support Teehee and colleagues' (2009) findings that having a child with ASD aged 11 to 14 years was associated with decreased parenting stress and higher positive parenting behaviors, such as increased involvement. Researchers suggested a difference in services available to families of children with ASD between 11 to 14 and 15 to 18 years. Parents with younger adolescents reported having more involvement with a variety of service providers compared to families with older adolescents. The transition out of high school and into adulthood is a challenging time for families of children with ASD and is often associated with a loss of services (e.g., Kapp et al., 2011; Taylor & Seltzer, 2011). Therefore, it is possible that having an older adolescent may increase parenting stress, which, in turn, may be associated with less positive parenting behaviors as the results of this study show.

The direct effect of child age was also associated with child externalizing behaviors, such that older children displayed fewer externalizing behaviors. While previous research was mixed throughout developmental stages (Boonen et al., 2014; Zaidman-Zait et al., 2014), Shattuck and

colleagues (2007) found that adolescents and young adults with ASD displayed fewer problem behaviors over time. Further, some research suggests that as children age, they display fewer externalizing behaviors as they have received treatment interventions to reduce these behaviors (Zaitman-Zait et al., 2014). Future research should examine the impact the type and length of interventions have on externalizing child behaviors in adolescents with ASD.

Child verbal ability was only a significant predictor for fathers' parenting behaviors. Specifically, lower child verbal ability was associated with higher rates of parenting warmth and, in turn, lower child externalizing behaviors. While prior research has linked higher rates of child verbal ability to increased levels of child externalizing behaviors, no studies to my knowledge have examined how children's verbal ability impacts the parenting system. McStay and colleagues (2014) examined the impact of child ASD verbal ability on parenting stress but found no significant relationship. It is possible that since high levels of extraversion is associated with verbal ability in children with ASD and, therefore, higher rates of maladaptive behaviors (Bauminger et al., 2010), fathers engage in less warm parenting behaviors since their child's difficulties with communication increase their rates of externalizing behaviors. Ozturk and colleagues (2014) found that child communication difficulties affect mothers and fathers of children with ASD differently. Results of their study indicate that child verbal ability and communication deficits were negatively associated with fathers' perceptions of their child's behaviors, such that when their child displayed more communication difficulties, fathers reported higher levels of parenting stress related to their child's problem behaviors. However, for mothers, child communication deficits were associated with overall parenting stress. Researchers suggested these results may be due to differences in how much parents interact with their child. Mothers of children with ASD often take on the caregiving role and engage in more social

interactions with their child (e.g. Hartley et al., 2014; Ozturk et al, 2014). Therefore, fathers may be affected more by their child's low verbal abilities because they do not spend as much time with their child and have difficulties affectively communicating with their child.

Parent-Level

When Belsky first proposed his determinants of parenting theory (1984), he theorized the parent-level factors were the most important aspect to predicting quality parenting. Results of the study indicate that, for mothers, depressive symptoms were directly associated with higher child externalizing behaviors as well as indirectly via parenting warmth which was related to lower child externalizing behaviors. In the NT literature, several studies show that maternal depression negatively affects parenting quality as mothers are more likely to engage in negative or coercive parenting practices (e.g., Lovejoy et al., 2000; Parent et al., 2014). However, while the direct effect of depression was associated with higher child externalizing behaviors, the results of the current study suggest maternal depression was related to increased parenting warmth, contrary to the study hypothesis. Turney (2011) suggested that while prior research has supported the relationship between maternal depression and harsh parenting practices, these studies were flawed and should be interpreted with caution. She proposed that since most of these studies examined clinical populations or homogenous samples, the generalizability is limited, and the effect sizes may be smaller than prior studies have suggested. Results of Turney's (2011) longitudinal study with a diverse sample did not support the relationship between maternal depression and parenting behaviors long term. She suggested individual characteristics of the mothers with depression dictate whether they engage in more harsh parenting practices.

In the current study, it is possible that the cross-sectional data and variables in the model do not account for the full relationship between maternal depressive symptoms and parenting

behaviors, providing a possible explanation for why higher levels of depression were associated with more warm parenting behaviors. It is also possible that high levels of depression of mothers in the sample was not common. The IDAS has been used in clinical populations to detect major depressive disorder with a diagnostic cutoff score of 64.50 (Stasik-O'Brien et al., 2019). In the current study, only 2.6% of mothers met the diagnostic cutoff score for major depressive disorder. Therefore, these contrary results may be due to a lack of high levels of depression in the sample. Although speculative, it is also possible that mothers of children with ASD can prevent their depressive symptoms from spilling over and negatively impacting their parenting. Indeed, these mothers may be especially cognizant of their child's unique needs and overcompensate in their interactions with their child. Conversely, there may also be social desirability effects emerging. In future research, it would be helpful to examine mothers' parenting behaviors with their NT children or have multiple reporters of maternal parenting.

At the parent level, there were several hypotheses that were not supported. For example, while father depressive symptoms were associated with lower levels of parenting psychological control, there was no direct or indirect association with child externalizing behaviors. For fathers, there are several factors to consider that might explain this pattern of results. First, fathers of children with ASD in the current study reported lower levels of depressions compared to mothers, which has often been found in prior studies (e.g., Davis & Carter, 2008). Yet, depression in fathers of NT children has been associated with more negative parenting and fewer positive parenting behaviors (e.g., Davis et al., 2011; Parent et al., 2014; Wilson & Durbin, 2010). However, results of Wilson and Durbin's (2010) meta-analysis found several moderators of the association between NT fathers' depression and parenting behaviors including father age, child age, and methodological differences. Results indicated that younger fathers and fathers of

younger children were more likely to engage in more negative parenting behaviors due to the demands of their parenting role and inexperience in the fathering role. Further, researchers found that on self-report measures, fathers with higher rates of depression were more likely to rate their parenting as more negative. These results suggest that when fathers have high levels of depressive symptoms and report more harsh parenting behaviors, there may be a depression-distortion bias, (Richters, 1992), which suggests a difference between self-reported and observed behaviors. As the current study only included self-report measures of parenting behaviors, it is possible that fathers of children with ASD may not be accurate reporters of their parenting behaviors. Therefore, future studies should include multiple reporters, such as partner- or child-report, or observational assessments of fathers' parenting behaviors.

For both mothers and fathers, relationship quality had no significant associations, direct or indirect, with children's externalizing behaviors. This contrasts with O'Brien and colleagues (1997) which found that in NT families, lower relationship satisfaction was associated with higher rates of child externalizing behaviors. However, more recent findings from Peltz and colleagues (2018) has suggested that coparenting cooperation and conflict mediated the association between relationship satisfaction and parent-child relationship in families of NT children. Similarly, in families of children with ASD, coparenting quality and conflict mediated the association between child symptom severity and parent relationship satisfaction (Chan & Leung, 2020). Results indicated that when children with ASD displayed elevated ASD symptoms, parents engaged in more coparenting conflict, which was associated with decreased marital satisfaction. Therefore, in the current study, coparenting quality and conflict may be a missing variable to help link relationship satisfaction to parenting behaviors.

Family-Level

Family functioning is defined as how well members of a family system interact with one another in several domains, including affective responsiveness, interpersonal communication, and problem solving (Epstein et al., 1978). In the current study, the relationship between family functioning (i.e., family cohesion and conflict) and child externalizing behaviors was also mediated by parenting warmth for mothers, such that higher levels of family cohesion and lower levels of family conflict was associated with greater parenting warmth and lower child externalizing behaviors. In mothers of NT children, family cohesion (e.g. high family communication and family satisfaction) was associated with authoritative parenting style (Matejevic et al., 2014), which is characterized by high responsiveness and low intrusive parenting behaviors (Baumrind, 1967). In NT families, cohesion and parenting practices were associated with better child behavioral regulation; yet, for families of children with ADHD, family cohesion and was not associated with parenting behaviors (Schroeder & Kelley, 2008). While few studies in the ASD literature have examined family, most studies have reported that families of children with ASD report lower levels of family cohesion compared to NT families (e.g. Higgins et al., 2005; Gau et al., 2011; Rao & Beidel, 2009). Prior research has found that family cohesion predicted positive outcomes for mothers of children with ASD, such as higher perceived quality of life and lower parenting stress (Henry, 2019; Pisula & Porebowicz-Dorsmann, 2017). As the current study found that family cohesion was associated with more positive parenting practices, it is possible family cohesion is a protective factor for mother against the stressors of having a child with ASD. Therefore, future research should examine this relationship further to better understand the protective role family cohesion has in families of children with ASD.

Increased family conflict was also indirectly related to child externalizing behaviors via parenting warmth for mothers of children with ASD. When mothers reported higher levels of family conflict, they engaged in lower levels of parenting warmth that predicted higher levels of child externalizing behaviors. Katz and Gottman (1996) proposed that these relationships might be explained by the spillover effect, which posits that when negative emotions and conflict arise in the family or parenting system, parents are unable to keep them contained in the original system. The negative emotions then spillover into the parent-child relationship through negative parenting practices. In the current study, family conflict is associated with lower maternal parenting warmth, which suggests that conflict that occurs in the family system spills over into the parenting system that then negatively impacts the rate of the child's externalizing behaviors. The results of the current study support the findings of Buehler and Gerard (2002) which suggests that when NT parents reported higher rates of marital conflict, they engaged in more harsh parenting discipline practices and had more parent-child conflict that was associated with higher rates of child maladjustment. The spillover effect has also been examined in families of children with ASD. Hartley and colleagues (2018) used daily diary methods to examine how positive and negative marital interactions impacted parenting stress. Days when mothers reported increased negative parenting conflict predicted mothers' same-day parenting stress. Therefore, future studies should further examine spillover effect in mothers of children with ASD, specifically examining the relationship between family conflict and child externalizing behaviors via parenting behaviors.

For both mothers and fathers of children with ASD, there was a significant direct relationship between family conflict and child externalizing behaviors for both mothers and fathers, in that higher levels of family conflict were related to increases in child externalizing

behaviors. Further, for fathers, higher family conflict was related to increases in father parenting psychological and firm control. These results may be explained by the Emotional Security Theory (Davies & Cummings, 1994), which posits that when children are exposed to marital conflict, they display higher levels of maladaptive behaviors as their sense of security is compromised. In families of NT children, increased levels of marital conflict have been associated with more child externalizing behaviors (Gartstein & Fagot, 2003; Jenkins et al., 2005). Streit and colleagues (2020) found family conflict that occurs in early childhood predicted NT child aggressive behaviors in late childhood and early adolescence. Thus, family conflict is a particularly salient factor that has been shown to have negative outcomes for NT. While there is a gap in the ASD literature exploring the association between family conflict and child outcomes, the results of the current study support preliminary findings by Ekas and Kourous (under review) that suggest when children with ASD are exposed to marital conflict, they displayed higher levels of negative emotionality and physical reactivity. Future studies should further explore the effects of marital conflict on the outcomes for children with ASD.

While parenting warmth mediated the relationship between family cohesion and child externalizing behaviors for mothers, family cohesion was not a significant predictor of child externalizing behaviors, directly or indirectly for fathers. This stands in contrast with previous studies that have indicated high levels of family cohesion was associated with lower child externalizing behaviors in NT families (Richmond & Stocker, 2006). It is possible the lack of significant results for fathers may be related to how parents handle the division of labor. Mitchell and colleagues (2016) found that child externalizing behaviors predicted mothers', but not fathers', perceptions of family functioning and cohesion. Further, since mothers of children with ASD are more likely to engage in caregiving activities and spend more time with their child with

ASD while fathers are more likely to engaged in outside employment (Hartley et al., 2014), they are more likely to be affected by their child's problem behaviors than fathers. Mitchell and colleagues (2016) suggested this difference in division of labor and impact of child behaviors generally lead mothers to be more sensitive to family cohesion compared to fathers. Future research should investigate how caregiving and division of labor impact family functioning and sense of cohesion.

Theoretical and Clinical Implications

Overall, the results of the current study provide mixed support for Belsky's (1984) determinants of parenting theory. The results of the model for mothers in the current study better illustrate the impact of this theory as child-, parent-, and family-level variables had an impact on parenting behaviors, which, in turn, had a significant association with child externalizing behaviors. When parents of NT children engage in more positive parenting practices, their children displayed fewer child externalizing behaviors (Reitz et al., 2006). Results of the current study extend these findings to families of children with ASD as parenting warmth was associated with lower rates of child externalizing behaviors. Therefore, understanding how these variables each affect the parenting system provide insight into how the parenting system plays a significant role in child externalizing outcomes.

However, these findings were different for mothers compared to fathers. There may be a few reasons as to why the outcomes were different for mothers and fathers. First, fathers of children with ASD are underrepresented in the ASD literature as they are typically either left out of studies completely or grouped together in parent outcomes along with mothers (e.g. Braunstein et al., 2013). As a result, less is known about how these factors may impact the fathers. It is possible, therefore, that fathers' parenting may be impacted by different factors not

included in the current study. For example, May and colleagues (2015) found that coparenting quality mediated the relationship between parenting self-efficacy and parenting stress for fathers of children with ASD. Further, child gender and symptom severity has been associated with greater parenting stress for fathers, but not mothers, of children with ASD (Rivard et al., 2014). Therefore, future studies should explore more factors that might be specifically related to fathers. Additionally, parents of children with ASD often display mild expressions of ASD-related symptoms, known as the broad autism phenotype (BAP; Hurley et al., 2006). BAP is often characterized by three main domains: aloof personality (i.e., disinterest in social interactions), rigid personality (i.e., preference for sameness or desire for lack of change), and pragmatic language problems (i.e., social communication challenges in reciprocal interactions). Prior research has indicated a gender difference in which characteristics parents of children with ASD are more likely to display and fathers are often rated as more aloof in that they lack interest in participating in social interactions (Klusek et al., 2014; Seidman et al., 2012). Klusek and colleagues (2014) suggested the BAP aloof personality is related to the social deficits in ASD, which males are more likely to be at risk for. Therefore, since fathers of children with ASD are more likely than mothers to display aloof personality behaviors, it is possible this factor may impact the quality of their parenting. If these fathers are more aloof and have difficulties related to social interaction, future studies should explore the relationship between the BAP aloof personality and fathers' parenting.

When designing interventions to decrease child externalizing behaviors in adolescents with high-functioning ASD, clinicians should examine the parenting system and understand the factors that might be stressing the system. As demonstrated by the current study, for mothers, each level of the determinants of parenting had a unique effect on parenting, but many of these

factors were related to the other. This suggests that interventions aimed at improving outcomes for children with ASD should not only focus on child-level factors but should also consider the impact parent- and family-level factors are having on child outcomes via the parenting system.

Prior research has found that involving parents in their child's ASD treatment interventions is essential in helping decrease externalizing behaviors and manage ASD symptoms (Brookman-Frazee et al., 2006; Shultz et al., 2011). Many of the interventions currently available to families have behavior therapists teaching the parents how to implement strategies to incorporate social, cognitive, and emotional training in the home (Burrell & Borrego, 2012). Further, studies have indicated that when parents are involved in their child's treatment, they report higher levels of parenting-self efficacy as they feel more capable of managing their child's behaviors (Feldman & Werner, 2002). A few interventions have been developed that focus specifically on meeting the needs of the parent to address the challenges associated with raising a child with ASD. In a review and meta-analysis of parent outcomes related to these interventions, Rutherford and colleagues (2019) identified several types of parent-focused interventions, which included parent ASD education, mindfulness training, support groups, and interventions that incorporated parents into therapies designed to teach their child cognitive and social skills. Results of the meta-analysis indicated parent participation in one of these interventions was associated with positive outcomes for the parents including improved well-being and reduction of lax and overreactive parenting styles. However, only a small number of studies exploring these studies have been conducted. Therefore, more studies need to be performed to determine if these interventions may have an impact on child outcomes as well.

Limitations and Future Directions

While this study has many strengths and adds to the literature examining the impacts of parenting in families of children with ASD, the study has several limitations that may impact the results. First, the sample size of the current study creates some limitations regarding power. The initial hypothesized model included both mother- and father-report of each of the determinants of parenting, mediators, and outcome variables. Having both parents in the same model increased the number of variables and parameters in the model. When conducting structural equation modeling, it is generally recommended to have 10 cases per variable in the model (Wolf et al., 2013). Based on that general recommendation, the initial hypothesized model would have a recommended sample of 180 mothers and fathers. However, researchers have suggested that number should be adjusted depending on the size of the effect and the presence of missing data. Wolf and colleagues (2013) recommend having a large enough sample to adequately detect the smallest effect in the model. Future studies examining the relationship between the determinants of parenting and child externalizing behaviors via parenting behaviors should consider the small-to-moderate effects and recruit a larger sample size to adequately detect statistical significance.

The current results may also have some issues with generalizability. The sample was mainly married, affluent, White families of children with high-functioning ASD. The same pattern of results may not hold true for other samples, such as single parent households, families of children with lower-functioning children ASD, or families from historically underrepresented backgrounds. Single parents and racial/ethnic minority families may have additional stressors that impact the parenting system, such as lower family quality of life (McAuliffe et al, 2016), less access to respite care (Dyches et al., 2016), and inadequate access to diagnosis and support services (Zeleke et al., 2019). Future studies should include a sample with a more diverse background in order to capture the unique challenges these families face. Comparisons between

families with more diverse backgrounds may provide greater insight into how the parenting behaviors mediate the relationship between Belsky's (1984) determinants of parenting and child externalizing behaviors.

With respect to the measures used in the study, the scale reliabilities for the parenting psychological (Mothers: $\alpha = .67$; Fathers: $\alpha = .68$), and firm control were low (Mothers: $\alpha = .61$; Fathers: $\alpha = .66$), though still within the acceptable range. These low reliabilities might explain why the parenting latent variables in the original hypothesized models were not loading successfully. Additionally, as the observational variables were not included in the models, all variables except child age and verbal ability were parent-report. Including observational data and having multiple reporters lends validity to the results as it reduces error due to bias inherent in self-report data. Future studies should include measures from multiple reporters (e.g., parent, child, or teacher-report), observational, or physiological data. This would allow for a more nuanced exploration of the associations between determinants of parenting, parenting behaviors, and child outcomes. For example, with multiple reporters it would be possible to examine whether discrepancies in parent- vs. child-report of parenting behaviors is a predictor of child behaviors.

Future Directions

While the current study adds to the current literature examining Belsky's (1984) determinants of parenting and child externalizing behaviors in families of children with ASD, there are some questions that have yet to be explored. The current study only examines child externalizing behaviors. As prior research has shown, externalizing behaviors have a negative impact on children with ASD and their families (e.g., Mahon & Matson, 2011). However, in children with high functioning ASD, internalizing behaviors (e.g., depression and anxiety) also

have a high prevalence rate, with more than one-third reporting meeting the criteria for depression (32%) and anxiety (39%) disorders (Mazefsky et al., 2010). With such high rates of anxiety and depression in this population, future research should examine how child-, parent-, and family-level factors impact internalizing behaviors in children with ASD. Indeed, it would be particularly interesting to include both internalizing and externalizing behaviors in the same study to explore whether similar patterns of associations exist.

Future studies should also incorporate some methodological changes that might help improve the current study. Including observational data in studies reduces the bias of self-report data and may provide a more accurate picture of parenting behaviors and child externalizing behaviors these families engage in during everyday tasks. The child could also report on their perceptions of family functioning, parenting behaviors, and externalizing behaviors. Further, additional child-level factors that were not included in this study (e.g., child anxiety, depression, and symptom severity) could provide better insight into how these factors impact parenting and child externalizing behaviors. The current study is also only utilized cross-sectional data, which limits the conclusions that are drawn. The determinants of parenting factors examined in the current study may change over time and longitudinal data may provide better insight into the causes and mechanisms behind these relationships.

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ABSTRACT

ASSOCIATIONS BETWEEN DETERMINANTS OF PARENTING AND CHILD EXTERNALIZING BEHAVIORS IN FAMILIES OF CHILDREN WITH AUTISM: THE MEDIATING ROLE OF PARENTING BEHAVIORS

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Children with autism spectrum disorder (ASD) often display externalizing behaviors, such as aggression and hyperactivity, that impact their adaptive functioning, decrease parental mental health, and adversely impact family functioning. Child-, parent-, and family-level factors often directly negatively impact the child and are associated with higher levels of externalizing behaviors. As parenting has been shown to affect the level of child externalizing behaviors in neurotypical children, it is possible that parenting may act to mediate these relationships in children with ASD. The goal of the current study was to examine the extent to which parenting behaviors mediated associations between child-, parent-, and family-level factors and child externalizing behaviors. The current study included 117 families (mother, father, and child) of children with ASD. Parents answered a series of questionnaires related to the determinants of parenting, parenting behaviors, and child externalizing behaviors. Results indicated that, for mothers, parenting warmth mediated the relationship between child age, depressive symptoms, family cohesion, and family conflict and child externalizing behaviors. For fathers, parenting warmth only mediated the relationship between child-level factors (age and verbal ability) and child externalizing behaviors. Results of the study support prior research and Belsky's (1984) determinants of parenting theory.