# The Broad Autism Phenotype and its Relation to Parental Reflective Functioning in Mothers of Children with Autism Spectrum Disorders

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**Abstract**

Attachment theory posits that a strong attachment between parent and child is necessary for the child to grow and develop emotionally. Parental reflective functioning (PRF), the way that a parent is able to reflect on their own and their child's internal mental states, is an underlying factor to fostering children's own reflective functioning abilities and, in turn, the parent-child attachment relationship. Individuals with autism spectrum disorders (ASD) have impairments in reflective functioning abilities. As genetic factors contribute to ASD, parents of children with ASD may have higher levels of the Broad Autism Phenotype (the BAP), which refers to non-clinically significant symptoms of ASD. Examining levels of PRF in parents of children with ASD, and the impact of level of the BAP on level of PRF, is important, as this will allow for a better understanding of how these variables interact with each other and impact the parent-child relationship within these populations. Further, examining the relationship between level of PRF and level of parenting stress, along with the mediating role that externalizing behaviours play in this relationship, is important in order to allow us to further understand how PRF interacts with these variables that are often present within families of children with ASD. Broadly, the current study sought to examine PRF in mothers of children with ASD, along with the relationship that the PRF has with the BAP, parenting stress, and child externalizing behaviour problems.

The current study examined 105 mothers of children with ASD and 100 mothers of children without ASD. ANCOVAs revealed that mothers of children with ASD had significantly lower levels of PRF than the comparison group, while a significant negative relationship existed between levels of the BAP in parents of children with ASD and PRF; more specifically, between ASD and prementalizing. An ANCOVA also revealed that mothers of children with ASD experienced significantly higher levels of parenting stress than the comparison group, and level

of child externalizing behaviour mediated the relationship between level of PRF in parents of children with ASD and parenting stress.

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## List of Terms and Abbreviations

**Term 1.** Adult Attachment Interview (AAI)

**Term 2.** Ages and Stages Questionnaire (ASQ-3)

**Term 3.** American Psychological Association (APA)

**Term 4.** Applied Behaviour Analysis (ABA)

**Term 5.** Attention-Deficit Hyperactivity Disorder (ADHD)

**Term 6.** Autism Spectrum Disorders (ASD)

**Term 7.** Autism Spectrum Quotient (AQ)

**Term 8.** Autism Spectrum Quotient: Children's Version (AQ-Child)

**Term 9.** Broad Autism Phenotype (BAP)

**Term 10.** Broad Autism Phenotype Questionnaire (BAPQ)

**Term 11.** Conduct Disorder (CD)

**Term 12.** Intellectual Disability (ID)

**Term 13.** Oppositional Defiant Disorder (ODD)

**Term 14.** Parent-Child Interaction Therapy (PCIT)

**Term 15.** Parent Development Interview (PDI)

**Term 16.** Parental Reflective Functioning (PRF)

**Term 17.** Parental Reflective Functioning Questionnaire (PRFQ)

**Term 18.** Parental Reflective Functioning Questionnaire for Adolescents (PRFQ-A)

**Term 19.** Parenting Stress Index (PSI)

**Term 20.** Parenting Stress Index-Short Form (PSI/SF)

**Term 21.** Reflective Function Scale applied to the Parent Development Interview (PDI-rated RFS)

**Term 22.** Socioeconomic Status (SES)

**Term 23.** Swanson, Nolan, and Pelham - IV Questionnaire (SNAP-IV)

**Term 24.** Theory of Mind (ToM)

**Term 25.** Weak Central Coherence (WCC)

# The Broad Autism Phenotype and its Relation to Parental Reflective Functioning in Mothers of Children with Autism Spectrum Disorders

Autism Spectrum Disorder (ASD) is a disorder characterized by social and communication impairments, as well as repetitive behaviours (American Psychiatric Association, 2013). ASD has sparked a large body of research across many domains over the past several decades. This increased interest across fields of study is in large part because of ASD's increased prevalence. Although no cause is entirely clear, growing rates of ASD are in part due to changes in diagnostic and reporting practices (Hansen et al., 2015; King & Bearman, 2009), significant decreases in average age of diagnosis (Parner et al., 2008), increased awareness of ASD symptomology among health care professionals as well as the general public (Wing & Potter, 2002), and improved efficiency of diagnosis (Caronna, 2003). Other factors, such as the advancement of modern medicine, could also help explain the increased rates of ASD. More specifically, infants born progressively more premature now have higher rates of survival in comparison to previous decades (Glass et al., 2015). These increased survival rates, paired with preterm infants being at higher risk for developing ASD (Kuzniewicz et al., 2014), are likely adding to the observed increased rates of ASD. According to data obtained through the National Health Interview Survey, the current rate of ASD is estimated to be roughly 2.24% in the United States of America (Zablotsky et al., 2015). Further, the American Psychiatric Association (2013) estimates rates of ASD are between 1–2% in the regions of Europe, North America, and Asia.

ASD is a worthwhile disorder to continue researching for a multitude of reasons. Briefly, individuals diagnosed with this pervasive disorder are at increased risk for having health-related issues and illnesses (Gurney et al., 2006), being bullied by peers (Cappadocia et al., 2012), and generally experiencing a decreased quality of life in comparison to individuals without ASD

(Lee et al., 2008). The way in which ASD can impact the family unit has also been examined. Parents of children with ASD, especially mothers (Moes et al., 1992), are at increased risk for experiencing strain within their families (Nealy et al., 2012). A potential contribution to this strain is lower levels of parental reflective functioning (PRF).

PRF can be conceptualized through the lens of object relations theory, which is grounded in a psychodynamic framework and posits that the way in which individuals interact with others is rooted in the way that their primary caregivers interacted with them (Klein, 1952). PRF is therefore also closely linked to the attachment relationship between caregiver and child (Fonagy & Target, 1998). PRF is defined as the way in which a parent views their child's behaviours as being driven by their internal mental states (e.g., their feelings and desires; Luyten, Mayes et al., 2017). PRF is also concerned with the way in which a caregiver reflects upon their own mental states and how interactions with their child shape both their behaviours and what is driving them (Sharp & Fonagy, 2008). A central feature of PRF is mentalization, which can be defined as "the process by which we make sense of each other and ourselves, implicitly and explicitly, in terms of subjective states and mental processes" (Bateman & Fonagy, 2010, p. 11). Given the social nature of mentalization, it is not surprising that individuals with ASD have been shown to exhibit deficits in this area (Chung et al., 2013). Although mentalization abilities in individuals with ASD have been examined, research has not yet investigated PRF abilities in individuals who also present with non-clinically significant symptoms of ASD; specifically, those ranking higher in the broad autism phenotype (BAP).

The BAP can be defined as clinically nonsignificant symptoms of ASD often found in relatives of individuals with ASD (Folstein & Rutter, 1977). Individuals ranking higher in the BAP tend to be aloof, anxious, rigid (Hurley et al., 2007), have issues in pragmatic language

usage, and are at risk for language delay (August et al., 1981). Higher levels of the BAP are often found in individuals who are direct relatives of those with ASD (e.g., in parents of children with ASD) due to ASD's significant genetic component (Bailey et al., 1995; Muhle et al., 2004). Although it has been made clear that relatives of individuals with ASD are at increased risk of experiencing symptoms of ASD in the form of the BAP, and that symptoms of ASD can lead to decreased levels of mentalization, the link between the BAP and PRF has yet to be examined. This is an important area of study, as the way in which a parent engages in PRF is related not only to the parent-child relationship (Rostad & Whitaker, 2016) but also more specifically to the transmission of secure attachment (Fonagy et al., 1991).

When a parent has difficulty engaging in mentalization and therefore reflecting on the underlying contributors to their child's behaviours, they may in turn experience a decreased level of distress tolerance (Rutherford et al., 2013). Distress tolerance, defined in this context as the parent's ability to experience and endure negative states (Simons & Gaher, 2005), is related to parenting stress, which can be conceptualized through a family stress model framework (e.g., McCubbin & Patterson, 1982; see Figure 1). At its base, the family stress model posits that the stress a family feels should be viewed from a social systems approach, which views stress in the context of the family as well as the ecosystem in which they are living (Boss, 2002). Parenting stress theories that are more aimed towards parents of children with developmental disorders have also been outlined in the literature.

Perry (2004) examined the unique variables that contribute to level of parenting stress among families of children with developmental disorders such as ASD. Perry's model includes the domains of stressors, resources, supports, and outcomes (see Figure 2). These domains are each broken into two categories. Stressors are broken into stressors from the child's

characteristics (e.g., level of negative externalizing behaviours) as well stressors outside of the child and family (e.g., stressors from the workplace). Resources are broken into level of personal (e.g., coping mechanisms) and family resources (e.g., level of marital satisfaction). The supports domain is divided into informal social support (e.g., help received from friends or family members external to the main family unit) and formal supports and services (e.g., structured treatment programs for the family or child). The outcomes variable, which is categorized by either negative or positive parental outcomes, is based on the positive (or negative) levels of resources and supports within the model. More simply put, if a parent has higher levels of personal and family resources, along with both informal and formal supports, they will have positive parental outcomes. The opposite would be true if lack of resources and supports were present for the family, resulting in negative parental outcomes (Perry, 2004).

**Figure 1**

*Double-ABX model of family stress*

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*Source:* McCubbin & Patterson (1983a).

**Figure 2**

*Model of stress for families of children with developmental disorders*

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*Source:* Perry (2004)

The relationship between level of PRF and level of parent distress tolerance has been studied with infants and toddlers with early regulatory disorders (i.e., feeding, sensory, sleeping, or crying disorders amongst infants and toddlers; Georg et al., 2018), but not with ASD populations. Similarly, the relationship between level of parenting stress and level of PRF has not been examined in the ASD literature. Examining this relationship in an ASD population would further add to our understanding of the BAP, PRF, and their relationships to levels of parenting stress.

Parents of children with ASD experience heightened levels of parenting stress in comparison to families of children without developmental disorders (Davis & Carter, 2008). One of the multiple reasons for these increases in parenting stress is the externalizing behavioural problems that often accompany ASD (e.g., Gray, 2002; Vaillancourt et al., 2017). Identifying whether these externalizing behaviours are partially mediating a parent's level of PRF in its relation to parenting stress is important to also consider[1].

This dissertation addressed these gaps in the ASD and parenting literature. Specifically, I examined whether level of maternal BAP was significantly related to maternal levels of PRF. PRF and its relation to level of parenting stress amongst mothers of children with ASD was also examined. Child externalizing behaviours and their mediating effects on the relationship between PRF and parenting stress was also studied. Overall levels of parenting stress and the BAP were compared between ASD and non-ASD samples. Mothers of children with ASD were recruited for this study due to the increased likelihood that they would have elevated levels of the BAP compared to mothers of children without ASD. Mothers of children without ASD were recruited to serve as a comparison group. In order to answer the specific research questions outlined within

[1] Partial mediation (as opposed to full mediation) was hypothesized due to the numerous factors that contribute to parenting stress in parents of children with ASD (Hayes & Watson, 2013).

this dissertation, questionnaires were completed by participants that assessed for PRF, BAP, parenting stress, child externalizing behaviour problems, and background data (e.g., socioeconomic status [SES], age). Broadly, this study aimed to advance the research on family relations amongst mothers of children with ASD.

# Chapter I

## Literature Review

### Gender and Parenting

Although traditional gender roles have shifted in the last several decades (Brooks & Bolzendahl, 2004; Pelchaht et al., 2007), research continues to show that women consistently take on more of the household labour in comparison to men (Charbonneau et al., 2019; Dempsey, 2002; Lachance-Grzela & Bouchard, 2010; Starmer et al., 2019). The introduction of parenthood into heterosexual relationships tends to elicit more gender-stereotyped roles, with women falling into more of the household and child-rearing roles and men focusing on more of a provider role (Katz-Wise et al., 2010). Research has shown that parents who have children with disabilities tend to have even more pronounced gender stereotyped roles when it comes to parenting (Gray, 2003). Fathers of a child with a disability are less likely to be the primary care provider of the child and engage in more of the social roles of parenting (e.g., playing; Simmerman et al., 2001). Fathers also tend to be more concerned with income earning to support their family and are less involved with things such as the child's therapy or engaging with the child's medical care providers (Hauenstein, 1990).

A theoretical framework that helps to explain the stereotypical gender roles that are still seen amongst parents is social structural theory, which was initially proposed by Eagly and Wood (1999) as a way to challenge the notion that gender differences exist solely because of evolutionary factors. In the construct of parenting, social structural theory would posit that mothers and fathers fall into their individual parenting roles due to a mixture of: pressures from society, their own choices, and their biological makeup. Therefore, mothers may take on a higher portion of the parenting role due to larger expectations placed on them within their culture

surrounding mothering, paired with their larger physical role in parenting (e.g., carrying the child throughout pregnancy, birthing the child, breastfeeding), and their own desire to become a mother (Katz-Wise et al., 2010).

**Attachment Theory**

At its base, attachment theory posits that children need a consistent and loving relationship with their primary caregiver(s) (Van Rosmalen et al., 2015). The attachment relationship begins its formation when infants engage in attachment behaviours, such as seeking proximity to their attachment figure when feeling scared or threatened through crying, smiling, and reaching, that in turn may or may not be appropriately reciprocated by their caregiver (e.g., by picking up the child and comforting them; Bowlby, 1969). Children who are securely attached display confidence that their needs will be met by their primary caregiver and are able to use this caregiver as a safe base to explore the world around them (Main & Cassidy, 1988).

Within attachment theory, four general types of attachment are outlined. The first three, identified by Ainsworth and Bell (1970), are secure, anxious-avoidant, and anxious-ambivalent. Disorganized attachment was later added by Main and Solomon (1986). As already noted, infants who are securely attached use their caregiver as a safe base to be able to explore (Main & Cassidy, 1988). Infants who are anxious-ambivalent tend to seem anxious and angry towards caregivers and become extremely preoccupied with them, while anxious-avoidant infants do not appear upset when separated from their caregiver and will avoid contact with them (Campos et al., 1983). Infants who are disorganized in their attachment do not have a reliable pattern of dealing with distress, and present a mixture of anxious and avoidant behaviors (Main & Solomon, 1990).

Attachment to a parental figure is essential for not only the emotional health of the child, but also for their overall survival (Ainsworth & Bell, 1970). Children who are not securely attached to their caregivers are at increased risk for psychopathologies (Davila et al., 2005), difficulties in adult romantic relationships (Feeney, 1999), and issues in school and work environments (Suess et al., 1992). Reflective functioning and, in turn, parental reflective functioning (PRF) are important underlying factors to secure attachment, as a parent must understand the meaning behind their child's behaviours in order to respond appropriately to them (Fonagy et al., 1991).

**Reflective functioning**

Reflective functioning can be thought of as an individual's understanding of their own, as well as other individuals', mental states (Fonagy et al., 2002). Reflective functioning is concerned with the relational aspects of human functioning and aids in the formation of social relationships (e.g., friendships, romantic partnerships; Slade, 2005) as it helps humans understand their own internal states as well as those of those around them. This skill has allowed humans to evolve into highly complex social creatures (Fonagy et al., 1991). Fonagy and colleagues (2002) describe these mental states as being the feelings, beliefs, and desires that in turn guide our behaviours and, more broadly, the way in which we go about our day to day lives. While mentalization is thought of as the capacity to understand our own as well as other individual's mental states (Fonagy & Target, 1998), reflective functioning is the operationalization of this concept (Jurist & Meehan, 2009). By being able to understand mental states (i.e., engage in reflective functioning), we are also able to make sense of one another by interpreting people's behaviours and having others understand our behaviours as something deeper than merely the actions we carry out to meet our basic needs (i.e., that individuals engage

in behaviours that correspond to their underlying feelings and beliefs; Fonagy et al., 2002). Humans are constantly being driven to engage in interpersonal relationships as a means of survival (Baumeister & Leary, 1995). Reflective functioning also allows individuals to regulate their own affect by allowing one to make sense of their own internal thoughts and feelings (Fonagy & Target, 1998).

**Parental reflective functioning**

Fonagy and colleagues (1991) furthered the reflective functioning research by examining reflective functioning abilities in parents towards their children (i.e., parental reflective functioning). PRF, therefore, can be defined as the way that a parent views their child's behaviours as being driven by their child's internal mental states (Luyten, Mayes et al., 2017). PRF is also concerned with the way that the caregiver reflects upon their own mental states and how interactions with their child shape both their behaviours and what is driving them (Sharp & Fonagy, 2008).

Several elements are involved when a caregiver successfully engages in PRF, which were outlined in an integrative review by Ordway and colleagues (2014). The first involves the caregiver maintaining a *curious* viewpoint of the child's mental state (Fearon et al., 2006; Rutherford et al., 2013; Slade, 2007). This curiosity involves having a true interest and flexibility when thinking about the child's thoughts and emotions, acknowledgment on the parent's part that their own thinking might be influenced and expanded upon by taking in other's perspectives, and avoiding holding judgements or preconceived notions about the child's mental states (Fearon et al., 2006; Slade, 2007). Second, the parent/caregiver must *acknowledge* that their child's mind and, therefore, their mental states, are not always fully transparent to the caregiver (Slade, 2007). Specifically, the parent must acknowledge that they will not always be certain or completely

accurate about their child's mental state. Thirdly, the caregiver must engage in what is referred to as "non-compulsive contemplation and reflection" (Ordway et al., 2014, p. 3493). The authors explain that this involves the caregiver approaching mindfulness (i.e., reflecting on theirs and their child's mental states) from a relaxed state while not being forceful, overly controlling, or too detail oriented with their children in their approach to understanding their behaviours and mental states. A fourth component to PRF involves the caregiver engaging in *perspective taking*; essentially, the caregiver must be able to acknowledge that their child may have a different perception of their shared experiences (Lena, 2014). The fifth element is referred to as *impact awareness* and is concerned with the caregiver being able to recognize that the way they think, feel, and behave will have an impact on their child (Rosenblum et al., 2008). The caregiver's understanding that their child's thoughts and feelings are not in any way a threat to their parenting is outlined as the sixth component to the definition of PRF (Bevington, 2010). Lastly, engaging in PRF requires the caregiver to keep in mind the developmental age of the child within the context of understanding what is driving their behaviours (Slade, 2005). For example, the caregiver should take into context the age of the child (e.g., 8 years old versus 2 years old) when the child is displaying negative externalizing behaviours and the parent is reflecting on the underlying reasonings for these behaviours.

Luyten and colleagues (2017) further reviewed the PRF literature in a publication that summarized the theoretical underpinnings of PRF. The authors identified the concept of pre-mentalizing (Fonagy et al, 2010), which broadly occurs when parents/caregivers experience impairments in PRF. Essentially, pre-mentalizing can be thought of as the opposite of mentalizing. There are three modes of prementalizing, and these often occur together. First, parents might show a lack of curiosity and/or interest in the mental states of their child (Luyten,

Nijssens, et al., 2017). This overall lack of interest in turn makes it impossible for the parent to enter into the mind of the child and attempt to understand their mental states. Secondly, caregivers with PRF deficits may engage in either hypermentalizing or hypomentalizing. Hypermentalizing occurs when the caregiver assumes that they are fully and completely aware of their child's mental states at any given moment, leading to an inflexible way of viewing the child's internal experiences. Hypomentalizing, on the contrary, occurs when the caregiver believes that their child's mental states are somewhat of a mystery, thereby believing that there is no way for them to know or understand what internal states are driving their child's behaviours. Relatedly, caregivers may either assume that their child does not yet have the ability to engage in mentalizing, essentially viewing them as having a blank mind, or they might have far too high expectations for their child's mentalizing abilities for their developmental age. Fonagy and colleagues (2017) also point out that parents who have PRF deficiencies might engage in a mixture of both hypermentalizing and hypomentalizing.

The third way in which parents with PRF deficits exhibit prementalizing is by viewing their child and their underlying mental states through warped and inaccurate lenses that tend to view their child as malicious in nature (Luyten, Nijssens et al., 2017). This mode of viewing their child results in unlikely reports of the child that are not accurately related to their mental states (e.g., believing that their child cries in public only as a way to embarrass or humiliate them, never stopping to consider that their child might cry in public due to a host of underlying mental states, such as feeling embarrassed or upset by another individual in the social setting). This also can lead the caregiver to default to the "teleological mode of experiencing subjectivity" (Luyten, Nijssens et al., 2017, p. 6), meaning that the caregiver may view only objective behaviours as what are impacting the child's mental states. For example, a caregiver who was engaging in this

type of prementalizing might think, “When my child no longer has the flu (i.e., an objective state) they will be okay and their mood will be better,” or “My child has mental health issues because they had cancer as a child.”

Based on the literature reviewed above, Luyten and colleagues developed the Parental Reflective Functioning Questionnaire (PRFQ; Luyten, Mayes et al., 2017). The PRFQ is comprised of three main components: the overall *pre-mentalizing* component, which assesses if caregivers do not actively consider their child’s mental states when thinking about their behaviours, believing their child’s behaviours are deviant in nature, and being unable to take the subjective stance of their child (essentially, a parent who was engaging in prementalizing would not be engaging fully in any of the elements of PRF described by Ordway et al. [2014]). The second component is *certainty* about the child’s mental states, which refers to believing that you can always know what your child is thinking and feeling. Finally, the third component is *interest and curiosity* in the child’s mental states (i.e., showing a genuine interest in their child’s feelings and thoughts); decreased rates of which will lower levels of PRF (Luyten et al., 2017).

**Parental Reflective Functioning and Attachment**

When a child sees their primary caregiver as a secure base, they are able to explore the world around them, coming back to their base if they feel frightened or unsure (Bowlby, 1988). This secure base is developed by the parent sensitively, accurately, and lovingly responding to the child’s cues and providing a safe space for them to learn and grow (Bowlby, 1958, 1988).

The level of PRF that a caregiver displays is highly linked to the development of a secure parent-child attachment (e.g., Fonagy, 1997; Fonagy et al., 1991; Fonagy & Target, 1998; Slade, Grienenberger et al., 2005). This relationship was clearly elucidated through the London Parent Child Project (Fonagy et al., 1991). During this study, significant relationships were observed

between parent and child attachment classifications and PRF, as well as overall attachment security and PRF. The relationship between attachment security and PRF is not surprising. Specifically, in order for a parent to respond sensitively to a child's attachment cues, the parent must have some type of understanding of what these cues mean (e.g., understanding that the reason your child is clinging to you is because they are scared; Fonagy et al., 1991). Essentially, without PRF, a parent may struggle to promote a secure attachment because it is difficult to react appropriately to their child's cues. This may then perpetuate difficulties for the child in forming reflective functioning capabilities, as it is from the attachment relationship that a child is able to begin developing their own reflective functioning abilities. This skill of engaging in reflective functioning is therefore not inherent, but needs to be developed beginning in infancy through the attachment relationship between parent and child (Kovács et al., 2010). Reflective functioning capacities are first formed by the child mirroring their parents' responses to their mental states underlying their observed behaviours (Slade, 2005).

Reflective functioning capacities have been found to be impaired amongst individuals with certain psychological disorders, impacting the quality of their interpersonal relationships (Luyten, Nijssens et al., 2017). Specifically, individuals with eating disorders (Skårderud, 2007), personality disorders (Bateman & Fonagy, 2010), depressive disorders (Fonagy et al., 2020), and psychotic disorders (Brent et al., 2014) have been found to have lower levels of PRF in comparison to the general population. Finally, individuals with ASD display lower levels of reflective functioning in comparison to individuals without ASD (Lombardo et al., 2011).

Other factors that might further impact these individual's levels of PRF are lower levels of SES (e.g., Jessee et al., 2018, Sadler et al., 2013), making this an important variable to consider when examining PRF. Families who have lower levels of SES tend to experience higher

levels of stressors and parenting stress (Hurt & Bentacourt, 2017). Parenting stress can in turn have negative impacts on PRF (Håkansson et al., 2019; McMahon & Meins, 2012). The age of the child the parent is reflecting on can also impact a parent's level of PRF, making age of child another variable to keep in mind when researching this topic. For example, Pazzagli and colleagues (2018) recently found that parents of school-aged children engaged in less mentalization towards their children in comparison to parents of infant children. Older children have increased capacity to suppress or control what type of emotions that they do express, which can negatively impact the parent's level of engagement in PRF (Borelli et al., 2016). In comparison to younger children and infants, older children also have greater ability to regulate themselves emotionally, while their behaviours begin to be more influenced by individuals and events outside of the parent-child relationship. These increases in emotion regulation and external experiences that shape behaviours might also impact a parent's level of reflection on their child's underlying mental states, thus decreasing a parent's level of PRF towards them (Rutherford et al., 2015b).

**Autism Spectrum Disorder**

The American Psychiatric Association (2013) states that individuals with ASD experience ongoing issues in social communication and social interaction (Criterion A). Specifically, individuals with ASD experience struggles with social-emotional reciprocity, a diminished ability to engage in nonverbal communication, and a limited ability to understand, maintain, and develop relationships. In addition, individuals with ASD also engage in restricted and repetitive behaviours (Criterion B). That is, individuals with ASD engage in at least two of the following: repetitive behaviours (e.g., stereotyped motor behaviours), insistence that things remain the same (i.e., extreme inflexibility), restricted interests that are abnormal in terms of

intensity and/or focus on these interests, and hyper- or hyporeactivity to sensory input (American Psychiatric Association, 2013). Further, this disorder falls on a spectrum, with individuals ranging in their severity of symptoms (Volkmar et al., 2004). Although research is somewhat mixed and there are many theories that help to explain ASD and its accompanying symptoms (e.g., Hyper-Systemizing model; Baron-Cohen 2006; Extreme Male Brain theory (Baron-Cohen et al., 2002) deficits in theory of mind (ToM) and weak central coherence (WCC) have both been proposed as core cognitive deficits underlying many ASD symptoms.

**ASD and ToM.** Researchers have suggested that ToM can be used to understand the social impairments that accompany ASD (Baron-Cohen et al., 1985). This theory describes individuals' abilities to cognitively understand one's beliefs, thoughts, and emotions (i.e., internal states; Premack & Woodruff, 1978). There are several dimensions of ToM: 1) cognitive ToM (being able to reflect on thoughts, beliefs, and knowledge), 2) affective ToM (reflecting on and experiencing emotions), 3) interpersonal ToM (reflecting on other people's emotions), and 4) intrapersonal ToM (reflecting on one's own emotions; Westby & Robinson, 2014). Further, ToM is typically broken down into first and second orders. First order ToM is exhibited when an individual is able to reflect on another person's internal states (Wellman & Liu, 2004), while second order ToM is exhibited when an individual is able to infer what someone thinks or feels about what another person is thinking or feeling (Westby & Robinson, 2014). ToM is crucial for social interactions, as it is what we engage in to make sense of other people's behaviours, allowing us to predict an individual's future behaviours (Premack & Woodruff, 1978). Individuals with ASD have demonstrated a diminished ability to engage in ToM across studies (e.g., Baron-Cohen, 2000; Baron-Cohen et al., 1985; Perner et al., 1989; Ponnet, 2004; Senju, 2012). While ToM focusses primarily on understanding the cognitive differences leading to

social impairments amongst individuals with ASD (Baron-Cohen et al., 1985), WCC theory posits a more general, perceptual-cognitive deficit as an underlying cause for ASD (Frith, 1989).

**ASD and WCC.** Researchers have discovered that the mechanisms making up both broad (global) and specific (detailed) components of visual stimuli are disorganized in individuals with ASD (Burnett et al., 2005). Whereas typically-developing individuals process global and local visual stimuli in a hierarchical and integrated manner, individuals with ASD appear to process these components of visual stimuli in an isolated, non-integrated manner (Mottron & Belleville, 1993). These differences in detailed and global perceptual processing are at the centre of WCC theory (Frith, 1989).

The WCC construct, as first proposed by Frith (1989), suggests that ASD's core deficits arise because of an individual's inability to incorporate smaller details with a broader, more global viewpoint. This inability can become problematic in social situations, where integration of social information is needed (Kaufman, 2005). These deficits in cognitive perceptions may, therefore, underlie the social deficits that often accompany ASD (Jarrold et al., 2000). Specifically, if an individual is only able to approach social situations from a fragmented, non-integrative approach, they are bound to have problems understanding the full social situation. In order to gain a fuller understanding of ASD, examining the neurological differences associated with these cognitive differences amongst individuals with ASD is important.

**Neurodevelopment and ASD.** Research continues to show that individuals with ASD exhibit differences in their neuroanatomy in comparison to individuals without ASD (Donovan & Basson, 2017). Understanding these differences is therefore an important factor to understanding individuals with ASD. Knowledge on the neuroanatomical differences commonly present among individuals with ASD is in large part due to advances in brain imaging

technology (e.g., Taber et al., 2004) as well as from examining the brains of individuals with ASD post-mortem (e.g., Bauman & Kemper, 1996). It is important to note, however, that several issues are present within the study of the neuroanatomy of individuals with ASD. Specifically, studies focused on the brains of individuals with ASD often lack comparison groups, have small sample sizes, include individuals with comorbid disorders, and do not always control for the effects of medications typically used by ASD populations (Happé & Frith, 1996). Happé and Frith (1996) also note that, just as the symptoms of ASD fall on a spectrum, so do neuroanatomical differences. Therefore, differences present in one individual with ASD may not necessarily be present in another. Nevertheless, several common differences in the neurological framework amongst individuals with ASD in comparison to the general population have been outlined in the literature.

Across studies, the most consistent differences found in the brains of individuals with ASD (in comparison to those individuals without neurodevelopmental disorders) have been found in the limbic system, cerebellum, and inferior olive regions of the brain (Bauman & Kemper, 2005; Fatemi, 2016). Bauman and Kemper (1985) were the first to use the method of examining whole brain serial sections (post-mortem) to investigate the brain of a male individual with ASD in comparison to an age and sex-matched control. Bauman and Kemper (1996) built on this initial research and found an overall decreased number of cell connections, smaller than average size of cells, and an increase in cell packing in the limbic systems of individuals with ASD. Following this research, a decrease in Purkinje cell counts were discovered in the cerebellum, as well as abnormally small cells in the inferior olivary complex in the brain stem (Arin et al., 1991; Bailey et al., 1998). The abnormalities within these specific brain regions resemble what a typically developing brain would look like during the gestational period of

roughly 30–32 weeks (Bauman, 1991; Happé & Frith, 1996). Therefore, these findings point to the possibility that ASD arises from a halting of maturation of certain areas of the brain during gestation. Examining the likelihood of an individual developing the brain differences that often lead to ASD can be assessed by considering their genetic predisposition to the disorder.

**Genetics and ASD.** Kanner (1943) coined the term *refrigerator mother* to describe mothers of children with "infantile autism" who were seen as cold and emotionally distant. Kanner (1943) suggested that it was the mother's absence of emotional warmth that was causing their children to develop autism. This theory gained traction and was further supported by other researchers, such as Bettelheim, who formalized the refrigerator mother theory (Cohmer, 2014). The refrigerator mother theory came with detrimental effects for children with ASD and their families, especially in the form of treatment approaches that developed stemming from this idea. For example, in the 1950s, Bettelheim had children removed from their homes and housed in treatment facilities as an attempt to detach them from their supposed emotionally cold mothers, whom he compared to guards of concentration camps (Mesibov et al., 2004). When in treatment, children with ASD were instructed to play on a sculpture of a woman made of stone, which was an attempt to have them understand their mothers having hearts of stone (Mesibov et al., 2004). It was not until the 1960s that views began to shift towards the possibility of a genetic contribution to ASD.

In 1964, Rimland published *Infantile Autism,* a book that discredited the refrigerator mother theory and instead suggested a biological underpinning for ASD. It was not until a study was carried out by Folstein and Rutter in 1977 that the genetic link in this disorder was clearly outlined. Folstein and Rutter (1977) found that monozygotic twins had higher rates of ASD concordance than dizygotic twins (36% vs 0%, respectively). These findings were then

replicated, with results indicating even more evident differences between monozygotic and dizygotic twins (e.g., Bailey et al., 1995). More recent research continues to show similar findings with ASD concordance in monozygotic twins (Frazier et al., 2014; Sandin et al., 2017). The specific genes that underlie the behavioural genetics of ASD continue to be researched today (Qiu et al., 2022), and a list of candidate genes linked to the disorder is growing (Miles, 2011). Although this list of candidate genes is expansive, there are several that have been consistently found across studies (e.g., gamma-aminobutyric acid & A receptor; for a review see Yoo, 2015).

Besides Folstein and Rutter's (1977) study, subsequent behavioural genetics research that was carried out during this time also pointed to a genetic link in ASD. Specifically, a 4:1 ratio (male vs female) was uncovered for the disorder, with this sex difference explained by differences in the neural network as opposed to differences in socialization (Wing, 1976). Today, a male to female ratio of 3.67 in children and 2.57 in adults exists (Posserud et al., 2021). An increase in rates of family members with ASD was also identified (Gillberg, 1991). Other developmental disorders (e.g., dyslexia) were also found to be common in family members of individuals with ASD (Folstein & Rutter, 1988). The fact that other developmental disorders were common amongst families of those with ASD prompted researchers (e.g., Baron-Cohen & Hammer, 1997) to question whether the phenotype for ASD was more wide-reaching than the diagnostic criteria for the disorder.

Baron-Cohen and Hammer (1997) conducted a study that sought to understand whether social cognition deficits similar to those found in individuals with ASD were apparent in first-degree family members of those with ASD. To do this, they had family members of those with ASD complete a ToM task as well as an embedded figures task. The embedded figures task involves having individuals find specific shapes among a larger picture, thereby requiring them

to view the photo in a non-integrated manner (Shah & Frith, 1983). This task, therefore, acts as a direct measure of WCC (Jarrold et al., 2000; Tassini et al., 2022). Those with ASD tend to have above average capabilities in finding embedded figures (Shah & Frith, 1983; Van der Hallen et al., 2018) and lower abilities on ToM tasks (Baron-Cohen, 2000; Livingston et al., 2019). Parents of children with ASD performed slightly worse during the ToM task and significantly better during the Embedded Figures Task (Baron-Cohen & Hammer, 1997) compared to parents of typically developing sex-matched control children. From these results, it was concluded that parents of children with ASD exhibit a mild version of the cognitive profile typically displayed by those meeting full criteria for ASD. These non-clinical ASD symptoms are now known as the broad autism phenotype (the BAP; Piven, 2001).

**Broad autism phenotype.** The BAP can be defined as a lesser degree of ASD symptomology (Folstein & Rutter, 1977). As with ASD, the BAP is viewed as a continuous construct (i.e., falling on a spectrum), with those who have very low levels of the BAP presenting with mild ASD-like symptoms, and those with extremely high levels presenting with many symptoms similar to ASD (De Groot & Van Strien, 2017). It is now well understood that a genetic link exists between the BAP and ASD (Bailey et al., 1995; Hallmayer et al., 2011; Rosenberg et al., 2009), and is therefore often found in parents of children with ASD (Bolton et al., 1994). Similar to ASD and given its genetic basis, the BAP can be considered an unchanging trait variable that is ability-based (Gerdts & Bernier, 2011). When examining an individual's level of the BAP, this construct is broken down into several key factors that should also be discussed, especially in terms of how they may relate to the parent-child relationship (Hurley et al., 2007). Specifically, individuals with higher levels of the BAP tend to present with higher levels of aloofness and lower levels of pragmatic language. They are also more likely to be rigid

in their personalities in comparison to individuals who do not rank high in the BAP (Hurley et al., 2007).

When examining an individual's level of the BAP, aloofness can be thought of as "a lack of interest in or enjoyment of social interaction" (Hurley et al., 2007, p.1681). Being genuinely curious about your child, your interactions with your child, and delighting in your child and their world is an important aspect of building a secure parent-child relationship (Hoffman et al., 2017). If a parent has high levels of aloofness, they risk having difficulties displaying genuine interest in their interactions with their children, which may in turn impact the parent-child relationship.

Pragmatic language within the BAP is defined as insufficiencies in the social facets of an individual's linguistic abilities (Hurley et al., 2007). In terms of language, those ranking higher on the BAP have been shown to be at increased risk for developmental language delays as well as experiencing difficulties with the use of expressive and receptive language (August et al., 1981). Research has shown that a parent's level of pragmatic language skills is directly related to attachment security (Teufl et al., 2020).

An individual's level of the BAP also considers how rigid they are. Someone with a high level of rigidity would have a hard time dealing with change in their lives and environments, and would typically have no interest in change (Hurley et al., 2007). Being flexible as a parent is important, as research shows that inflexible parenting approaches can lead to non-secure forms of attachment for the parent-child relationship (Roberson, 2006).

Not surprisingly, individuals with higher levels of the BAP also exhibit decreased abilities to engage in ToM due to ToM being so inherently connected to social cognition (e.g., Tsang et al., 2016). These deficits, particularly those relating to social and personality spheres,

may impact the way that individuals with higher levels of the BAP engage in certain aspects of socially driven relationships (e.g., friendships, romantic relationships, and the parent-child relationship).

**Neurodivergence.** The term *neurodivergence* or *neurodiversity* grew largely from the autism community by individuals who were tired of being viewed solely as "disabled" or "ill" (Armstrong, 2015). At its base, *neurodiversity* refers to the fact that no brains are equal and there is no benchmark for what would be considered a "normal brain." It aims to view individuals as having differences, not deficits, with the way in which they interact with, think about, and learn from the world around them (Armstrong, 2011; Singer, 2016). The term was first used by Judy Singer, autism activist and sociologist, who was advocating for equality and inclusion for individuals with autism, and for those with autism to not be labeled as "disabled" but instead as "neurologically different" (Singer, 1998; Blume, 1998). The term was also popularized in a speech titled, "Don't Mourn for Us" that was delivered in 1993 by Jim Sinclair at the International Conference on Autism.

It is argued that the differences amongst individuals with neurodiversity might point to an evolutionary explanation for why disorders characterized by neurodiversity are still around today, as there may be evolutionary advantages to these disorders in both past and present (den Houting, 2019). Within the context of neurodiversity, is the notion that many of the individuals with disorders that are characterized by neurodivergence (e.g., attention-deficit/hyperactivity disorder, ASD, dyslexia) have strengths and outperform neurotypical individuals in many areas. Specifically, individuals with ASD tend to significantly outperform neurotypical individuals in tests that assess nonverbal forms of intelligence (Mottron, 2011). Further, research has outlined that individuals with ASD are better able to understand systems (e.g., computers, mathematical

systems) and outperform their neurotypical peers in tasks that require spotting minute differences amongst patterns (Baron-Cohen et al., 2009).

Due to the genetic component of neurodevelopmental disorders like ASD (Folstein & Rutter, 1977), it is likely that many of the parents of children with ASD involved in the current study, along with their children, would fall under the classification of individuals who are neurodivergent or have symptomology that is consistent with those who are neurodivergent. This means that, although they may experience symptoms that are typically present within these populations (e.g., differences in how they socialize, think about the world and others), they most likely have many strengths in comparison to the general population and, in the case of this study, the comparison group. These strengths are key to bear in mind when conducting research on individuals within the ASD and neurodivergent community.

Although there are differences within the ASD community in regards to preference for person-first versus identity-first language (i.e., individuals with autism versus autistic individuals; see Bury et al., 2020; Lei et al., 2021), this study uses person-first language. This choice was made due to the American Psychological Association (APA, 2020) recommending to use what fits best for the context (i.e., using person-first language if the population being studied tends to prefer this style), combined with the fact that the most recent literature on this topic found that parents of children with autism preferred for their children to be described in person-first language (Buijsman et al., 2022).

**ASD and the Family**

Parents of children with ASD tend to report lower levels of parent-child relationship satisfaction (e.g., Abdullah, 2013) and higher levels of parenting stress (Dabrowska & Pisula, 2010) than parents of children without neurodevelopmental disorders such as ASD. Further,

mothers of children with ASD seem to have higher levels of parenting stress in comparison to fathers of children with ASD (Moes et al., 1992), which may be partially due to women continuing to take on roughly twice as much of the parenting duties in heterosexual couples (Bianchi et al., 2012). In fact, research has shown that mothers of children with ASD seem to experience greater levels of parenting stress than mothers of children with other developmental disorders as well as mothers of children who do not have any developmental disorders (Estes et al., 2009). These findings surrounding parenting stress are important, as parenting stress can negatively impact the parent-child relationship (Murphy et al., 2018). Poor relationship quality between parent and child is linked to issues such as later substance misuse (Ledoux et al., 2002), mental health disorders (e.g., Branje et al., 2010), decreased romantic relationship quality later in life (Seiffge-Krenke et al., 2010), low academic achievement (Jeynes, 2007), and low self-esteem (Bulanda & Majumdar, 2009).

## ASD and the Parent-Child Relationship

**ASD and attachment.** Although it is important to highlight that not all children with ASD present with non-secure forms of attachment, rates of secure attachment are consistently lower among children with ASD in comparison to children without developmental disorders (e.g., Rutgers et al., 2004). Aspects surrounding ASD that may impact the parent-child bond and, in turn, the attachment relationship, include the levels of parenting stress and the BAP in the parent, and co-occurring behavioural difficulties in the child (Ingersoll & Hambrick, 2011; Schieve et al., 2007; Smith et al., 2008).

**Parenting stress.** Parenting stress can be defined as the negative emotions or distress a parent or caregiver feels towards their parenting roles (Deater-Deckard, 1998). McKenry and Price (2005) explain that all families, regardless of their makeup, experience both internal and

external stressors. The term *family stress* has been defined as "a disturbance in the steady state of the family" (Boss et al., 2016, p. 2). Stress in families can be seen as normal and, for the most part, inevitable. This stress experienced by the family system is only viewed as problematic when it is at a level that causes disturbance in the family (McKenry & Price, 2005).

More general theories of stress and coping have been studied extensively over the last century (for a review see Lazarus & Folkman, 1984). Theories of family stress subsequently emerged from this initial research on stress and coping (Boss, 2002). It is important to view family stress from a social systems approach as this allows for stress to be considered not only in the context of the family, but also the ecosystem in which it is existing (e.g., the cultural, economic, historical, and developmental impacts that the environment has on the family; Boss, 1988, 2002). Hill (1949) proposed the first social systems model of family stress, which was later expanded upon by other researchers (e.g., McCubbin & Patterson, 1982).

**Parenting stress and attachment.** A link exists between parenting stress and non-secure forms of attachment (e.g., Hadadian & Merbler, 1996; Teti et al., 1991; Tharner et al., 2012). A parent must engage in warm and responsive behaviours in order for a secure attachment relationship between parent and child to form (Bowlby, 1988). Stress, though, has consistently been shown to negatively impact the mental and physical functioning of individuals (Schnurr & Green, 2004; Thoits, 2013). These physical and mental decreases in functioning when under stress could negatively influence the way that the parent engages in behaviours towards their child that would promote a secure attachment (Jarvis & Creasey, 1991).

**Parenting stress and ASD.** Research has long suggested that parents of children with ASD experience significantly more parenting stress than parents of children without ASD (e.g., Dumas et al., 1991). Further, parents of children with ASD experience more parenting stress than

parents of children with other developmental disorders (Gallagher & Bristol, 1989). PRF might be one factor related to elevated levels of parenting stress in parents of children with ASD. Rutherford and colleagues (2013) found that lower levels of PRF in mothers was associated with elevated levels of parenting stress in a typically developing sample. Although the relationship between PRF and parenting stress has not yet been examined in parents of children with ASD, parenting stress alone has been studied in this population. Research has continually found elevated rates of parenting stress among parents of children with ASD. For example, a meta-analysis examining parenting stress in parents of children with ASD by Hayes and Watson (2013) found these parents experienced more parenting stress in comparison to parents of children without ASD, as well as parents of children with other disabilities. Further studies have confirmed this elevation in parenting stress amongst parents of children with ASD (e.g., Estes et al., 2013; Rivard et al., 2014; Seymour et al., 2013).

Although levels of parenting stress are generally elevated among parents of children with ASD, this is not true for all parents. For example, Sharpley and colleagues (1997) found that 20% of parents of children with ASD did not perceive their family situations as stressful. A number of reasons have been outlined in the literature as to why a large portion of caregivers for children with ASD do experience an increase in parenting stress. One of these reasons proposed for elevated levels of parenting stress is co-occurring child externalizing behaviour problems (Lecavalier et al., 2006; Nachshen et al., 2005; Neece et al., 2012).

Davis and Carter (2008) examined parenting stress in parents of toddlers with ASD. The authors interviewed and administered questionnaires to mothers and fathers who had a toddler with an ASD diagnosis. Parenting stress was measured with the Parenting Stress Index-Short Form (PSI/SF; Abidin, 1990). Results from this study showed that roughly one-third of both

mothers and fathers experienced a clinical level of parenting stress, as measured by the PSI (Abidin, 1990). The most consistent predictor of parenting stress was shown to be the child's social skills deficits. Further, child externalizing behaviour problems and regulatory problems were related significantly to parenting stress in both mothers and fathers. In fact, research continues to show a strong link between parenting stress and child externalizing behaviours (Henninger & Luze, 2014). In some cases, higher levels of parenting stress among parents of children with ASD persist as the child grows older, making age of child an important covariate to consider when examining parenting stress (Abbeduto et al., 2004; Barker et al., 2014).

**Parenting stress and age of child.** Gray (2002) conducted a longitudinal study to examine the families of children with ASD 8–10 years after an initial study that examined the experiences of parents raising a child with ASD. At the time of follow-up, the children ranged from adolescent (13 years) to early adult (27 years). Data was collected in the form of an open-ended interview that consisted of questions surrounding the child's current symptomology, their medical history, the child's experience receiving a referral for ASD, how the child had affected the parent's career and health, how the parents cope with stressors, their conceptualization of their child's illness, and their expectations for their child's future. Although Gray (2002) found that roughly two-thirds of parents viewed their situation with their child as improved in comparison to 8–10 years prior, a large proportion of parents reported their parenting stress levels and overall situation as worsened. For these parents, a sizable factor appeared to be their child's externalizing behaviour problems. Similar findings related to externalizing problems have been found in other studies examining ASD in adolescents (e.g., Fong et al., 1993). These behavioural concerns can also negatively impact the parent-child attachment relationship (e.g., Green et al., 2007).

Longitudinal findings of parenting stress are important to keep in mind, as the path of parenting stress can differ depending on the child's presenting issues (e.g., Baker et al., 2003; Woodman et al., 2015). For example, when studying longitudinal maternal stress in families with children with developmental disabilities, Woodman and colleagues (2015) found a bi-directional effect for the relationship between parenting stress and child internalizing behaviours in early childhood (i.e., ages 3–5 years). A child-driven model was found from ages 5–10, where level of the child's internalizing problems had a predictive effect on their parent's level of parenting stress. Finally, a parent-driven model was found during the adolescent stage (age 15–18), where parenting stress predicted internalizing behaviours for their children. For children who were presenting with externalizing behaviour problems, different directional models were found in comparison to children with internalizing problems. Specifically, child-driven effects were found for the relationship between parenting stress and child externalizing behaviours between the ages of 5–15. This relationship did not shift to a parent-driven model in later adolescence (i.e., ages 15–18). Overall, when examining externalizing behaviours of the children within their study, a child-driven effect was seen for most of their childhood and adolescent years, only shifting at the age of 15. Besides children's age impacting the relationship between externalizing behaviours and parenting stress, parenting stress can also be impacted by the family's level of socioeconomic status (SES; Steele et al., 2016), thus making it another variable to be mindful of when researching parenting stress.

**Parenting stress and SES.** Mothers who have a lower level of SES in comparison to mothers with higher levels of SES are at increased risk for higher levels of parenting stress (Hurt & Bentacourt, 2017; Steele et al., 2016). Parents of low SES are faced with limited and strained finances, leading to increased daily stressors in relation to finances, which leads to decreased

resources to deal with other stressors such as those that arise with parenting (Anderson, 2008). Put more simply, parents who have low SES and are needing to raise their children in low SES environments experience a compounded effect in relation to their stress, which in turn impacts their stressors related to child rearing (Pinderhughes et al., 2001). These socioeconomic stressors impact the psychological well-being of both parents and their children (Taylor et al., 2004). Parenting stress has also been shown to have a unique relationship with the BAP.

**Parenting stress and BAP.** As outlined previously, BAP is a non-clinical form of ASD symptomology (Piven, 2011). A limited amount of research has been conducted to date on parental levels of BAP and its relationship to the parent-child relationship. Due to the social deficits often observed in individuals falling higher on BAP (Hurley et al., 2007), it is not surprising that studies that have examined this relationship have found a negative impact on the relationship between parent and child. For example, Parr and colleagues (2015) examined the association between rates of BAP in parents and their relationships with their children with ASD. The study also examined the effect of maternal BAP levels on their children's progress in a parent-mediated psychosocial intervention. Mothers with higher BAP scores had significantly less interaction with their children, and their children appeared to benefit significantly less from the parent-led psychosocial ASD intervention. These results seem to outline the potential negative effects that maternal BAP can have on the parent-child relationship.

Ingersoll and Hambrick (2011) further examined levels of parenting stress, BAP, the parent's coping mechanisms, child's ASD symptom severity, and the parent's observed social supports. Through path analysis, the authors found that both child ASD symptom severity and level of parental BAP was positively correlated with level of parenting stress. That is, as child

ASD symptom severity and BAP increased, so did parenting stress. These results shed light on the broader effects that increased levels of BAP can have on families.

**Comorbidities in Autism Spectrum Disorder**

Comorbid psychiatric disorders are found frequently in ASD populations (Hossain et al., 2020; Leyfer et al., 2006), with approximately 74% of individuals with high-functioning ASD between the ages of 9-16 years old having at least one co-occurring psychiatric disorder (Mattila et al., 2010). Internalizing (e.g., anxiety and depression) and externalizing disorders (e.g., attention-deficit hyperactivity disorder [ADHD], intellectual disability [ID], and behavioural disorders such as oppositional defiant disorder [ODD]) are especially prevalent (Antshel & Russo, 2019; Gadow et al., 2005; Lainhart & Folstein, 1994; Lecavalier et al., 2011; Meyer et al., 2006). Specifically, research shows that 42% of individuals with ASD meet criteria for a co-occurring anxiety disorder, 6% meet criteria for a major depressive disorder, 44% meet criteria for a behavioural disorder (Mattila et al, 2010), 50-70% meet criteria for co-occurring ADHD (Rong et al., 2021), and 55% have a co-occurring ID (Charman et al., 2011). The parent-child relationship is at risk of being impacted when co-occuring disorders are present with ASD due to the complexities that having these comorbid disorders can bring (Smith et al., 2008).

**Child externalizing behaviours.** Externalizing behaviour problems are common amongst children with ASD (e.g., Hill et al., 2014). Externalizing behaviour problems can be defined as outward behaviours that cause distress to other individuals (Achenbach, 1990). Achenbach and Edelbrock (1978) noted that these behaviours are marked by defiance, aggression, and impulsiveness, are antisocial in their nature, and are seen as overactive and disruptive. Children and adolescents who experience externalizing behaviour problems are at risk for academic underachievement (Hinshaw, 1992), maladjustment later in life (Campbell et al.,

2000), harsher discipline practices by their parents (Deater-Deckard et al., 1996), and less satisfying parent-child relationships (Rothbaum & Wiesz, 1994).

**Externalizing behaviours and attachment.** A wide range of research has found a significant inverse relationship between child externalizing behaviour problems and level of secure parent-child attachment (e.g., Greenberg et al., 1991; Guttmann-Steinmentz & Crowell, 2006; Lyons-Roth, 1996). This relationship was recently clarified in a meta-analysis. Theule and colleagues (2016) found a moderate relationship between conduct disorder (CD) and ODD and attachment insecurity; specifically, the mean prevalence for insecure attachment among those with CD/ODD was 56% within ten analyzed studies ($N = 486$, child age range = 3.0 – 19.75 years). When the authors detailed the individual studies that were included in this portion of their meta-analysis, all studies had a rate of attachment insecurity amongst children with CD and ODD of at least 30% and the rate ranged from 30-93.75% (Theule et al., 2016).

Relatedly, children of mothers who have lower levels of reflective functioning abilities are more likely to engage in problematic externalizing behaviours (Meins et al., 2013; Smaling et al., 2016). Meins and colleagues (2013) collected data on low SES mothers' mindfulness towards their children at both 44 and 61 months of age, along with the children's externalizing and internalizing behavioural problems. The data collected across 171 mothers indicated that, while controlling for other variables (e.g., mothers' depressive symptoms), a significant negative relationship was found between children's negative externalizing and internalizing behaviours and the mother's level of mindfulness towards their children. When viewed through the context of an attachment framework (Bowlby, 1969), a child who is non-securely attached (i.e., have not had their attachment needs met in times of stress by their caregiver) may engage in secondary coping behaviours (i.e., externalizing behaviours) to cope with distress (Fearon et al., 2010).

Although decreased levels of a parent's PRF (mentalizing abilities) leads to increases in a child's externalizing behaviours, a parent's inability to engage in adequate levels of mentalizing also has a negative impact on their levels of parenting stress (McMahon & Meins, 2012). In contrast, when a parent is able to engage in appropriate levels of reflective functioning towards themselves and their child, their emotions will be more stable and their levels of stress will decrease because they will have a better understanding of their child's behaviours (Adkins et al., 2018; Sharp & Fonagy, 2008). For example, a parent who is able to reflect on their child's negative behaviours through a mindful lens (e.g., "They are probably having a tantrum because they are tired and upset that they can't play with that toy right now") will become less stressed and less upset than a parent who is unable to engage in this level of reflective functioning (e.g., "I know they are throwing a tantrum because they are trying to embarrass me in this store and ruin my day"; Dix & Grusec, 1985). Together, this suggests that PRF and parenting stress are inversely related.

Comorbidities amongst individuals with ASD can further compound difficulties in the parent-child relationship (Smith et al., 2008). Specifically, behavioural problems amongst children with ASD are often related to increases in parenting stress (Bauminger et al., 2010; Hoffman et al., 2009; Lecavalier et al., 2006). In turn, this parenting stress is likely to negatively impact the way in which the parent views the child (Forehand et al., 1980; Webster-Stratton, 1988). Therefore, it is important to examine not only the effects of level of PRF in parents of children with ASD as a potential link to level of parenting stress, but also the potential partial-mediating effect that externalizing behaviours have on this relationship. Partial-mediation of externalizing behaviors, as opposed to full mediation, is proposed due to parents experiencing parenting stress as a result of a number of factors aside from child externalizing behaviours alone

(Hayes & Watson, 2013). Mothers, regardless of whether their child has a developmental disorder, experience parenting stress due to many factors such as level of social support (Armstrong et al., 2005), the mother's perception of their child's socializing abilities (Östberg & Hagekull, 2013), and low SES (Huaqing & Kaiser, 2003).

## Current Study

It is clear that there is a need within the ASD literature to further explore the parent-child relationship. In this study, I examined the relationship between levels of PRF and parenting stress among mothers with children with and without ASD. Next, I determined whether the level of the broad autism phenotype (BAP) among mothers of children with ASD was significantly related to levels of PRF. This was important, as it allowed us to further identify the effects that lower levels of PRF had on level of parenting stress in this population. Additionally, externalizing behaviour problems are common in children with ASD and can put a strain on the parent-child relationship. Child externalizing behaviour problems were therefore explored as a possible mediator between PRF and parenting stress in mothers of children with ASD.

## Research Objectives

The overall objective of this study was to gain a better understanding of the relationship between mothers and their children with ASD. Specifically, I explored level of PRF amongst and between mothers of children with and without ASD, and whether mothers' BAP symptoms affected their engagement in PRF. This study also specifically aimed to examine PRF and its relation to parenting stress in mothers of children with ASD, and whether child externalizing behavioural problems played a role in this relationship. The primary research objectives and hypotheses were:

1. To determine whether a significant difference exists between PRF levels in mothers of children with ASD in comparison to mothers of children without ASD while controlling for the effects of the age of the child and maternal SES.

   Hypothesis 1: Based on findings of generally lower attachment security between parents and their children with ASD, along with the strong relationship between PRF and attachment, I hypothesized that mothers of children with ASD would have significantly lower levels of PRF than mothers of children without ASD.

   1a) To determine whether a significant difference exists between *pre-mentalizing* levels in mothers of children with ASD and mothers of children without ASD. Hypothesis 1a): I expected that mothers of children with ASD would have significantly higher *pre-mentalizing* levels than mothers of children without ASD.

   1b) To determine whether a significant difference exists between *certainty* of mental state levels in mothers of children with ASD in comparison to mothers of children without ASD.

   Hypothesis 1b): I expected that mothers of children with ASD would have significantly higher *certainty* of mental state levels in comparison to mothers of children without ASD.

   1c) To determine whether a significant difference exists between *interest and curiosity* levels in mothers of children with ASD and mothers of children without ASD.

   Hypothesis 1c): I expected that mothers of children with ASD would have significantly lower *interest and curiosity* levels in comparison to mothers of children without ASD.

2. To determine whether a significant difference exists in the level of parenting stress between mothers of children with ASD and mothers of children without ASD while controlling for the effects of the age of the child and maternal SES.

   Hypothesis 2: Based on the existing literature surrounding the significant relationship between parents of children with ASD and parenting stress, I expected that mothers of children with ASD would have significantly higher levels of parenting stress in comparison to mothers of children without ASD.

3. To examine the effect of maternal BAP level (independent variable; IV) on the level of PRF (dependent variable; DV) in mothers of children with ASD.

   Hypothesis 3: Considering the genetic component of ASD and the BAP, along with the links between ASD and difficulties with reflective functioning/mentalization, I hypothesized that a significant negative relationship would exist between levels of maternal BAP and level of PRF among mothers of children with ASD. Specifically, as level of total BAP scores increased in mothers, I hypothesized that level of PRF would in turn decrease.

   3a) To examine the predictive power of level of aloofness (IV1) rigidity (IV2) and pragmatic language (IV3) on pre-mentalizing levels (DV) in mothers of children with ASD.

   Hypothesis 3a: I expected a significant positive prediction of pre-mentalizing levels in mothers of children with ASD by aloofness, rigidity, and pragmatic language.

   3b) To examine the predictive power of aloofness (IV1) rigidity (IV2) and pragmatic language (IV3) on levels of certainty about mental states in mothers of children with ASD.

Hypothesis 3b: I expected a significant positive prediction of levels of certainty about mental states in mothers of children with ASD by aloofness, rigidity, and pragmatic language.

3c) To examine the predictive power of aloofness (IV1) rigidity (IV2) and pragmatic language (IV3) on levels of interest and curiosity in mothers of children with ASD.

Hypothesis 3c: I expected that there would be a significant negative prediction of levels of interest and curiosity in mothers of children with ASD by aloofness, rigidity, and pragmatic language.

4. To examine the mediating effects of child externalizing behaviour problems (M) on maternal PRF (IV) and maternal parenting stress (DV) within families of children with ASD.

   Hypothesis 4: Given the links between insecure attachment and externalizing behaviours, PRF and parenting stress, along with the relationship between PRF and attachment, I hypothesized that child externalizing behaviour problems would partially mediate the relationship between PRF and parenting stress.

   4a) To examine the mediating effects of child externalizing behaviour problems (M) on maternal pre-mentalizing levels (IV) and maternal parenting stress (DV) within families of children with ASD.

   Hypothesis 4a: I hypothesized that child externalizing behaviour problems would partially mediate the relationship between maternal pre-mentalizing levels and parenting stress.

4b) To examine the mediating effects of child externalizing behaviour problems (M) on maternal level of certainty about mental states (IV) and parenting stress (DV) within families of children with ASD.

Hypothesis 4b: I hypothesized that child externalizing behaviour problems would partially mediate the relationship between maternal level of certainty about mental states and parenting stress.

4c) I examined the mediating effects of child externalizing behaviour problems (M) on maternal level of certainty about mental states (IV) and parenting stress (DV) within families of children with ASD.

Hypothesis 4c: I hypothesized that child externalizing behaviour problems would partially mediate the relationship between maternal level of interest and curiosity and parenting stress.

# Chapter II

# Method

## Participants

Overall, 495 mothers were surveyed. A total of 105 mothers of children with ASD and 100 mothers of children without ASD were included in analyses for the current study.

**Eligibility.** Mothers with a child between the ages of 6–11 years with a diagnosis of ASD were asked to participate in the study. The comparison group consisted of mothers who had a child between the ages of 6–11 years with no DSM-5-TR (Diagnostic and Statistical Manual of Mental Disorders) diagnoses, and no other children with ASD. All mothers were required to read and understand English, as this was the only format that the study was available in. Within the comparison group, any mothers who reported that their child had an intellectual disability (or those who were rated as not being "on schedule" based on their score from the mother completing the Ages and Stages Questionnaire Communication Subtest [ASQ-3; Squires & Bricker, 2009]) were screened out of the study.

The 6–11-year-old age group was selected for several reasons. First, although research shows that ASD can be identified in children as young as 2 years of age (American Psychiatric Association, 2013; Charman & Baird, 2002), most children with ASD without accompanying intellectual disabilities  do not receive an official diagnosis before they reach school age (Yeargin-Allsopp et al., 2003). Second, the target ages for the proposed study were similar in range to other studies that have examined parent-child relationships in ASD samples (e.g., Seskin et al., 2010). Having similar target ages to other studies that have been conducted on this topic allows for comparison of this study to this area of research.

This study focussed on mothers as the few studies conducted on parental reflective functioning in parents of children with ASD have examined mothers only (Gołaska & Twardowski, 2016), precluding a justification for focusing on fathers at this time. Further, mothers continue to take on significantly greater amounts of the childrearing responsibilities in heterosexual households, specifically in households with children with disabilities, making them an important group to study when examining the parent-child relationship (Gray, 2003; McBride et al., 2002). Gray (2003) found that, in comparison to fathers, mothers of children with ASD took on more of the childcare responsibilities and, in turn, the parenting stressors that may arise when raising a child with a disability. Most likely in part due to their taking on a large portion of childrearing responsibilities, mothers of children with ASD experience higher levels of parenting stress as well as internalizing symptoms, such as depressed and anxious mood than fathers, further justifying the need to research mothers (Dabrowska & Pisula, 2010; Hodge et al., 2011).

Although recruiting true probability samples is considered best practice within scientific research, most of the studies conducted within developmental sciences rely on convenience samples (Bornstein et al., 2013). Homogeneous convenience samples can be differentiated from typical convenience samples in that they intentionally limit their sample to specific subgroups (e.g., recruiting only mothers with children of a specific age range, as opposed to all caregivers of children of any age; Jager et al., 2017). Jager and colleagues (2017) outlined that the strength with homogeneous convenience samples is that they are more generalizable in comparison to a typical convenience sample. The current study used a homogeneous convenience sample (i.e., by specifically recruiting mothers of children with ASD within a specific age range) which means that, although the generalizability of the findings will be narrow, they will also provide clear and accurate explanations of subpopulation effects.

**Homogeneity of sample.** Mothers of boys and girls[2] were included in both the ASD and non-ASD groups for this study. To justify this decision, homogeneity tests were run. This was due the fact that boys can differ from girls in their presentation of ASD (Hartley & Sikora, 2009). For example, girls diagnosed with ASD have been shown to engage in more masking of their symptoms (Sutherland et al., 2017). These differences could have confounded results if they were present in the collected data for the current study. Several *t*-tests were conducted comparing the scores of the outcome measures of parental reflective functioning and the BAP for mothers of girls versus mothers of boys in both the ASD and non-ASD groups (see Tables 1 and 2). No significant differences were found between the boys' and girls' groups in terms of outcome measures; therefore, mothers of girls were included in both the ASD group as well as the non-ASD group. Although I had initially hoped to run separate analyses for boys and girls, there were an insufficient number of girls ($N = 17$) to power the planned analyses, so samples were comprised of both boys and girls.

**Table 1**

*PRFQ-A Score Comparisons Between Boys and Girls with ASD*

| Variable | ASD Boys | | | ASD Girls | | | | |
|---|---|---|---|---|---|---|---|---|
| | *N* | *M* | *SD* | *N* | *M* | *SD* | *t*(55) | *p* |
| Prementalizing | 47 | 13.77 | 4.83 | 10 | 14.70 | 6.13 | .529 | .599 |
| Certainty | 47 | 24.23 | 5.45 | 10 | 23.20 | 7.60 | -.507 | .614 |
| Interest and curiosity | 47 | 35.57 | 4.93 | 10 | 35.30 | 3.65 | -.166 | .869 |

*Note.* ASD = Autism Spectrum Disorder, PRFQ-A = Parental Reflective Functioning Questionnaire–Adolescent Version. ASD boys and girls with no reported intellectual disabilities were compared in this *t*-test.

**Table 2**

[2] This study was conceived prior to the common use of other gender identifications, including non-binary.

*BAPQ Score Comparisons Between Boys and Girls with ASD*

| Variable | ASD Boys | | | ASD Girls | | | | |
|---|---|---|---|---|---|---|---|---|
| | *N* | *M* | *SD* | *N* | *M* | *SD* | *t*(55) | *p* |
| BAPQ total | 47 | 2.84 | 0.72 | 10 | 2.98 | 0.99 | .534 | .595 |
| Pragmatic language | 47 | 2.48 | 0.64 | 10 | 2.62 | 0.80 | .568 | .572 |
| Rigidity | 47 | 3.12 | 0.95 | 10 | 3.18 | 1.22 | .172 | .864 |
| Aloofness | 47 | 2.91 | 0.91 | 10 | 3.15 | 1.27 | .702 | .485 |

*Note.* ASD = Autism Spectrum Disorder; BAPQ = Broad Autism Phenotype Questionnaire. ASD boys and girls with no reported intellectual disabilities were compared in this *t*-test.

This study also included mothers of children with intellectual disabilities within the ASD group. Intellectual disabilities often co-occur with ASD (see Lecavalier et al., 2011), and individuals with ASD with co-occurring intellectual disabilities can sometimes exhibit more severe ASD symptoms in comparison to those with only ASD (Matson & Shoemaker, 2009). Girls with ASD have also been shown to be more likely to have an intellectual disability (Loomes et al., 2017; Memari et al., 2012). Nevertheless, it was important to attempt to be as inclusive as possible, and the same series of *t*-tests that were run for the mothers of boys versus girls were also run between mothers of children with ASD versus mothers of children with ASD and co-occurring intellectual disabilities. There were 50 children in the ASD group who were flagged for an intellectual disability either via parent-report or the Ages and Stages Questionnaire (ASQ-3; Squires & Bricker, 2009), as this measure was used as a brief screening measure for intellectual disability. As was found for the comparison of boys and girls with ASD, no significant differences in outcome measures were found between mothers of children with ASD and co-occurring intellectual disabilities and mothers of children with only ASD (see Tables 3 and 4).

**Table 3**

*PRFQ-A Score Comparisons Between Boys with ASD and Co -Occurring ID and Boys With ASD and no ID*

| Variable | ASD ID | | | ASD no ID | | | | |
|---|---|---|---|---|---|---|---|---|
| | *N* | *M* | *SD* | *N* | *M* | *SD* | *t*(72) | *p* |
| Prementalizing | 20 | 15.50 | 4.22 | 54 | 14.04 | 5.12 | -1.143 | .257 |
| Certainty | 20 | 22.95 | 5.61 | 54 | 24.06 | 5.72 | .742 | .461 |
| Interest and curiosity | 20 | 34.15 | 4.65 | 54 | 35.48 | 4.75 | 1.08 | .285 |

*Note.* PRFQ-A = Parental Reflective Functioning Questionnaire–Adolescent Version; ID = intellectual disability.

**Table 4**

*BAPQ Score Comparisons Between Boys with ASD and Co-Occurring ID and Boys With ASD and no ID*

| Variable | ASD ID | | | ASD no ID | | | | |
|---|---|---|---|---|---|---|---|---|
| | *N* | *M* | *SD* | *N* | *M* | *SD* | *t*(72) | *p* |
| BAPQ total | 20 | 2.99 | 0.91 | 54 | 2.84 | 0.74 | -.703 | .484 |
| Pragmatic language | 20 | 2.73 | 0.86 | 54 | 2.52 | 0.67 | -1.10 | .277 |
| Rigidity | 20 | 3.08 | 1.01 | 54 | 3.09 | 0.95 | .047 | .963 |
| Aloofness | 20 | 3.16 | 1.10 | 54 | 2.92 | 0.94 | -.950 | .345 |

*Note.* BAPQ = Broad Autism Phenotype Questionnaire*;* ID = intellectual disability.

**Recruitment.** Physical recruitment sites were comprised of spaces such as St.Amant Centre, Autism Society of Manitoba, Autism Spectrum Disorders Manitoba, Autism Learning Centre, Children's Hospital Research Institute, University of Manitoba, rural and urban pediatrician's offices, and rural and urban community centres. In order to reach a more diverse sample (i.e., across North America), online recruitment was also utilized. Advertisements were posted on Facebook and targeted parent populations, community groups, as well as ASD support groups. Online ASD websites (e.g., Autism Canada, Autism Speaks Canada) were also approached and asked to disseminate information on the proposed study in the form of an

information poster (see Appendix A for the recruitment posters targeted at both mothers of children with ASD and comparison group mothers). Physical and digital posters were circulated in person and online, briefly outlining the study and eligibility criteria, how to participate, contact information of the primary investigator, as well as information on a draw for the chance to win a gift card. Ten $50 gift cards were purchased, and individuals' names were drawn randomly for a chance to win a gift card once data collection was complete.

**Sample size.** In order to determine how many individuals were needed in both the comparison and ASD group, the N:q guidelines set forth by Jackson (2003) were used. These guidelines are typically used for simple multiple regressions models such as the mediation and moderation model that were used to analyze data for the current study. The N:q guideline states that 20 participants should be added for each parameter in the model. The mediation model has three parameters for the non-ASD group (level of PRF, level of child externalizing behavioural problems, and level of parenting stress) as well as the ASD group, equating to a total of three parameters. Overall, 100 mothers were included for the non-ASD group and 105 mothers were included for the ASD group for the study, exceeding these guidelines.

**Data collection procedure.** Participants were instructed to follow a link to the study website that was provided on the study's information poster. The online data collection site Qualtrics (2014) was used for all data collection. Qualtrics has been commonly and successfully used in ASD research (e.g., Ausderau et al., 2014; Khanna et al., 2014). Data was collected via Qualtrics from February 2020 until March 2021. Data collection begun just prior to North America being impacted by the COVID-19 pandemic. Therefore, there will undoubtedly be some variability between responses, depending on when during the pandemic mothers completed the study, as a

result of different stressors during different times that the pandemic brought for families that are not possible to be accounted for.

After entering the Qualtrics study site, mothers first provided their consent to participate in the study and were given the option to obtain a copy of the study consent via email (see Appendix B). Once this was completed, they completed the demographic questionnaire (see Appendix C) before continuing on to the other measures. Participants then completed the measures outlined below, which were initially transcribed by the researcher from their paper format to the Qualtrics (2014) site when creating the Qualtrics survey. It is important to note that the study is a part of a larger study examining multiple areas of the mother-child relationship amongst mothers of children with and without ASD. Therefore, several other measures were included in this study that are not outlined here. Of the mothers who completed the entirety of the study, the total study's measures took an average of 47.2 minutes to complete.

Once the participants completed the study, they then had the option to enter into the gift card draw. To be eligible to enter the draw, they needed to provide a valid email address. This information was not linked to their data in any way. Qualtrics (2014) is a secure site for data collection, and all data was securely exported from this site once data collection for all projects was complete. From there, it was housed on a password and file protected University of Manitoba computer for data analysis. Finally, participants were taken to a debriefing page (see Appendix D), where they were given a brief overview of the study, asked if they would like to receive a summary of the survey they completed, and given the email of supervisor, Dr. Jen Theule if they had any further questions or concerns regarding the study.

**Measures**

A number of measures were used in the study to assess PRF, child externalizing behavioural problems, parenting stress, parental BAP, as well as to screen for child intellectual disability and child ASD. Questionnaires were selected due to their relative ease of administration, which allowed for a larger and more diverse sample to be collected. Both the comparison group and ASD group completed the same battery of measures, which were available in English only.

**Demographics Questionnaire.** Mothers were asked to complete a demographic information questionnaire (see Appendix C). Information such as parent and child age, socioeconomic status (SES), co-occurring disorders, and the mother's current of view how well she feels the supports needed for her family are being met were gathered. SES is a continuous variable that encompasses an individual's level of education, profession, salary, and overall wealth (Clarfield, 2010). SES is a concept with multiple aspects, therefore it can be measured in a number of ways. Researchers have typically measured SES with one indicator of a family's life (e.g., income level), several separate indicators (e.g., income level and occupation), or a combination of indicators producing a composite index of SES (Hoff et al., 2002). Although a composite index score takes into consideration a broader scope of a family's level of SES, this makes it difficult to understand SES's areas of impact on the family (Entwislea & Astone, 1994). Therefore, for the purpose of this study, SES was measured by examining household income in a rank-ordered manner.

**Intellectual functioning.** When filling out the demographics questionnaire, mothers were asked whether or not their child has ever been diagnosed with an intellectual disability. The Ages and Stages Questionnaire Communication Subtest (ASQ-3; Squires & Bricker, 2009) was also used as a brief screening measure for intellectual disability. The 60-month questionnaire was

used in order to determine whether the mothers included in the comparison group of the study had children with communication skills of at least a 57–66-month-old child (i.e., being able to communicate at a roughly 5-year age ability). Mothers were asked to select an answer of either *yes, sometimes,* or *not yet* to 6 questions on the communication scale. These questions outlined their child's ability to understand basic verbal instructions (e.g., respond appropriately to "clap your hands"), use four- and five-word sentences, use comparison words, use words with "-ed" endings to describe something that has already happened (e.g., "we walked"), answer questions (e.g., respond appropriately to "what do you do when you are hungry?"), and repeat sentences back to their parent without errors (Squires & Bricker, 2009).

The ASQ-3 was selected due to the overall high rates of sensitivity and specificity when this measure is used to screen for developmental delay in children (Juneja et al., 2012). Specifically, sensitivity rates of 100% and specificity rates of 93.3% have been reported (Squires & Bricker, 2009). Further, test-retest reliability is strong, with intraclass correlations ranging from .75 to .82 and percent agreement for parents completing the measure at two separate time points being 92% (Squires et al., 2009). Internal consistency of the measure has also been shown to be good, as evidenced by a Cronbach's alpha for the total score of .86 (Hornman et al., 2013). A total score was calculated from the mother's responses on this measure. Children who were rated as being "on schedule" were included in the comparison group, whereas those whose score placed them in the "in need of ongoing monitoring" or "in need of further assessment regarding delay" (Squires & Bricker, 2009) were excluded from the comparison group.

**Screening for child ASD.** Mothers participating in the ASD group included children previously diagnosed with ASD. Mothers were asked whether their child has received a formal diagnosis of ASD within the demographic questionnaire (see Appendix C). To help ensure our

ASD sample included children who had clinically significant ASD symptomology (and to be sure the comparison sample did not), all mothers were asked to complete The Autism Spectrum Quotient: Children's Version (AQ-Child; Auyeung et al., 2008). This measure was selected due to its high level of internal consistently ($\alpha = 0.97$) and good test-retest reliability ($r = .85$, $p < 0.001$). The AQ-Child is a parent-report questionnaire that assesses the degree of autistic traits in children between the ages of 4–11 years in the domains of social skills, attention switching, attention to detail, communication, and imagination (Auyeung et al., 2008). This measure is comprised of 50 items, and parents are asked to rate their responses on a 4-point scale (*definitely agree, slightly agree, slightly disagree, definitely disagree*). A total score was obtained from this measure, with a cut-off score of 76 used for the ASD group. This score was selected due to it yielding a high sensitivity and specificity rating of 95% (Auyeung et al., 2008). If children in the ASD group scored below 76 on this measure they were excluded from the study. Conversely, the data collected from mothers whose ratings of their children in the non-ASD group fell above a score of 66 were removed from the study to ensure that they did not have ASD. This cut-off score was selected due to it having the highest level of sensitivity at 99%.

**Child externalizing behaviours.** In order to assess for child externalizing behaviours, select items from the Swanson, Nolan, and Pelham - IV Questionnaire (SNAP-IV; Bussing et al., 2008) were used. The SNAP-IV is used to examine symptoms of ADHD and oppositional defiant disorder (ODD) in children aged 6–18 years (Alda & Serrano-Troncoso, 2013; Swanson, 1995). Mothers were asked to answer only the questions related to externalizing behaviours (i.e., questions 21–28; Swanson, 1995). Mothers answered questions about their children's behaviours on a 4-point scale from 0-3 (*not at all, just a little, quite a bit, very much*), with examples of questions being: "my child: often argues with adults, is often angry and resentful," and "often

actively defies or refuses adult requests or rules." This measure was selected due to the good internal consistency for the items being administered ($\alpha$ = .89; Bussing et al., 2008). Predictive validity is also high for this measure, with the *p* values of Tukey Cramer adjusted pair-wise comparisons being < .0001 when examining concern levels of parents (Bussing et al., 2008). This measure was used dichotomously, and a cut-off score of 1.88 and above was used to categorize children as having clinically significant externalizing behaviour problems (Swanson, 1995).

**Parental BAP.** To measure mothers' level of the BAP (see Sasson et al., 2013), the Broad Autism Phenotype Questionnaire (BAPQ) was administered (Hurley et al., 2007). The BAPQ is a 36-item self-report questionnaire that uses a 6-point Likert scale with responses ranging from 1 = *never* to 6 = *always* and examines the main components of BAP. Overall, the scale is broken into three subscales: 1) aloof personality, 2) rigidity, and 3) pragmatic language. The aloof personality subscale measures an individual's level of interest or pleasure in social interactions, while the rigidity subscale examines the level of difficulty that an individual experiences with change or engaging in flexibility in their day to day lives (Hurley et al., 2007). The pragmatic language subscale inspects an individuals' level of deficits within the social aspects of linguistic ability (Hurley et al., 2007).

Although the Autism Spectrum Quotient (AQ) is a self-report measure that was initially created to examine an individual's placement on the autism spectrum and was later used to measure levels of the BAP (Wheelright et al., 2010), the BAPQ is currently the only self-report measure that was specifically designed to measure BAP symptomology (Hurley et al., 2007). The BAPQ is a commonly used measure for assessing level of the BAP (e.g., Seidman et al., 2012; Wheelwright et al., 2010) and good sensitivity and specificity have been reported for the

measure (Hurley et al., 2007). Specifically, when predicting for the level of the BAP in females, total sensitivity was found to be 75% whereas specificity was 87%. Further, internal consistency has been reported at $\alpha = .95$ overall. This measure was used continuously.

**Parenting stress.** To measure levels of parenting stress in the mothers completing this study, the Parenting Stress Index-4-Short Form was used (PSI-4-SF; Abidin, 2012). The PSI has been used across a multitude of studies with varying populations (e.g., Uzark & Jones, 2003; Whiteside-Mansell et al., 2007; Zaidman-Zait et al., 2010). This measure has been shown to have good internal consistency ($\alpha = .88$ to .95; Barroso et al., 2016). The PSI-4-SF consists of 36 items that are ranked by parents on a 5-point scale (*strongly agree* to *strongly disagree*) that together make up the Total Stress Scale (Abidin, 2012). This measure was used continuously within the study.

**PRF.** Parental reflective functioning was measured using the Parental Reflective Functioning Questionnaire for Adolescents (PRFQ-A), an 18-item measure that utilizes a 7-point Likert scale from 1 (*strongly disagree*), to 7 = (*strongly agree*; PRFQ-A; Luyten, Mayes et al., 2017). The scale is divided into three subscales: 1) Pre-mentalizing, 2) Certainty about Mental States, and 3) Interest and Curiosity. The Pre-mentalizing subscale measures a parent's level of pre-mentalizing (i.e., non-mentalizing), with items such as "My child sometimes gets sick to keep me from doing what I want to do." The Certainty about Mental States subscale measures a parent's failure to understand that their child's mental states are not outwardly obvious (e.g., "I always know why my child acts the way he or she does"). Lastly, the Interest and Curiosity subscale identifies the level of interest and curiosity a parent displays in terms of actively taking their child's perspective and thinking about their child's internal experiences (e.g., "I am often curious to find out how my child feels"; Luyten et al., 2017). Although a comparatively new

measure, the PRFQ-A was used as it displays promising internal consistency (α = .67, .81, and .62 for pre-mentalizing, certainty about mental states, and curiosity subsections, respectively; Pazzagli et al., 2018) and it is the most time efficient measure of PRF. Further, this measure is commonly used in research (e.g., Badoud et al., 2015; Rostad & Whitaker, 2016; Rutherford et al., 2013). All other measures of PRF involve more time intensive resources, such as in-person meetings with the caregivers (e.g., Aber et al., 1985). Although the proposed study involved mothers of children between the ages of 6–11 years, the adolescent version of the PRFQ (i.e., PRFQ-A) was used as the items are appropriate for the proposed age group (i.e., the items, such as "I always know what my child wants" and "I always know what my child will do" are appropriate questions for parents of children as well as adolescents). Although the PRFQ and PRFQ-A are relatively new measures, there are other studies that have utilized the PRFQ-A with age ranges falling slightly outside of the measure's age range (e.g., Borelli et al., 2021; Russo, 2021).

**Analytic Strategy**

All analyses were run using IBM SPSS Statistics (IBM, 2017).

**Research Question 1.** To determine whether significant differences existed between mothers of children with ASD and mothers of children without ASD in PRF, an ANCOVA was used. Keppel (1991) explains that an ANCOVA combines ANOVA and regression, and seeks to determine whether the means of a dependent variable (i.e., PRF) differ across the levels of the independent variable (i.e., mothers of children with ASD vs no ASD), while controlling for the potential effects of covariate variables (i.e., SES and child age within and between groups) on the dependent variable. Although a clear relationship has been observed between SES and PRF (Stacks et al., 2014), less is known about PRF abilities in relation to age of the child (Borelli et

al., 2016). No significant difference for SES or child age were found between groups (i.e., ASD vs typical groups) prior to running the ANCOVA, therefore these variables were able to be included as a covariate in the analysis.

**Research Question 2.** To determine whether a significant difference exists in the level of parenting stress between mothers of children with ASD and mothers of children without ASD, an ANCOVA (Keppel, 1991) was conducted. SES and age of child were covaried out.

**Research Question 3.** To determine whether a significant negative relationship existed between level of parental BAP (IV) and PRF (DV) in mothers of children with ASD, Spearman's correlation ($\rho$) was calculated (Freedman et al., 2007). Spearman's correlations were used due to the assumption of normality not being met for the PRFQ-A subscale data (certainty, prementalizing, and interest), as Spearman's correlations do not have any distributional assumptions (Hauke & Kossowski, 2011). To check that a linear relationship existed between the dependent and independent variables, a scatterplot was made. To check for normality, a Shapiro-Wilks test was conducted in SPSS (Elliott & Woodward, 2007). The individual subscales of the BAPQ and the PRFQ-A were also analyzed.

**Research Question 4.** To determine whether presence of clinically elevated child externalizing behavioural problems (M) mediated the relationship between level of PRF (IV) and level of parenting stress (DV), Baron and Kenny's (1986) model for mediation was used. Within this analysis, PRF and parenting stress were treated as continuous variables, while externalizing behaviour problems were treated as dichotomous. This question was further broken down in research questions 4a, 4b, and 4c, where the individual PRFQ-A subscales were analyzed as independent variables within the model. Prior to carrying out this mediation model, a correlation

matrix was carried out (Steiger, 1980) to determine whether correlational relationships existed within the mediation model.

It is important to briefly outline mediation and moderation analyses. Hayes (2017) explains that mediation analyses display how an independent variable exerts its effect on the dependent variable. An intervening or mediating variable is then added to the equation between the independent and dependent variable to determine whether an indirect effect is present. The direct effect (i.e., the effect of the independent variable on the dependent variable) summed with the indirect effect (i.e., the effect of the independent variable on the dependent variable through the mediating variable) makes up the total effect. Hayes explains that a moderation occurs if the strength, sign, or size of the effect that the independent variable has on the dependent variables is in some way predicted by the moderating variable. Essentially, researchers should use mediation models when the researcher seeks to answer the question of *how* (e.g., *how* does level of child externalizing behaviour problems affect the relationship between PRF and parenting stress?), whereas moderation is suited for questions surrounding *when* (i.e., under which conditions) the effect occurs or does not occur. This study utilized the Baron and Kenny (1986) method of mediation as it allows for the mediating variable to be used dichotomously. The SNAP-IV, which was the questionnaire used to obtain the data for the mediator of externalizing behaviours, is most valid when used dichotomously (Swanson et al., 2012).

# Chapter III

# Results

## Data Cleaning

Once data collection was completed, completed questionnaires were screened for eligibility, composite scores were calculated, and data was entered into SPSS. Of the mothers who completed or attempted the survey study, 205 mothers met eligibility criteria ($N = 100$ for mothers of children without ASD, $N = 105$ for mothers of children with ASD). Participants were excluded from the total data set based on not identifying as female ($N = 26$), not being the child's biological parent ($N = 59$), not completing the survey ($N = 116$), duplicate data ($N = 1$) and falling outside of the child age range ($N = 1$). From this point, data was cleaned within the two groups (ASD and non-ASD). Within the ASD group, eight participants were excluded due to not meeting the ASD-symptom cut-off based on the AQ-Child. Within the non-ASD group, 60 participants were excluded due their scores exceeding the cut-off that was set for the non-ASD. group based on the AQ-Child. Within the non-ASD group, an additional 19 participants were excluded due to not meeting criteria based on parent report of ID ($N = 6$) or not meeting the ASQ-3 cut-off for ID ($N = 13$).

Due to the study offering a gift card draw as opposed to gift or cash incentives for everyone who participated in the study, it was less likely that individuals engaged in false responding (e.g., randomly responding or selecting the same answer for every question to get to the end of the survey quickly). To check that individuals were not simply selecting neutral or extreme answers for each question, however, visual analysis was conducted by the researcher to determine whether mothers answered in this fashion. No survey responses needed to be discarded due to extreme responding. Further, the researcher checked the time-to-completion for

each questionnaire. If an individual completed the questionnaire in a time frame deemed too quickly to accurately respond (i.e., in less than one quarter of the average time of other participants, which was the equivalent of 11.8 minutes), their data would be discarded. No data needed to be discarded as none of the mothers completed this survey in less than 11.8 minutes (this was the last criteria that was checked after other data cleaning was carried out). Finally, although it is impossible to ensure who is completing the questionnaires, participants were reminded before participating in the study that mothers should complete all questionnaire items on their own.

**Missing data.** After data was screened for eligibility criteria, the remaining data was screened for missing data points within the PRFQ-A, BAPQ, PSI, AQ-Child, ASQ-3, and SNAP-IV. Missing data was managed based on the guidelines for each measure. No instruction for missing data was available for the PRFQ-A, the BAPQ, and the SNAP-IV; therefore, if data was missing from any of these measures, the average score of the subscale from which the data point was missing was used in substitution for the missing value. Due to only the ODD subscale being used from the SNAP-IV, if missing data points were present, the average score of the total subscale was used in place of the missing value. This practice was used as it has been deemed appropriate for research with large data sets where no more than 10% of the data is missing, which is true for this study (Dodeen, 2003; Parent, 2013).

Regarding the PRFQ-A, five participants were missing between 1-3 data points in the ASD group, whereas two participants were missing one data point in the non-ASD group. Within the BAPQ, four participants were missing between 1–2 data points from the ASD-group, whereas five participants were missing one data point from the non-ASD group. For the SNAP-

IV, one data point was missing for one participant in the ASD group, while one data point was missing for one participant in the non-ASD group.

This same process was completed for missing data points on the PSI-4; however, if more than one value was missing per subscale, the data was fully excluded as per this measure's instructions (Abidin, 1995). This resulted in one additional participant being excluded from the ASD group and one participant being excluded from the non-ASD group. If fewer than five data points were missing from the AQ-Child, the total score was adjusted by multiplying the mean of the item score by the number of missing items and adding this to the initial total score (Auyeung et al., 2008). For the ASD group, nine participants were missing one data point. For the non-ASD group, seven participants were missing between 1–4 data points. Although no missing data points were present for the ASQ-3, the way in which this would have been approached is to calculate the average of response scores and use this in place of the missing values. If more than two questions would have been left unanswered, however, this data would have been discarded (Squires & Bricker, 2009).

**Description of Participants**

Within the cleaned data, mothers ranged in age from 23 to 52 years, with a mean age of 38.7 (*SD* = 5.38). When examining all children across the ASD and non-ASD groups, the children being reported on had a mean age of 8.94 years and ranged from 6.08–11.92 years (*SD* = 1.79). A wide spread for household income ranging from 0–$40,000 to greater than $125,000 was reported. The majority of mothers were married (71.7%), 8.3% were in common-law relationships, 10.2% were single, and 9.8% were separated/divorced. Most mothers were from Canada (79.5%); 11.2% were from the United States of America, and 9.3% did not report where in North America they resided. See the participant demographics table (Table 5) for a breakdown

of participant demographics by group (mothers of children with ASD vs mothers of children without ASD), and the ages table (Table 6) for a breakdown of participant ages (mother and child) by group.

**Table 5**

*Participant Demographics*

| Variable | Non-ASD | | ASD | | Total | |
|---|---|---|---|---|---|---|
| | *N* | % | *N* | % | *N* | % |
| Target child gender | | | | | | |
| Boy | 83 | 83 | 87 | 82.9 | 170 | 82.9 |
| Girl | 17 | 17 | 18 | 17.1 | 35 | 17.1 |
| Marital status | | | | | | |
| Single | 8 | 8 | 13 | 12.4 | 21 | 10.2 |
| Married | 73 | 73 | 74 | 70.5 | 147 | 71.7 |
| Common-law | 11 | 11 | 6 | 5.7 | 17 | 8.3 |
| Divorced/separated | 8 | 8 | 12 | 11.4 | 20 | 9.8 |
| Income[a] | | | | | | |
| $0–40,000 | 22 | 22 | 19 | 18.1 | 41 | 20 |
| $40,000–60,000 | 13 | 13 | 16 | 15.2 | 29 | 14.1 |
| $60,000–90,000 | 14 | 14 | 24 | 22.9 | 38 | 18.5 |
| $90,000–125,000 | 24 | 24 | 29 | 27.6 | 53 | 25.9 |
| ≥$125,000 | 26 | 26 | 15 | 14.3 | 41 | 20 |
| Not reported | 1 | 1 | 2 | 1.9 | 3 | 1.5 |
| Country | | | | | | |
| Canada | 85 | 85 | 78 | | 163 | 79.5 |
| United States of America | 9 | 9 | 14 | | 23 | 11.2 |
| Not reported | 6 | 6 | 13 | | 19 | |
| Province/Territory | | | | | | |
| Alberta | 1 | 1.2 | 5 | 6.4 | 6 | |
| British Columbia | 9 | 10.6 | 25 | 32.1 | 34 | |
| Manitoba | 62 | 72.9 | 43 | 55.1 | 105 | |
| New Brunswick | 0 | 0 | 1 | 1.3 | 1 | |
| Nunavut | 1 | 1.2 | 0 | 0 | 1 | |
| Ontario | 12 | 14.1 | 3 | 3.9 | 15 | |
| Saskatchewan | 0 | 0 | 1 | 1.3 | 1 | |
| State | | | | | | |
| Alabama | 1 | 25 | 0 | 0 | 1 | |
| California | 0 | 0 | 1 | 14.3 | 1 | |
| Colorado | 1 | 25 | 0 | 0 | 1 | |
| Georgia | 0 | 0 | 1 | 14.3 | 1 | |
| Illinois | 0 | 0 | 1 | 14.3 | 1 | |
| Maryland | 1 | 25 | 1 | 14.3 | 2 | |

| | | | | | |
|---|---|---|---|---|---|
| Massachusetts | 1 | 25 | 0 | 0 | 1 |
| Michigan | 0 | 0 | 1 | 14.3 | 1 |
| Missouri | 0 | 0 | 2 | 28.6 | 2 |
| Massachusetts | 1 | | 0 | 0 | 1 |
| Nebraska | 0 | 0 | 1 | | 1 |
| New York | 1 | | 0 | 0 | 1 |
| Ohio | 1 | | 1 | | 2 |
| South Carolina | 0 | 0 | 2 | | 2 |
| South Dakota | 0 | 0 | 1 | | 1 |
| Tennessee | 1 | | 0 | 0 | 1 |
| Texas | 2 | | 1 | | 3 |
| Utah | 0 | 0 | 1 | | 1 |

[a]Income was reported in the metric of the country that the mother completed the survey in (i.e., Canada or the United States of America)

**Table 6**

*Participant Ages and AQ-Child Scores*

| Variable | Non-ASD | | | ASD | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Range | *M* | *SD* | Range | *M* | *SD* | Range | *M* | *SD* |
| Child age | 6.08–11.92 | 8.94 | 1.93 | 6.08–11.92 | 8.95 | 1.65 | 6.08–11.92 | 8.94 | 1.79 |
| Boy | 6.08–11.92 | 8.96 | 1.91 | 6.08–11.92 | 9.05 | 1.66 | 6.08–11.92 | 9.00 | 1.78 |
| Girl | 6.58–11.67 | 8.87 | 2.05 | 6.50–11.17 | 8.46 | 1.54 | 6.50–11.67 | 8.66 | 1.79 |
| Mother age[a] | 23–47 | 37.86 | 5.41 | 25–52 | 39.43 | 5.28 | 23–52 | 38.70 | 5.38 |
| AQ-Child scores | 12–66 | 47.48 | 13.79 | 78–130 | 101.51 | 13.39 | 12–130 | 75.03 | 30.28 |

[a]47 mothers chose to not report their ages, 21 from the ASD group, 26 from the non-ASD group.

*Note.* All ages reported in years. AQ-Child = Autism Spectrum Quotient–Children's Version

**Descriptive Statistics**

Both across and within groups, mothers ranged in their total levels of parenting stress (measured by the PSI-4-SF), parental reflective functioning (measured with the three subscales of the PRFQ-A), the BAP (measured with the BAPQ), and reports of their children's

externalizing behaviours (measured by the SNAP-IV). For a breakdown of descriptive statistics, see Table 7 and 8.

An uneven distribution was seen for the SNAP-IV dichotomous variable (see Table 8). Specifically, 31 parents in the ASD group rated their children's externalizing behaviour problems as falling above the clinical cut-off on the SNAP-IV, whereas 74 rated them as falling below the clinical cut-off. This uneven distribution was expected as it fits with the literature regarding the rate of externalizing behaviour problems within ASD populations (Hastings et al., 2022). The higher percentage of children meeting cut-off for clinically elevated externalizing behaviours in the ASD group vs the non-ASD group is also not surprising, as higher rates of externalizing behaviour problems are found in ASD than non-ASD populations (Bauminger et al., 2010).

**Table 7**

*Descriptive Statistics for all Continuous Study Variables*

| Variable | Non-ASD | | | ASD | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Range | *M* | *SD* | Range | *M* | *SD* | Range | *M* | *SD* |
| BAP-Q | | | | | | | | | |
| Total score | 1.36–4.06 | 2.65 | 0.53 | 1.25–4.72 | 2.90 | 0.79 | 1.25–4.72 | 2.78 | 0.68 |
| Aloofness | 1–4.5 | 2.79 | 0.76 | 1.08–5.42 | 3.04 | 1.0 | 1–5.42 | 2.92 | 0.90 |
| Rigidity | 1.42–5 | 2.85 | 0.75 | 1–5.58 | 3.10 | 0.93 | 1–5.58 | 2.99 | 0.85 |
| Pragmatic language | 1.08–3.75 | 2.31 | 0.63 | 1–4.58 | 2.55 | 0.75 | 1–4.58 | 2.43 | 0.70 |
| PRFQ-A | | | | | | | | | |
| Pre-mentalizing | 6–20 | 10.24 | 3.50 | 6–26 | 14.11 | 4.88 | 6–26 | 12.25 | 4.69 |
| Certainty | 11–41 | 27.06 | 6.46 | 11–39 | 24.85 | 6.04 | 11–41 | 25.92 | 6.33 |
| Interest & curiosity | 24–42 | 34.26 | 3.81 | 22–42 | 35.48 | 5.02 | 22–42 | 34.91 | 4.53 |
| SNAP-IV | | | | | | | | | |
| Total score | 0–3 | .79 | 0.71 | 0–3 | 1.43 | 0.80 | 0–3 | 1.12 | 0.82 |
| PSI-4-SF | | | | | | | | | |
| Total score | 37–127 | 73.25 | 23.41 | 60–162 | 105.90 | 24.42 | 37–162 | 90.35 | 29.18 |

*Note.* BAP-Q = Broad Autism Phenotype Questionnaire; PFRQ-A = Parental Reflective Functioning Questionnaire for Adolescents; SNAP-IV = Swanson, Nolan, and Pelham–IV Questionnaire. BAP-Q and PRFQ-A are broken down into their respective subscales (BAP-Q: Aloofness, Rigifity, Pragmatic Language, and PRFQ-A: Pre-mentalizing, Certainty about mental states, Interest and curiosity).

$N = 105$ for the total ASD group, $N = 100$ for the total non-ASD group. Due to removal of outliers in the ASD group: $N = 104$ for the PRFQ-A prementalizing subscale, $N = 104$ for the PRFQ-A interest and curiosity subscale. Due to removal of outliers in the non-ASD group: $N = 96$ for the PRFQ-A prementalizing subscale, $N = 91$ for the PRFQ-A interest and curiosity subscale, $N = 99$ for Parenting stress.

**Table 8**

*Descriptive Statistics for SNAP-IV ODD Scale*

| Variable | Non-ASD | | | ASD | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Range | *N* above cut-off | *N* below cut-off | Range | *N* above cut-off | *N* below cut-off | Range | *N* above cut-off | *N* below cut-off |
| SNAP-IV Total score | 0–3 | 7 | 93 | 0–3 | 31 | 74 | 0–3 | 38 | 167 |

Note: SNAP-IV ODD Scale = Oppositional Defiant Disorder Scale from the Swanson, Nolan, and Pelham-IV Questionnaire.

$N = 105$ for ASD group, $N = 100$ for non-ASD group. Cut-off score = 1.88.

**Assumption Testing**

**Research question 1.** The first research question sought to identify whether significant differences existed in levels of PRF between mothers of children with ASD and mothers of children without ASD while controlling for SES and child age. Prior to running a one-way analysis of covariance (ANCOVA) for each dependent variable (prementalizing, certainty, and interest and curiosity) to examine whether significant differences did exist between the two groups, preliminary analyses were completed to assess the assumptions of linearity, normality, homogeneity of variance, and homogeneity of regression slopes. Outliers were first identified for both research groups across the dependent variables of pre-mentalizing, certainty, and interest and curiosity. Outliers were identified by examining histogram boxplot outputs in SPSS. Overall, five outliers were removed from the prementalizing subscale (one from the ASD group, four from the non-ASD group). Ten additional outliers were removed from the interest and curiosity subscale (one from the ASD group, nine from the non-ASD group). No outliers were found within the certainty subscale scores for either group.

A Kolmogorov-Smirnov test indicated that scores were not normally distributed amongst the ASD and non-ASD groups for the prementalizing and interest and curiosity subscales of the PRFQ-A. Specifically, for the ASD prementalizing subscale, $W(103) = .138$, $p < .001$. For the non-ASD prementalizing subscale, $W(88) = .142$, $p < .001$. For the ASD interest and curiosity subscale, $W(103) = .110$, $p = .004$; whereas for the non-ASD interest and curiosity subscale $W(88) = .108$, $p = .012$. The Kolmogorov-Smirnov test indicated that the scores were normally distributed among the ASD and non-ASD groups for the certainty subscale. For the ASD group, $W(103) = .084$, $p = .072$, and for the non-ASD group, $W(88) = .082$, $p = .197$. Although the prementalizing and interest and curiosity variables did not pass the Kolmogorov-Smirnov test,

ANCOVAs with adequate sample sizes are quite robust to these types of violations (Palland, 2011). Therefore, failing this normality test was not viewed with marked concern or examined further.

Next, scatterplots were examined to determine whether the assumption of linearity was being met. More specifically, separate scatterplots for the relationship between parental reflective functioning (prementalizing, interest and curiosity, certainty; DV) and the covariate of SES, and parental reflective functioning and the covariate of age, were examined for the ASD and non-ASD groups. A clear linear relationship was not viewed when examining any of the scatterplots (see Appendix E through J).

In regards to the assumption of homogeneity of regression slopes, when examining the scatterplots, the regression of slopes of the IV (ASD vs non-ASD group) were in opposite directions when examining the relationships between certainty (DV) and the covariate of age (see Appendix F), certainty (DV) and the covariate of SES (see Appendix I), and interest and curiosity (DV) and the covariate of SES (see Appendix J). The remaining scatterplots suggested that the regression slopes were similar for both groups (ASD vs non-ASD), thereby meeting the homogeneity of regression slopes assumption (see Appendices E, G, and H). However, this assumption was further examined by looking at the interaction effect between the independent variable (ASD versus non-ASD group) and covariates (SES and age). Neither of the interactions between the independent variable and the covariates were significant across the dependent variables of parental reflective functioning (i.e., prementalizing, certainty, and curiosity and interest subscales), meaning that the regression slopes for the covariates did not differ between the ASD and non-ASD groups. Specifically, across the dependent variable of prementalizing: for the covariate of age, $F(1, 191) = .10$, $p = .748$, and for the covariate of SES, $F(1, 191) = .08$, $p =$

.773. Across the dependent variable of certainty: for the covariate of age, $F(1, 196) = .07$, $p = .790$, and for the covariate of SES, $F(1, 196) = .30$, $p = .585$. Across the dependent variable of interest and curiosity: for the covariate of age, $F(1, 187) = .48$, $p = .487$, and for the covariate of SES, $F(1, 187) = .12$, $p = .732$. Therefore, by examining these interactions further, the assumption of homogeneity of regression slopes was satisfied.

Homogeneity of variance was examined using the Levene's test. Unequal variances were detected for the DVs of prementalizing, $F(1, 195) = 7.056$, $p = .009$, and interest and curiosity, $F(1, 191) = 10.10$, $p = .002$. Equal variances were observed for the DV of certainty, $F(1, 200) = .23$, $p = .630$. Although unequal variances were detected amongst two of the DVs, homogeneity is only absolutely necessary if there are stark contrasts in group sample sizes (Keppel, 1993). Because the ASD and non-ASD group did not differ tremendously in sample size, no further actions were required.

**Research question 2.** The second research question aimed to determine whether a significant difference existed in the level of parenting stress between mothers of children with ASD and mothers of children without ASD while controlling for child age and SES. Preliminary analyses were completed to assess the assumptions of linearity, normality, homogeneity of variance, and homogeneity of regression slopes. Outliers were first identified for both research groups across the dependent variables of parenting stress. Outliers were identified by examining histogram boxplot outputs in SPSS. Overall, one outlier was removed from the non-ASD group for this research question.

Regarding the assumption of normality, A Kolmogorov-Smirnov test indicated that scores were normally distributed amongst the ASD and non-ASD groups for parenting stress

scores. Specifically, for the ASD group, $W(105) = .062$, $p = .20$. For the non-ASD group, $W(99) = .076$, $p = .174$.

Next, scatterplots were examined in order to determine whether the assumption of linearity was being met. More specifically, separate scatterplots for the relationship between parenting stress and the covariate of SES, and parenting stress and the covariate of age, were examined for the ASD and non-ASD groups. The scatter plots did not appear linear for either of the ASD and non-ASD groups (see Appendices K and L).

In regards to the assumption of homogeneity of regression slopes, both scatterplots suggested that the regression slopes were similar for both groups, meeting the homogeneity of regression slopes assumption (see Appendices K and L). This assumption was further supported by examining the interaction effect between the independent variable (ASD versus non-ASD group) and covariates (SES and age) across the dependent variable of parenting stress. Neither of the interactions between the independent variable and the covariates were significant across the dependent variable of parenting stress, meaning that the regression slopes for the covariates are not differing between the ASD and non-ASD groups. Specifically, for the covariate of age, $F(1, 195) = .07$, $p = .791$, and for the covariate of SES, $F(1, 195) = .39$, $p = .532$. Therefore, the assumption of homogeneity of regression slopes was satisfied. Finally, a Levene's test indicated that the assumption of homogeneity of variance was not violated $F(1, 199) = .590$, $p = .443$.

**Research question 3.** The third research question of this study aimed to determine whether a significant negative relationship existed between level of parental BAP (IV) and PRF (DV) in mothers of children with ASD. Although Pearson's correlations were initially planned for this research question, the assumption of normality was not met during assumption testing for the PRFQ-A subscale data (certainty, prementalizing, and interest and curiosity). This

assumption of normality was tested using the Kolmogorov-Smirnov test in SPSS. Specifically, for prementalizing, $W(105) = .13$, $p < .001$. For certainty, $W(105) = .09$, $p = .04$. For interest and curiosity, $W(105) = .11$, $p = .003$. The assumption of normality was met for the BAPQ data based on Kolmogorov-Smirnov tests. Specifically, for the BAPQ total, $W(105) = .06$, $p = .20$; for the BAPQ aloofness subscale, $W(105) = .07$, $p = .20$; for the BAPQ pragmatic language subscale, $W(105) = .06$, $p = .20$; and for the BAPQ rigidity subscale, $W(105) = .05$, $p = .20$. Due to the assumption of normality not being met for the PRFQ-A, Spearman's correlations were used instead as this test does not have any distributional assumptions. Three scatterplots between total BAPQ scores and certainty, prementalizing, and interest and curiosity were also examined to ensure monotonicity between variables. Monotonicity was noted for all three scatterplots (see Appendices M, N, and O).

**Research question 4.** The final research question aimed to determine whether the presence of clinically elevated child externalizing behavioural problems (M) was mediating the relationship between level of PRF (IV) and level of parenting stress (DV). Prior to examining the assumptions for the Baron and Kenny (1986) mediation model, outliers were detected and removed by examining histogram boxplot outputs in SPSS. No outliers for parenting stress were noted, while externalizing behaviour scores were used dichotomously, therefore outliers were not examined. An outlier from the prementalizing subscale, along with one outlier from the interest and curiosity subscale, were removed and not used in this analysis. Assumptions of normality, linearity, homoscedasticity, and independence were checked.

As was done for research questions one and two, Kolmogorov-Smirnov tests were run to examine the assumption of normality. As was also already discussed for research question one, for PRF, prementalizing along with the interest and curiosity subscales were not normally

distributed, while the certainty subscale was normally distributed. As was outlined for research question two, parenting stress was normally distributed. Due to data being dichotomous for the SNAP-IV ODD subscale, this test was not run for this variable.

The second assumption is that the relationship between continuous variables is linear. In the case of this mediation model, A (PRF subscales; IV), and C (parenting stress; DV) need to have a linear relationship. Data was plotted in SPSS via scatter plots and examined visually. When examining the IV of prementalizing, linear relationships were noted between and A and C (Appendix P), indicating that this assumption was met for this relationship within the mediation model. Linear relationships were not observed for the IV's of interest and curiosity or certainty for the relationship between A and C (see Appendices Q and R).

For the assumption of homoscedasticity, which states that the errors should remain equally variable across all values of the IV, scatterplots of the residuals were scanned. This was examined for all interactions between continuous variables within the mediation model (i.e., between A and C (Appendix S). By examining these scatterplots, it was determined that the assumption of homoscedasticity was met for all interactions of the mediation.

The last assumption of independence was checked by carrying out Durbin-Watson tests, which specifically test for autocorrelation in regression models. All assumptions were met for this research question. Specifically, all interactions fell within 1.5–2.5, meaning that no autocorrelation exists between A–C, A–B, and B–C for the mediation model. More specifically, for the relationship between the IV and DV, the Durbin-Watson value = 2.05; for the relationship between the IV and mediator, the Durbin-Watson value = 1.83, and for the relationship between the mediator and DV, the Durbin-Watson value = 1.91.

**Internal validity.** Internal consistency ranged from borderline to excellent (i.e., α ranging from .687 to >.9) across measures. See Table 9 for a full listing of Cronbach alpha scores for each measure and subscale.

**Table 9**

*Internal Consistency of Study Measures*

| | *N* | | Items | Cronbach's α | |
|---|---|---|---|---|---|
| | ASD | Non-ASD | | ASD | Non-ASD |
| BAPQ | | | | | |
| Total score | 105 | 100 | 36 | .95 | .89 |
| Aloofness | 105 | 100 | 12 | .91 | .87 |
| Rigidity | 105 | 100 | 12 | .90 | .85 |
| Pragmatic language | 105 | 100 | 12 | .83 | .80 |
| PRFQ-A | | | | | |
| Prementalizing | 104 | 96 | 6 | .69 | .65 |
| Certainty | 105 | 100 | 6 | .73 | .75 |
| Interest and curiosity | 104 | 91 | 6 | .74 | .72 |
| SNAP-IV | 105 | 100 | 8 | .91 | .93 |
| PSI-4 | 105 | 99 | 36 | .93 | .95 |

*Note.* BAP-Q = Broad Autism Phenotype Questionnaire; PFRQ-A = Parental Reflective Functioning Questionnaire for Adolescents; SNAP-IV = Swanson, Nolan, and Pelham–IV Questionnaire; PSI-4 = Parenting Stress Inventory. BAP-Q and PRFQ-A are broken down into their respective subscales (BAP-Q: Aloofness, Rigifity, Pragmatic Language, and PRFQ-A: Pre-mentalizing, Certainty about mental states, Interest and curiosity).

## Research Question 1

Prior to carrying out the analyses for research question 1, a full correlation matrix was produced (see Table 10)

**Table 10**

*Correlation Matrix for all Study Measures*

| Measure | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1) ASD vs non-ASD | - | -.413** | .175* | -.134 | -.565** | -.181** | -.142* | -.171* | -.145* | -.290** |
| 2) PRFQ-A prementalizing | | - | -.356** | -.168* | .649** | .309** | .183** | .364** | .252** | .348** |
| 3) PRFQ-A certainty | | | - | .120 | -.371** | -.102 | -.015 | -.248** | -.025 | -.245** |
| 4) PRFQ-A interest and curiosity | | | | - | .002 | .026 | .066 | -.072 | .052 | -.030 |
| 5) PSI-4 | | | | | - | .384** | .302** | .377** | .295** | .491** |
| 6) BAPQ total | | | | | | - | .869** | .787** | .837** | .125 |
| 7)BAPQ aloofness | | | | | | | - | .551** | .580** | .069 |
| 8) BAPQ pragmatic language | | | | | | | | - | .485** | .115 |
| 9) BAPQ rigidity | | | | | | | | | - | .134 |
| 10) SNAP-IV externalizing behaviour | | | | | | | | | | - |

*Note.* PFRQ-A = Parental Reflective Functioning Questionnaire for Adolescents; PSI-4 = Parenting Stress Inventory; BAP-Q = Broad Autism Phenotype Questionnaire; SNAP-IV = Swanson, Nolan, and Pelham Questionnaire. BAP-Q and PRFQ-A are broken down into their respective subscales (BAP-Q: Aloofness, Rigifity, Pragmatic Language, and PRFQ-A: Pre-mentalizing, Certainty about mental states, Interest and curiosity).

Correlation matrix included the entire sample (ASD and non-ASD groups).

$N = 105$ for the total ASD group, $N = 100$ for the total non-ASD group. Due to removal of outliers in the ASD group: $N = 104$ for the PRFQ-A prementalizing subscale, $N = 104$ for the PRFQ-A interest and curiosity subscale. Due to removal of outliers in the non-ASD group: $N = 96$ for the PRFQ-A prementalizing subscale, $N = 91$ for the PRFQ-A interest and curiosity subscale, $N = 99$ for Parenting stress.

* $p < .05$, two-tailed. ** $p < .0$, two-tailed.

A one-way analysis of covariance (ANCOVA) for each dependent variable (prementalizing, certainty, and interest and curiosity) was run in SPSS to examine whether significant differences existed in levels of PRF between mothers of children with ASD and mothers of children without ASD while controlling for SES and child age.

First, univariate ANOVAs were run using SPSS. Significant effects were revealed for prementalizing, $F(1, 198) = 40.83$, $p < .001$, $n_p^2 = .171$, and certainty, $F(1, 203) = 6.41$, $p = .012$, $n_p^2 = .031$. No significant effect was found for interest and curiosity $F(1, 193) = 3.533$, $p = .062$, $n_p^2 = .018$. The significant effect found for certainty was in the opposite direction than was hypothesized. That is, mothers of children with ASD had significantly lower levels of certainty in their children's mental states. The significant difference found for prementalizing, however, was in the direction that was hypothesized. Specifically, mothers of children with ASD had significantly higher levels of prementalizing in comparison to mothers of children without ASD.

Separate ANCOVAs were then run for prementalizing, certainty, and interest and curiosity. These ANCOVAs revealed that, after controlling for SES and child age, no changes in significant or non-significant effects were noted. More specifically, mothers of children with ASD continued to show significantly higher levels of prementalizing, $F(1, 193) = 38.15$, $p = <.001$, $n_p^2 = .165$, and significantly lower levels of certainty, $F(1, 198) = 6.44$, $p = .012$, $n_p^2 =$

.032, in comparison to mothers of children without ASD. Controlling for SES and child age also did not impact the non-significant result in level of interest and curiosity between mothers of children with ASD and mothers of children without ASD, $F(1, 189) = 3.517$, $p = .062$, $n_p^2 = .018$.

**Research Question 2**

A one-way analysis of covariance (ANCOVA) for the dependent variable of parenting stress was run in SPSS to examine whether significant differences existed in levels of parenting stress between mothers of children with ASD and mothers of children without ASD while controlling for SES and child age. When the univariate ANOVAs were first run using SPSS, a significant effect was revealed for parenting stress, $F(1, 202) = 94.759$, $p < .001$, $n_p^2 = .319$. Specifically, mothers of children with ASD had significantly higher levels of parenting stress in comparison to mothers of children without ASD. A separate ANCOVA was then run in order to control for SES and child age. This ANCOVA revealed that, after controlling for SES and child age, no change in the significant effects was noted. More specifically, mothers of children with ASD continued to show significantly higher levels of parenting stress, $F(1, 197) = 88.754$, $p < .001$, $n_p^2 = .311$.

**Research Question 3**

Consistent with hypotheses, there were significant positive correlations between prementalizing and total BAPQ scores, between prementalizing and BAPQ rigidity, and between prementalizing and BAPQ pragmatic language (see Table 10). Thus, as a parent's level of prementalizing increased (i.e., PRF decreased), so did their overall level of the BAPQ and, more specifically, level of rigidity and level of pragmatic language difficulties. No other significant correlations were discovered. For the full correlation matrix, see Table 11.

**Table 11**

*Correlation Matrix for PRFQ-A and BAPQ Among ASD Group*

| Measure | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1) PRFQ-A Prementalizing | - | -.368** | -.434** | .229* | .107 | .323** | .198** |
| 2) PRFQ-A Certainty | | - | .219* | -.043 | -.003 | -.078 | -.011 |
| 3) PRFQ-A Interest and curiosity | | | - | .021 | .007 | -.081 | .084 |
| 4) BAPQ total | | | | - | .906** | .825** | .853** |
| 5) BAPQ Aloofness | | | | | - | .650** | .651** |
| 6) BAPQ Pragmatic language | | | | | | - | .604** |
| 7) BAPQ Rigidity | | | | | | | - |

*Note.* PFRQ-A = Parental Reflective Functioning Questionnaire for Adolescents; BAPQ = Broad Autism Phenotype Questionnaire. PRFQ-A and BAPQ are broken down into their respective subscales (BAPQ: Aloofness, Rigifity, Pragmatic Language, and PRFQ-A: Pre-mentalizing, Certainty about mental states, Interest and curiosity).

$N = 105$ (ASD group only). Due to outliers being removed, $N$ for PRFQ-A Prementalizing = 104, $N$ for PRFQ-A Interest and curiosity = 104.

* $p < .05$, two-tailed. ** $p < .01$, two-tailed.

**Research Question 4**

To determine whether level of child externalizing behavioural problems (M) was mediating the relationship between level of PRF (IV) and level of parenting stress (DV), a mediation analysis using the Baron and Kenny (1986) method was carried out via SPSS (see Figure 3). Within this analysis, PRF and parenting stress were treated as continuous variables, while externalizing behaviour problems was treated dichotomously. This question was analyzed in research questions 4a, 4b, and 4c, where the individual PRFQ-A subscales were analyzed as independent variables within the model. A correlation matrix was first carried out to examine whether any significant relationships existed between the IV, DV, and M (see Table 12).

**Figure 3**

*Mediation Model*

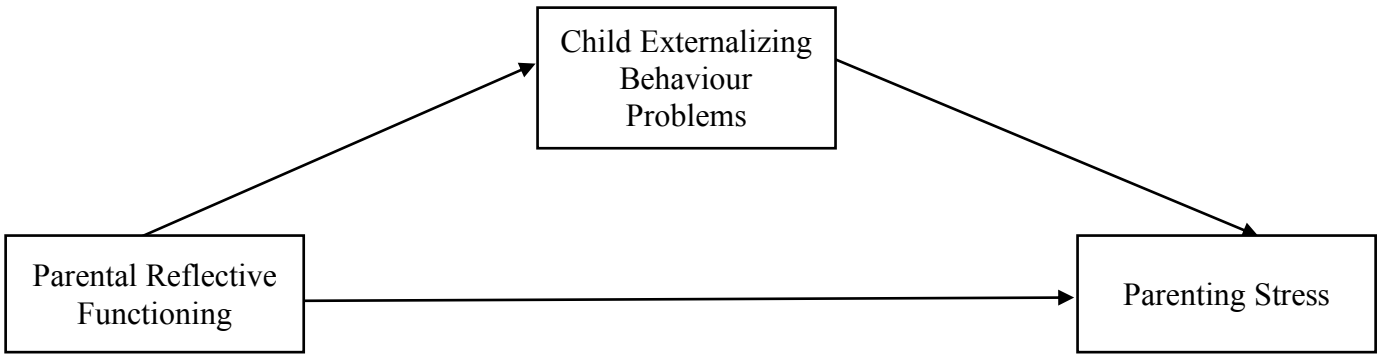


**Table 12**

*Correlation Matrix for PRFQ-A, PSI-4, and SNAP-IV Among ASD Group*

| Measure | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1) PRFQ-A Prementalizing | - | -.343** | -.401** | .543** | .235** |
| 2) PRFQ-A Certainty | | - | .199* | -.225* | -.230* |
| 3) PRFQ-A Interest and curiosity | | | - | -.153 | -.109 |
| 4) PSI-4 Parenting stress | | | | - | .456** |
| 5) SNAP-IV Externalizing behaviours | | | | | - |

*Note.* PFRQ-A = Parental Reflective Functioning Questionnaire for Adolescents; PSI-4 = Parenting Stress Inventory; SNAP-IV = Swanson, Nolan, and Pelham Questionnaire. PRFQ-A is broken down into its respective subscales (Pre-mentalizing, Certainty about mental states, Interest and curiosity).

Total $N = 105$ (ASD group only). Due to outliers being removed, $N$ for PRFQ-A Prementalizing = 104, $N$ for PRFQ-A Interest and curiosity = 104.

* $p < .05$, two-tailed, ** $p < .01$, two-tailed.

**4a.** In Step 1 of the mediation model, the regression of prementalizing (IV) on parenting stress (DV), ignoring the mediator, was significant, $b = 3.509$, $t(201) = 11.33$, $p < .001$. Step 2 showed that the regression of prementalizing on the mediator, child externalizing behaviours,

was also significant, $b = .021$, $t(101) = 2.08$, $p = .04$. Step 3 of the mediation process showed that the regression of the mediator (child externalizing behaviours), controlling for prementalization, was significant, $b = 18.02$, $t(102) = 4.24$, $p < .001$. Step 4 of the analysis revealed that, controlling for the mediator (child externalizing behaviours), prementalizing was still a significant predictor of parenting stress, $b = 2.196$, $t(102) = 5.65$, $p < .001$. Therefore, child externalizing behaviours partially (as opposed to fully) mediated the relationship between mother's level of prementalizing and level of parenting stress as hypothesized.

**4b.** In Step 1 of the mediation model, the regression of interest and curiosity (IV) on parenting stress (DV), ignoring the mediator of child externalizing behaviours, was significant, $b = .99$, $t(201) = 3.69$, $p < .001$. This significant finding was not in the direction hypothesized (i.e., it was hypothesized that as interest and curiosity in the child's mental states increased, parenting stress would in turn decrease). Step 2 showed that the regression of interest and curiosity on the mediator, child externalizing behaviours, was not significant, $b = .01$, $t(101) = .51$, $p = .608$; therefore, Steps 3 and 4 of the Baron and Kenny (1986) method could not be carried out.

**4c.** In Step 1 of the mediation model, the regression of certainty (IV) on parenting stress (DV), ignoring the mediator of child externalizing behaviours, was significant, $b = -.79$, $t(201) = -3.15$, $p = .002$. As with 4b., the direction of this significant relationship is also not what was hypothesized (i.e., it was hypothesized that as certainty of the child's mental state increased, parenting stress would also increase). Step 2 showed that the regression of certainty on the mediator, child externalizing behaviours, was not significant, $b = -.01$, $t(101) = -1.59$, $p = .114$; therefore, Steps 3 and 4 of the Baron and Kenny (1986) method could not be carried out.

# Chapter IV

## Discussion

This study included 105 mothers of children with ASD and 100 mothers of children without ASD. Regarding demographic variables, mother's age ranges and mean age in the current study are similar to other studies that have examined the relationship between mothers and their children with ASD (e.g., Batool & Khurshid, 2015), which is also true for the child's age ranges and mean age in the current study (e.g., Vasilopoulou & Nisbet, 2016). A good range was found for household income for the overall sample, indicating a good variability of socioeconomic status for the study. The majority of mothers were either in common-law relationships or married and living in Manitoba, Canada. As the co-variates of child age and SES were not significant predictors of PRF levels and parenting stress levels, these results can therefore be generalized across SES levels and parents of children between the ages of 6-11. Overall, the demographics of this study best represent Canadian mothers who are in relationships and have a varied level of SES.

The current study appears to have a good resemblance to the broader population of mothers of children with ASD. Specifically, the current study found higher levels of parenting stress amongst mothers of children with ASD in comparison to those without, which mirrors the literature that is already well established on this topic (Hayes & Watson, 2013). In comparison to the non-ASD group, higher levels of child externalizing behaviours problems in the ASD group were also noted, which is often found amongst children with ASD (Hill et al., 2014). Mothers of children with ASD within the current study also had higher levels of the BAP in comparison to mothers of children without ASD, which is not surprising given the genetic link between ASD and the BAP that has been outlined in the literature (Bailey et al., 1995; Hallmayer

et al., 2011; Rosenberg et al., 2009) meaning that parents of children with ASD often fall higher on the BAP spectrum (Bolten et al., 1994).

In regards to PRF, parents of children with ASD had higher scores in prementalizing on the PRFQ-A, indicating lower levels of PRF overall. Mothers of children with ASD did not, however, have higher levels of certainty, or lower levels interest and curiosity in comparison to mothers of children without ASD. As was noted within the results section, the data from the PRFQ-A was not normally distributed based on assumption tests that were conducted on this data. These results may indicate that the parenting sample included in this study was not a fully accurate representation of the total population of parents of children with ASD. These non-normally distributed PRFQ-A results may also speak to this measure's construct validity, specifically for the subscales of certainty and interest and curiosity. The relationship between PRF and having a child with ASD, and how the findings of the current study both align with and contrast the current literature on the topic, are further discussed below.

**Parental Reflective Functioning**

The first goal of this dissertation was to determine whether parental reflective functioning levels differed amongst mothers of children with ASD in comparison to mothers of children without ASD. It was hypothesized that mothers of children with ASD would have lower levels of PRF in comparison to mothers of children without ASD. As was hypothesized, mothers of children with ASD had significantly higher levels of pre-mentalizing in comparison to mothers of children without ASD.

This is an important addition to the literature, as no study has yet to examine levels of PRF amongst parents of children with ASD in comparison to parents of children without ASD. In fact, most studies that have examined PRF in parents of children with ASD have done so

through program-evaluation style studies (e.g., Enav et al., 2019; Frolli et al., 2021). For example, Frolli and colleagues (2021) examined a group of parents whose children, between the ages of 20–30 months, were at risk of having ASD. Within this study, which took place over six months, parents were divided into one of two treatment groups. The first treatment group was provided weekly parent training based on applied behaviour analysis (ABA; $n$ = 42), while the second group received weekly parent training based on reflective functioning ($n$= 42). At the end of the study, parents who were placed in the experimental group (i.e., received reflective functioning training once weekly) had increased levels of PRF in comparison to the treatment as usual group (i.e., parent training based on ABA principles). No comparisons, however, were made to parents of neurotypical children. Knowing whether parents of children with ASD have lower levels of PRF than parents in the general population would not only allow researchers to eventually draw more causal conclusions surrounding levels of PRF in parents of children with ASD in comparison to the general population, but it could also be used as evidence to advocate for increased funding and availability of these types of parent-intervention programs.

The finding that mothers of children with ASD have higher levels of prementalizing in comparison to mothers of children without ASD in the present study are in contrast to a study that examined parents' levels of PRF towards their children with ASD and their levels of PRF displayed towards their neurotypical children (a sibling of the proband; Enav et al., 2020). The researchers found that within families with at least one child with and one child without ASD, parents displayed higher levels of PRF towards their child with ASD. In that study, PRF was measured via the Parent Development Interview (PDI; Slade et al., 2004). It was argued that due to the difficulties children with ASD have in engaging in their own mentalization (Slade, 2009), parents might compensate for this by exerting more energy towards their engagement of PRF

towards the children (Enav et al., 2020). That study differs from the current study, however, in that they did not compare the level of PRF in parents of children with ASD to that of parents of children without neurodevelopmental disorders. Having an independent comparison group is important as parents within their study may still have had lower levels of PRF in comparison to the general population. Given the genetic nature of ASD and the BAP (Bailey et al., 1995; Folstein & Rutter, 1977; Hallmayer et al., 2011; Rosenberg et al., 2009), it is likely that both the parents and siblings who were not clinically diagnosed with ASD had at least some sub-clinical threshold symptoms of ASD. The authors also did not identify level of parent BAP as a variable that could have been impacting the level of the PRF that they were displaying towards their children. I argue that the current study saw a decreased level of parents of children with ASD engaging in reflective functioning due in part to their higher levels of the BAP.

Contrary to hypotheses, I failed to find a significant difference in levels of interest and curiosity between the ASD and non-ASD groups. Within this analysis, mothers of children with ASD tended to have higher levels of interest and curiosity towards their children in comparison to parents of children without ASD. The non-significant result might be due to an issue of power, as the effect size was small for this analysis. Therefore, prior to any conclusions being drawn from this analysis, a larger sample size would need to be collected to increase the power of the analysis.

Another finding that was contrary to hypotheses was that mothers of children with ASD had lower levels of certainty towards their children's mental states in comparison to mothers of children without ASD. When a parent does not engage in high levels of certainty when reflecting on their children, they are acknowledging that they are not always aware of what their child is thinking and feeling (Luyten, Mayes et al., 2017). Although lower levels of certainty are often

viewed as part of a healthy approach to engaging in PRF (Luyten, Nijssens et al., 2017), this finding could also be related to the argument that Enav and colleagues (2020) made in their recent findings. Specifically, parents of children with ASD may have had lower levels of certainty towards their children's mental states in comparison to parents of children without ASD due to their children having difficulties engaging in their own appropriate levels of mentalization for their ages and development. Therefore, parents would in turn need to engage in more flexibility and lower levels of certainty towards their children as a way to make up for their children's lower levels of reflective functioning. Another argument for this finding could be due to the fact that the parents of children with ASD may have been engaging in hypomentalizing of their child (Luyten et al., 2017). Essentially, the ASD-group might have been engaging in very low levels of certainty by viewing their child's mental states as completely indecipherable.

**Parenting Stress**

A goal of this dissertation was to determine whether a significant difference existed in the level of parenting stress between mothers of children with ASD and mothers of children without ASD. Indeed, mothers of children with ASD had significantly higher levels of parenting stress in comparison to mothers of children without ASD. This research finding is consistent with the vast literature on this topic (Dabrowska & Pisula, 2010; Estes et al., 2013). Specifically, research conducted on parents of children with ASD continues to find higher parenting stress levels amongst this population in comparison to parents of neurotypical children (see Hayes & Watson, 2013) Although this research question was asked to set the foundation for research question #4 (i.e., examining the mediating effect of externalizing behaviours between the relationship of PRF and parenting stress) study/data replication within the psychological research is important (Lamal, 1990).

The finding that mothers of children with ASD experience significantly higher parenting stress levels than mothers of children without ASD maps nicely onto the family stress model discussed earlier in this document (Boss et al., 2016; McCubbin & Patterson, 1982). These higher parenting stress levels within this population of mothers makes sense when we consider the multiple stressors that parents of children with ASD face in comparison to parents of neurotypical children (e.g., increased levels of regulatory issues in comparison to children without ASD; Davis & Carter, 2008). These higher parenting stress levels are also logical given the ecosystem in which the family is existing (e.g., attempting to meet demands of everyday life, difficulties existing as a family with a child with a disability in environments that can be ableist in nature).

When we consider Perry's (2004) model of family stress, which takes into consideration parents of children with developmental disorders such as ASD, these findings also make sense and map nicely onto research question #4. As was outlined earlier in this document, this model takes into consideration stressors, resources, supports, and outcomes for parents of children with developmental disorders. Mothers of children with ASD who were involved in this study and whose children engaged in higher levels of externalizing behaviour problems would have therefore had higher levels of stressors from their child's characteristics. Parents with lower levels of prementalizing would have also had lower levels of personal resources. Perry's model would argue that both of these domains would lead to negative outcomes for the parent and higher levels of stress overall, which was outlined in the results of research question 4a.

**The BAP and PRF**

This study hypothesized that, as level of the BAP increased, PRF levels would in turn decrease. In line with this hypothesis, BAP and PRF levels were correlated in the group of

mothers of children with ASD. Specifically, significant correlations were found between mothers' level of prementalizing and BAPQ total scores, level of rigidity on the BAPQ, and level of pragmatic language on the BAPQ.

This hypothesis builds off of a recent study conducted by Nijhof and colleagues (2017). The authors examined mentalization abilities in a general population of individuals not diagnosed with ASD but compared two groups: those with higher and lower levels of ASD symptomology. Similar to the current study's use of the BAPQ, the authors measured the subclinical levels of ASD traits amongst participants using the Autism Quotient, 10-item scale (AQ-10; Allison et al., 2012) and hypothesized that individuals in the general population with higher levels of ASD symptomology would have decreases in spontaneous mentalization (i.e., a form of mentalizing/reflective functioning that requires the individual to engage in 'on-the-spot' mentalization). Spontaneous mentalization, like mentalizing abilities in general, is something that has also been found to be impaired amongst individuals with ASD (e.g., Callenmark et al., 2014). The study by Nijhof and colleagues (2017) had participants complete tasks that required them to engage in spontaneous mentalization (i.e., watching a movie clip and then having them press buttons on a screen that indicated whether or not they were accurately and spontaneously mentalizing in regards to what was happening on the screen).

In the study conducted by Nijhof and colleagues (2017), although both the high-level of ASD symptom group and the low-level of ASD symptom group had similar error rates in spontaneous mentalization, the reaction time (i.e., spontaneous mentalization speed) for the high ASD symptomology group was significantly slower in comparison to the low ASD symptomology group. This study displayed that, even amongst individuals from the general population without ASD, mentalization is impaired at least in part related to level of subclinical

ASD symptoms (i.e., the BAP). It is also reasonable to speculate that this diminished reflective functioning amongst general population individuals with higher levels of subclinical ASD symptoms would also transfer into the parenting domain, therefore impacting levels of parental reflective functioning. Put more simply, if parents have heightened levels of the BAP, this may impact their parental reflective functioning levels. Having a decreased level of social language abilities (i.e., pragmatic language) may also be impacting a parent's skill level of being able to discuss and describe their child's mental states, further impacting their PRF.

It is important to also discuss the non-significant findings within this research question. As was already discussed, a significant finding was discovered for overall level of the BAP and prementalizing, as well as the rigidity subscale and the pragmatic language subscale from the BAPQ and prementalizing from the PRFQ. The fact that the BAPQ total score was significantly correlated with prementalizing (but not the aloofness subscale from the BAPQ) may point to an issue of decreased reliability and power when examining individual subscales as opposed to the total measure (e.g., the aloofness subscale of the BAPQ versus the total BAPQ score). In other words, we risk not observing a true effect due to too little power and decreased reliability when we decrease the number of items being analysed. The PRFQ scale of prementalizing was, however, significantly correlated with the subscale of rigidity on the BAPQ. When an item analysis was conducted between these two subscales, it was found that some questions on the PRFQ might be mapping on to the rigidity subscale of the BAPQ. For example, item 24 on the BAPQ, which is one of the items that makes up the rigidity subscale, reads: *I act very set in my ways* (Hurley et al., 2007), while item seven on the PRFQ, which is one of the items that makes up the prementalizing subscale, reads: "I find it hard to actively participate in make believe play or imaginary activities with my child*"* (Luyten et al., 2017). Both of these items have underlying

tones of rigidity and therefore may be measuring similar constructs. In other words, this significant result might not be highlighting a true significant relationship between these two variables, but instead they might be showing a positive correlation between each other because they are measuring the same construct. The larger issue of the reliability and validity of the PRFQ subscales certainty and interest/curiosity are discussed below.

**PRF and WCC.** As outlined earlier in this document, the WCC theory states that the main deficits that individuals with ASD face arise because of their inability to incorporate smaller social details with a broader, more global viewpoint of their social interactions (Frith, 1989). This inability can become problematic in social situations, where integration of social information is needed, but individuals with ASD might instead approach these situations from their fragmented parts (Kaufman & Kaufman, 1983). PRF has several parts that also need to be integrated (e.g., keeping your mental states in mind while also reflecting on the child's mental states; Luyten et al., 2017; Sharp & Fonagy, 2008). Parents who are falling higher on levels of the BAPQ might be approaching parenting and their interactions with their children in a similar, fragmented way, which may be impacting their reflective functioning towards their child. For example, if a parent is viewing their child in small, fragmented parts (e.g., focusing too heavily on certain parts of their tantrum behaviours) and is not observing their child and their interactions with them from a broader viewpoint, they will most likely be unable to integrate their child's behaviours, their child's mental states, and their own mental states. Specifically, if a parent is only able to approach interactions with their child from a fragmented, non-integrative approach, they are bound to have problems understanding the child as well as their reactions to the child.

**PRF, Externalizing Behaviours, and Parenting Stress**

**PRF and Parenting Stress.** The results of the linear regression analysis revealed that the more that a mother is unable to engage in mentalization towards their child (i.e., higher pre-mentalizing) and adequately consider their feelings and other internal states, the stress that they feel towards their parenting and the duties that come with it also increased. Although this is among the first studies to examine PRF and its relation to parenting stress in ASD populations, these findings build nicely on a recent systematic review carried out by Ilias et al. (2018). These researchers examined the literature on parenting stress among parents of children with ASD and found that one of the main factors for increased levels of parenting stress in this group was the parents' level of understanding and perception of their children with ASD (Ilias et al., 2018). Although reflective functioning or mentalization was not directly outlined within this review, it is likely that parents of children with ASD who report difficulties with understanding and perceiving their children are actually having difficulties engaging in PRF with their children.

Studies that have been carried out amongst other parent populations have discovered similar findings in relation to PRF and parenting stress. For example, Adkins et al. (2022) examined a randomized control trial of a group intervention for foster parents aimed at PRF. Parents who received this intervention experienced a decrease in levels of parenting stress, and an improvement in their PRF; more specifically, their levels of prementalizing on the PRFQ (Luyten et al., 2017) decreased and parenting stress (as measured by the PCDI subscale within the Parenting Stress Index–Short Form; Abidin, 1995) significantly decreased in comparison to the control group. Similar findings in the general population have been found in research conducted with the PRFQ by Luyten et al. (2017), where a significant and positive correlation was found between prementalizing and parenting stress, with parenting stress being measured with the PSI (Abidin, 1990). No relationship was found between parenting stress and the interest

and curiosity or certainty subscales of the PRFQ. When parents are able to engage in PRF, they are in turn better able to understand the variables (e.g., beliefs, wishes, emotions) that underlie their children behaviours and actions, allowing them to have more successful interactions with the child, which is especially important during times of emotional distress or dysregulation (Adkins et al., 2022).

In another study conducted by Georg and colleagues (2018), which examined PRF levels using the PRFQ and its relation to parenting stress, the authors also found that prementalizing levels were again the only significant relationship between PRF and parenting stress. The significant findings with the prementalizing subscale and no other subscales within the PRFQ are not only found in studies researching parenting stress. For example, Zimmer-Gembeck and colleagues (2019) examined the effectiveness of Parent-Child Interaction Therapy (PCIT) on parents' emotion regulation and PRF levels. Results indicated that parents experienced decreases in emotion dysregulation as well as increases in PRF levels at the end of the treatment program, however, prementalizing was the only subscale from the PRFQ that significantly decreased.

The current study found similar results to Luyten et al. (2017), Adkins et al. (2022), and Georg et al. (2018) for prementalizing and parenting stress. Either no relationship or, in the case of the current study, significant relationships in the opposite hypothesized directions, were observed for the subscales of interest and curiosity as well as certainty for the PRFQ. These results, along with the results of other research questions involving the PRFQ in this study (i.e., differences in level of PRF between mothers of children with ASD and those without children with ASD, the relationship between levels of the BAP and PRF amongst mothers of children with ASD), may be indicative of these subscales not adequately measuring PRF.

Besides the above findings in relation to the PRFQ subscales, further evidence of the subscales of interest and curiosity potentially not adequately measuring PRF can be seen when these subscales were compared to attachment classifications (Luyten, Mayes et al., 2017). It has already been outlined in this document that a strong relationship exists between attachment and PRF (e.g., Fonagy, 1997; Fonagy et al., 1991; Fonagy & Target, 1998; Slade, Grienenberger et al., 2005). It was therefore surprising when Luyten, Mayes and colleagues (2017) found only a strong correlation between levels of prementalizing and attachment avoidance/anxiety when they compared the PRFQ to maternal attachment ($r = .49$, $p < .001$), while the subscales of certainty and interest and curiosity either produced no significant correlations with attachment anxiety and avoidance or, when significant correlations were observed for certainty and attachment security, they were very small (i.e., $r < .15$) These findings suggest that prementalizing may be the only subscale within the PRFQ that is truly measuring PRF. This issue is expanded on within the limitations section of this document.

**The Mediating Effect of Child Externalizing Behaviours on PRF and Parenting Stress.** As was hypothesized, not only was there a positive and significant relationship between level of prementalizing and level of overall parenting stress, child externalizing behaviours were shown to partially mediate this relationship. Although this is the first study to specifically examine this relationship, these findings make sense theoretically. Specifically, research in the general population has outlined a relationship between prementalizing and parenting stress (e.g., Adkins et al., 2022; Georg et al., 2018). It is also well known that parents of children with ASD experience heightened levels of parenting stress compared to the general population (Dabrowska & Pisula, 2010; Estes et al., 2013; Hayes & Watson, 2013). Further, an inverse relationship exists between increased levels of externalizing behaviour problems and attachment security

(Greenberg et al., 1991; Huttmann-Steinmentz & Crowell, 2006; Theule et al., 2016). Due to the intimately tied relationship between PRF and attachment (e.g., Fonagy, 1997) it is therefore not surprising that similar findings were found between prementalizing and externalizing behaviours that have already been found for attachment and externalizing behaviours. To further strengthen this argument, limited research has also shown a more specific inverse relationship with mother's level of mentalizing and child externalizing behaviours (Meins et al., 2013). Finally, when children engage in increased levels of negative externalizing behaviours, parenting stress tends to increase (Bauminger et al., 2010; Hoffman et al., 2009; Lecavalier et al., 2006).

Although a partial mediation model was observed for prementalizing (IV), externalizing behaviours (M) and parenting stress (DV), the same was not observed for interest and curiosity or certainty. In fact, significant relationships were found in the opposite direction than hypothesized for the main effect that interest and curiosity had on parenting stress as well as the main effect of certainty on parenting stress. Specifically, as certainty of the child's mental states increased, parenting stress decreased. Further, as interest and curiosity towards the child's mental states increased, so did parenting stress. These two PRFQ subscales were also not significantly related to the mediator of externalizing behaviours in the way that was hypothesized. These findings are most likely speaking to a broader issue of the validity and/or reliability of these subscales of the PRFQ.

## Limitations

Although this dissertation has provided novel contributions to the study of PRF, ASD, and the BAP, it is important to discuss the limitations that are present. Several methodological limitations exist. First, this study did not collect data regarding the mother's attachment or trauma history, nor did it collect any in-depth data on the mother's mental health.

Although the relationship between PRF and attachment style in mothers has already been outlined within this paper (e.g., Fonagy, 1997; Fonagy et al., 1991; Fonagy & Target, 1998; Slade, Grienenberger et al., 2005), a relationship also exists among experiences with trauma, attachment, and PRF. Specifically, mothers who have experienced childhood abuse and neglect are at risk for passing their nonsecure forms of attachment onto their offspring, thus producing an intergenerational transmission of trauma and attachment (Madigan et al., 2006; van Ijzendoorn et al., 1999). However, not all parents who have experienced childhood abuse and neglect go on to develop and, in turn, pass down nonsecure forms of attachment to their children (e.g., Stovall-McClough et al., 2008). Berthelot and colleagues (2015) argue that a mediating factor between experiencing childhood abuse and neglect and developing nonsecure forms of attachment might be the parent's level of reflective functioning. Specifically, studies that examined mothers who had experienced trauma and/or neglect in their childhoods found that mothers with high levels of PRF displayed more secure attachment classifications with their children, whereas those with lower levels of PRF had more nonsecure forms of attachment with their children (Fonagy, 1993; Fonagy et al., 1994). Further, studies examining children who have been victims of abuse have shown that these children have lower levels of reflective functioning capacities in comparison to those who have not suffered abuse, whereas mothers who have suffered abuse in their childhoods show low levels of PRF abilities (Ensink et al., 2014; Ensink et al., 2015). It is clear that a relationship exists between reflective functioning abilities, PRF abilities, and experiencing abuse as a child. Therefore, mothers within this study who have experienced abuse in childhood may have lower levels of PRF abilities as a result of this, and not because of other factors such as their BAP levels. Besides the ASD group, this factor may have also pulled down PRF scores in the non-ASD group.

Further, as was outlined within the literature review of this paper, reflective functioning abilities can be impacted by mental disorders in the parent (e.g., borderline personality disorder; Fischer-Kern et al., 2010). Therefore, in both the control group as well as the group of mothers with children with ASD, maternal mental health symptoms could be impacting their scoring on the PRFQ.

A further limitation to this study is the fact that it was conducted during a global pandemic. Unsurprisingly, parenting stress increased during the COVID-19 pandemic (Wu & Xu, 2020). For example, recent research has found that parents who experienced increased COVID-19 related stressors, along with those reporting greater anxiety and depression during the pandemic, were reporting higher levels of parenting stress than those who did not experience COVID-19 related stressors or increases in mental health symptoms (Brown et al., 2020). This increase in parenting stress during the pandemic is especially true for parents of children with ASD (Alhuzimi, 2021). Although research has been showing that both parents of children with ASD and parents of children who are neurotypical have reported increased levels of stress during the pandemic, parents of children with ASD reported more stress (Corbett et al., 2021). When examining parents at the peak of pandemic-lockdown, parents of children with ASD reported higher stress levels in comparison to parents of children without ASD. Parents of children with ASD were most likely reporting higher levels of stress during the pandemic due to a multitude of factors including ASD-specific programming being halted (Corbett et al., 2021), as well as their structure and daily routine being disrupted during this time, which can be especially difficult for individuals with ASD (American Psychiatric Association, 2013). This parenting stress has most likely been very impactful for mothers in particular, as they tend to take on a higher portion of child rearing responsibilities and experience more parenting stress in comparison to fathers,

which is especially true in autism populations (Boyd, 2002). Therefore, parenting stress scores within this study, especially amongst the mothers of children with ASD, might have been inflated due to the pandemic.

Another study limitation is in regards to social desirability bias, which is especially prominent in self-report measures and is arguably one of the largest threats to validity of research studies conducted within social sciences, especially if the questions being asked to participants are sensitive in nature (Huang et al., 1998; King & Bruner, 2000). Although social desirability bias most likely impacted both the ASD and non-ASD groups' responses, this bias still could have impacted the relationship between variables within the ASD and non-ASD groups. Research shows that 10–75% of variance displayed in replies from research participants can be accounted for by social desirability bias (Nederhof, 1985). Though actions were taken to ensure quality of responding (e.g., providing clear instructions to all participants as they moved through the survey) including a social desirability scale could have further accounted for response bias in the analysis and interpretation of the results (e.g., Haghighat, 2007).

The self-selection bias that occurs with web-based surveys is an additional limitation. When individuals are randomly selected to participate in research studies, this sample is said to be an accurate portrayal of the entire population of which the research is targeting, and this accuracy becomes stronger (i.e., closer and closer to the precise characteristics of the entire population) as the sample size grows (Heckman, 1990). On the other hand, when individuals are able to self-select whether they participate in a research study, the characteristics within the sample may not accurately depict the population being studied as a whole because the principles of random sampling are no longer being met (Cochran, 1977; Heckman, 1990).

Due to the web-based nature of the data collection of this study, selection bias should also be discussed within this context. Although this form of data collection allowed for a wider and more diverse population to be recruited in comparison to if I were to have had individuals participate in-person, web-based data collection brings with it the issue of *under-coverage* (Bethlehem, 2010). Specifically, individuals within the target population (i.e., mothers of children with ASD) without access to computers and internet service cannot participate in these types of studies, meaning that this population of non-computer and internet users will not have a chance of being covered/accounted for (Bethlehem, 2010). Although it is true that a large proportion of North Americans have access to computer and internet usage, a large number of individuals do not. For example, internet access in remote northern communities in Canada remains an issue, with some communities not having any access to internet whatsoever (McMahon & Akçayır, 2022). The extremely high cost of internet in Canada also serves as an access barrier for many families across the country (Mundie, 2022). Despite this web-based study allowing for a broader demographic population to be recruited, Manitobans were over-represented within the data set. As families of children with ASD will differ between provinces (and, more broadly, countries), in regards to the public supports, interventions, and overall availability of resources being offered, generalizing these results to other provinces and countries should be done with caution.

Regarding the PRFQ-A measure itself, this is a relatively new measure. This study, as well as others that have used it, have found questionable internal consistency for the PRFQ-A subscales (Pazzagli et al., 2018). Although more and more research utilizes this measure as a way to obtain rates of PRF through a questionnaire format, it remains important to interpret results with caution due to its status as a relatively new measure that still needs to be further

researched for reliability and validity. The fact that normality was not obtained for this measure may be due the way in which the questions are worded within the measure. For example, questions within the PRFQ-A may have been worded too extremely, causing skewing of the data.

Levels of prementalizing, certainty, and interest and curiosity are important factors of PRF (Luyten, Nijssens et al., 2017). Therefore, the current study's results from the PRFQ-A, specifically regarding the certainty of mental states and interest and curiosity subscales, as well as similar findings from other studies that have utilized the PRFQ (e.g., Adkins et al., 2022; Georg et al., 2018) might point to an issue with the PRFQ-A's measurement of these subscales. The Cronbach's alpha scores on the PRFQ-A within this study were also not ideal, indicating that the reliability of this measure, especially when being used with parents of children with ASD, might not be consistently and reliably measuring PRF.

These results also bring into question whether the construct of PRF within the PRFQ-A need to be re-examined and shifted, specifically for the certainty and interest and curiosity subscales. Although the measure examines core features of PRF, there may be PRF components that are not adequately represented within the PRFQ-A. Specifically, the gold-standard measure of PRF (i.e., the Reflective Functioning Scale applied to the Adult Attachment Interview [AAI] or the PDI; Fonagy & Target, 1998) appears to take into consideration many more facets of reflective functioning in comparison to the PRFQ-A. For example, the Reflective Functioning Scale takes into consideration the parent's level of understanding that the child's reflective functioning abilities depend on their developmental age, which Slade (2005) identified as an important aspect of PRF. Too high or too low of levels on the certainty and interest and curiosity scales on the PRFQ are not ideal and could point to the parent engaging in hyper- or hypomentalizing, respectively (Stuhrmann et al., 2022). Although the PRFQ-A measure does

describe that high scores on the certainty subscales and low scores of the interest and curiosity subscale point to low levels of PRF (Luyten et al., 2017), the measure instructions are lacking in regards to interpreting scores that fall on the other extremes of these spectrums. It could be that the certainty and interest and curiosity subscales on the PRFQ-A are following a curvilinear distribution. Scores that fall closer to the middle or average would indicate strong levels of the PRF, whereas scores falling too high or too low indicate poor levels of PRF. The prementalizing subscale though would follow a linear distribution (i.e., the higher one falls on the prementalizing subscale, the lower their PRF scores are).

## Strengths

Although this study was met with several limitations that need to be given consideration, the strengths also need to be highlighted. First, this was the first study to examine the relationship between parents' level of the BAP and levels of PRF. Recent research focusing on PRF within parents of children with autism has been calling for this topic to be investigated. Specifically, Enav and colleagues (2023) recently examined maladaptive behaviours (i.e., maladaptive internalizing, externalizing, and "other" [e.g., attentional difficulties] behaviours) in children with ASD. This study examined the effect of maladaptive behaviours in children with ASD on parental hopelessness (i.e., adverse beliefs about one's parenting and their future parenting; Beck et al., 1974), with PRF being assessed as a moderating variable in this relationship. Results showed that, amongst parents of children with ASD, a significant and positive relationship was found between child maladaptive behaviours and parental hopelessness, with PRF moderating this relationship. Specifically, maladaptive behaviours were significantly and positively related to parental hopelessness for parents with low levels of PRF, however, this relationship was not present for parents with high levels of PRF. The authors noted that an

important factor that was not examined within this study was the parent's level of the BAP, as they indicated within their study limitations that this may be a factor that could help explain why some parents had lower levels of PRF. Overall, the current research lays a nice foundation to begin further exploring the relationship between PRF and the BAP.

Another study strength that should be outlined was the care that was taken during data collection to screen for ASD levels in both the ASD study group as well as the comparison group. This was done via parent report of the child by using the AQ-Child (Auyeung et al., 2008). Although parent-report measures can be problematic due to reporting biases (Seifer, 2005), many studies examining ASD populations simply rely on the parent's or caregiver's confirmation of ASD (or, in the case of comparison groups, parents reporting that their child does not have ASD). For example, a study examining parenting stress amongst parents of children with ASD determined that the children in their comparison group did not have ASD on the basis that they were attending mainstream schooling and were not currently seeing any physicians for issues related to developmental concerns (Jx et al., 2017). This is a highly problematic way of screening for ASD and other developmental disorders, as many children with ASD attend mainstream schooling (e.g., Ashburner et al., 2010). Further, ASD can often go undiagnosed by physicians, meaning that there are many children with undetected ASD who are not seeing a physician for issues related to concerns regarding these issues (Daniels et al., 2014).

A final strength of this study was that the current study utilized a homogeneous convenience sample by specifically recruiting mothers of children with and without ASD within a specific age range. Even though such an approach to recruitment reduces the generalizability of these findings in comparison to a true probability sample, the findings from this study provide clearer and more accurate explanations of subpopulation effects.

## Implications

### Research Implications

Although the current study was met with several limitations, it sheds further light on the relationship between mothers and their children with ASD. This is the first study of its kind to examine PRF in parents of children with ASD and its relationship to the BAP. Further, this study expands the literature on parenting stress in this population, examining the role of PRF levels in parenting stress of parents of children with ASD. This information allows clinicians who are working with parents with higher levels of the BAP to implement parent-child intervention programs more effectively.

As outlined earlier within this discussion, some of this study's findings on PRF call for further evaluation of the construct validity and reliability of the PRFQ-A, specifically for the subscales of certainty and interest and curiosity. Future research should engage in further examination of the factor structure of these subscales. Determining whether additional items need to be added to this measure in order to further encapsulate PRF and provide more construct validity should also be explored. Examining the wording of the items for the certainty and interest and curiosity subscales might also help with internal reliability of the PRFQ-A. Studies examining the validity and reliability of this measure should also include individuals from a wide range of populations (e.g., parents of children with developmental disorders).

This study found a negative correlation between PRF and the BAP. This significant finding will allow researchers to further examine how the BAP impacts parenting. In mothers, higher levels of the BAP led to lowered levels of PRF. It is important to build off of this finding by looking at this relationship between fathers and their children with ASD. ADHD research has found a similarity-fit framework for fathers with ADHD and their children with ADHD (i.e.,

fathers with ADHD are better able to understand tolerate their child with ADHD's behaviours; Grimbos & Wiener, 2018). This same research has found a similarity-misfit for mothers with ADHD who also have children with ADHD, which is most likely due to the different parenting roles that mothers and fathers play within the family (Grimbos & Wiener, 2018). As both ASD and ADHD fall under the category of neurodevelopmental disorders and share some similar features (American Psychiatric Association, 2013), the current research should be built upon by examining this similarity-fit hypothesis between the BAP and ASD in parents and their children.

Mothers and fathers of children with ASD experience different levels and types of parenting stress, with fathers experiencing more stress in comparison to mothers from their child's behaviours (Krauss, 1993). The current study's results therefore provide opportunity to compare the mediating role of child externalizing behaviours on the relationship between PRF and parenting stress in fathers of children with ASD.

**Clinical Implications**

Unlike the BAP, levels of PRF are not fixed and can therefore be improved with intervention (e.g., Sealy & Glovinsky, 2016). Research conducted on PRF has leant itself to the creation of several interventions centered around improving the quality of the parent-child relationship (for a review, see Camoirano, 2017). For example, an intervention centered around PRF is Minding the Baby (MTB). MTB is an attachment-based program directed at young and at-risk parents, primarily mothers, with its focus being on the reflective functioning capacities of the parent (Slade, Sadler et al., 2005). Research focussed on MTB has been promising. During a randomized control trial, Sadler and colleagues (2013) found that mothers who participated in this intervention had improved abilities to reflect on their own as well as their child's behaviours. Further, mothers who participated in this program were less likely to have child and family

services involvement, and their infants were more likely to be securely attached. Finally, at a 1–3-year follow-up, mothers in the intervention group reported fewer externalizing behaviours from their 3–5-year-old children in comparison to prior to treatment (Ordway et al., 2014a).

Although parenting programs aimed at increasing reflective functioning levels have been promising (Camoirano, 2017), only a few to date have been directed at parents of children with ASD and neurodevelopmental disorders (Enav, et al., 2019; Frolli et al., 2021; Sealy & Glovinsky, 2016). Most recently, Frolli and colleagues (2021) examined two groups of parents, all of whom had children with an ASD diagnosis. Parents were randomly assigned to one of two groups. The first, which had parents receive weekly parent-training based solely on ABA principles. The second group had parents take part in parent-training that focused on ABA skills as well as skills aimed at "improving reflective functions and parental awareness" (Frolli et al., 2021, p. 220). PRF levels for both groups, pre and post-intervention, were measured with the PRFQ (Luyten et al., 2017). Parents who participated in the parent-training that involved ABA and PRF training had significantly higher levels of PRF post-treatment in comparison to those parents who took part in the ABA-only parent-training. Another study examined the impact of a mentalization intervention for parents of children with ASD (Enav et al., 2019). Parents in this study all had a child with a previous ASD diagnosis and were divided non-randomly into an intervention or delayed-treatment group. Parents who took part in the intervention group attended weekly 90-minute sessions with other groups of parents. These intervention classes focused on teaching mentalization and emotion regulation strategies. PRF was measured pre and post-treatment using the PDI (Aber et al., 1985). Statistical analyses showed a significant interaction effect for PRF levels between both group (intervention vs. delayed-treatment) and time (pre vs. post). Specifically, parents who participated in the intervention group showed

significantly increased levels of PRF in comparison to those in the delayed-treatment group. The intervention group also reported significant improvements in their children's problem behaviours and internalizing problems post-treatment in comparison to the parents in the delayed-treatment group. This finding is important, as it highlights the relationship between children's internalizing and externalizing behaviours and parent's level of PRF.

The third study that has specifically examined treatment aimed at PRF for parents of children with ASD utilized a randomized control trial where parents were randomly divided into an intervention or wait-list (control) group (Sealy & Glovinsky, 2016). The treatment group participated in 24-hours of therapy based around the Developmental Individual-Difference Relationship-Based approach (DIR; Greenspan & Wieder, 1998) over a 12-week treatment period. Sealy and Glovinsky (2016) explain that the goal of this type of play-based therapy is designed for the parent to learn to be aware of their own internal states while at the same time reading their child's affective, sensory, and motor behaviours. Play interactions between the parent and child are video recorded and reviewed with the parent as a way for them to reflect on these interactions and consider why their child may have behaved in a certain way during them. Parents were then encouraged to incorporate the strategies used during these sessions at home with their child, and were asked to journal about their treatment experiences to further engage them in reflective thinking. The PDI (Aber et al., 1985) was used to measure PRF pre- and post-intervention. Results showed that parents who participated in the treatment group had significantly higher levels of PRF at the end of treatment when their scores were compared to those parents on the waitlist.

Given the findings of the current study that mothers of children with ASD have lower levels of PRF in comparison of mothers of children without ASD, combined with the limited but

promising research on parenting programs aimed at increasing PRF in parents of children with ASD, PRF intervention amongst this population should continue to be studied. Given the result on the mediating role that externalizing behaviours can have on PRF and parenting stress, clinical intervention research should also include measurement on level of child externalizing behaviours, as well as direct intervention for these behaviours, and examine how this impacts level of success of the interventions.

**Policy Implications**

It is important to note that none of the above studies utilized comparison groups of parents of children without ASD, nor did any take into consideration parental level of the BAPQ when considering factors for how the individual parents responded to these treatment approaches. Shedding light on the relationship between the BAP and levels of PRF among parents of children with ASD may increase the level of parent-child services being directed at this specific population. The non-fixed state of PRF abilities (Slade, Sadler et al., 2005), combined with PRF's strong relationship to attachment classification (Fonagy et al., 1991) highlight the importance of these services for parents who may be at risk for lower levels of PRF. Funding directed at research targeting the efficacy of these interventions for the ASD populations is important, as increasing levels of PRF can in turn reduce levels of parenting stress, further enabling parents to engage successfully in their parenting roles.

**Future Directions**

This research has laid the necessary groundwork to continue examining PRF amongst parents of children with ASD. It will now be important to build on these findings and expand this research to fathers of children with ASD. Although it has been made clear that fathers' levels of reflective functioning are important within the context of child development (Benbassat & Priel,

2015), much of the reflective functioning literature as a whole has focused on PRF in the context of mother-child interactions (Stover & Kiselica, 2014). The limited research that has compared PRF between mothers and fathers has displayed inconsistent findings. For example, several publications have found lower levels of PRF amongst fathers in comparison to mothers (Cooke et al., 2017; Mohaupt & Duckert, 2016; Stover & Kiselica, 2014). On the other hand, Borelli and colleagues (2016) and Steele and Steele (2008) found no differences in PRF between mother and father groupings. These conflicting findings might be partially explained by examining the role of gender norms. Fathers who do not conform as strictly to traditional gender norms and take on parenting roles that require them to be more mindful towards their child might in turn present with higher levels of PRF in comparison to fathers who engage in more gender-normed parenting. As parenting gender roles continue to shift and become more equal between men and women as they have been over the past several decades (Brooks & Bolzendahl, 2004; Pelchaht et al., 2007), research may in turn begin finding more equal levels of PRF amongst mothers and fathers. Using the PRFQ when examining PRF in father populations will be important to further assess the validity and reliability of this measure within this population as well.

Aside from examining fathers' levels of PRF, a broader age range of children should also be considered for future research. As was previously noted, this project examined a range of child age that is similar to other studies that have examined parents of children with autism (e.g., Seskin et al., 2010). Parents' level of mentalization may decrease as children get older though (Pazzagli et al., 2018). To my knowledge, these findings have not been studied amongst parents of adult children with ASD. Therefore, it is also important to replicate this study with older age groups of adult children to determine if levels of PRF change with child age in this population.

In order to further understand the validity of the relatively new PRFQ and PRFQ-A, replication of this study using the traditional, gold-standard measures of PRF (i.e., the Reflective Functioning Scale applied to the AAI or the PDI; Fonagy & Target, 1998, George et al., 1996; Slade et al., 2004) will also be important. Anis and colleagues (2020) recently examined the convergent validity of the PRFQ and the Reflective Function Scale applied to the PDI (PDI-rated RFS, provides Self, Child, and total scores of reflective function). They found that the two subscales of interest and curiosity and certainty in mental states (transformed and reverse-scored variable) from the PRFQ were significantly correlated with the PDI-rated RFS Self, Child, and total scores, while the prementalizing subscale was significantly correlated with the PDI-rated RFS Child scores, while significance was approaching for the Self-score. While this research by Anis and colleagues (2020) serves as a good starting point for understanding how the PRFQ maps onto established formats for measuring PRF, more studies with diverse populations (e.g., parents of children with developmental disorders, ensuring parents with a wide age-range of children are studied, examining parents from a wide range of SES backgrounds) will need to continue to be conducted.

Finally, although this research project included mothers of daughters with ASD, as well as mothers of children with co-occurring intellectual disabilities, separate analyses were not run with these individual groupings as it was either out of the scope of this project or the data set was too small to explore these subgroups. Although the groups were homogeneous in regards to their outcome measures, this project should be expanded in the future in order to examine whether any differences exist within and between these groups in regards to the specific statistical analyses that were carried out.

## Conclusion

In spite of the limitations of the current study, it provides an important and unique addition to the literature surrounding the relationship between mothers and their children with ASD, PRF, parenting stress, and the BAP. This is the first study that examined the relationship between the BAP and PRF, as well as the relationship between PRF, parenting stress, and externalizing behaviours. Results indicate that mothers of children with ASD have decreased levels of PRF, and that level of the BAP in mothers of children with ASD is related to level of PRF. More specifically, the higher the level of the BAP, the lower the level of PRF. Results also indicated that lower levels of PRF impacted parenting stress levels in a significant and negative relationship, and that level of child externalizing behaviours partially mediated this relationship amongst mothers of children with ASD. Two variables of the PRFQ-A (i.e., certainty, interest and curiosity) were not meaningfully related to the BAPQ nor child externalizing behaviours, and no significant differences were found with these variables between the mothers of children with ASD and the comparison group. These latter results indicate that more research on this measure needs to be conducted related to the validity of these subscales in accurately measuring PRF.

This research is important for families of children with ASD, as it is the first to compare PRF between mothers of children with ASD and mothers of children without any neurodevelopmental disorders. The finding that mothers of children with ASD have significantly lower levels of PRF (i.e., prementalizing) in comparison to mothers of children without ASD should serve as an indicator for how important further research targeting parenting intervention for parents of children with ASD is. The limited research that has examined parent intervention aimed at increasing PRF for parents of children with ASD has been promising (e.g., Frolli et al., 2021). Further, research aimed at examining the benefits of these interventions for parents of

children who are neurotypical is vaster (see Lo & Wong, 2022). Now that the current study has determined that mothers of children with ASD have lower levels of PRF in comparison to mothers of children without ASD, research should focus on whether parents with lower levels of PRF benefit in the same ways to these parenting interventions. These interventions could also be widened to include mothers who have ASD, as very limited, if any, research has been conducted on the efficacy of parent intervention programs for parents who have ASD. Finally, this study found a small subset of mothers of children with ASD who had higher levels of the BAP paired with higher levels of PRF. These parents should be examined in a follow-up study to determine which strengths they hold in comparison to other parents within this group.

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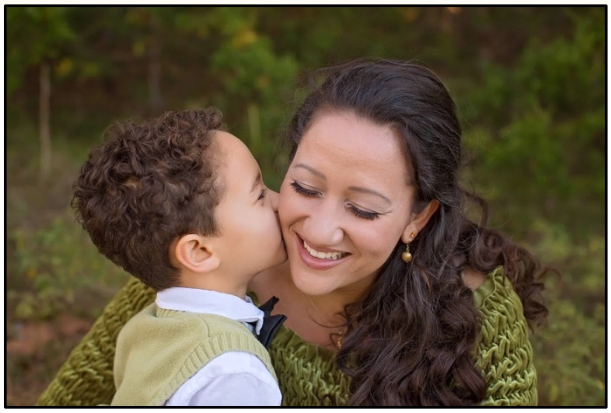
**Appendix A**

**Recruitment Posters**

# Research Opportunity:

## Researchers at the University of Manitoba are looking for

## Mothers of children with ASD 6-11 years old



The purpose of this study is to learn about the strengths of families of children with Autism Spectrum Disorders (ASD), as well as their parenting and family needs. In this study you will be asked to complete a survey on parenting, your family, as well as yours and your child's development and characteristics.

## Why Participate?

By taking part in this study, your contribution will help to improve the lives of families with a child with ASD and allow clinicians to more effectively implement parent-child intervention program. You will also be entered to win one of ten **$50 Amazon eGift Cards**!

## To Participate in this Study:

- Click on the link below to open a new browser
- This will lead you to a survey that will take approximately 30–45 minutes to complete

[Link here ]

If you are interested in participating in this research project
and would like to learn more please email

**Dr. Jen Theule** at **jen.theule@umanitoba.ca** or call **204-474-741**

# Research Opportunity:

Researchers at the University of Manitoba are looking for

**Mothers of sons 6-11 years old**

## What is the Study About?

The purpose of this study is to learn about the strengths, parenting experiences, and family needs of families of boys **with and without** Autism Spectrum Disorders (ASD). In this study you will be asked to complete a survey on parenting, your family, as well as yours and your son's development and characteristics.



## Why Participate?

By taking part in this study, your contribution will help to improve the lives of families with a child with ASD and allow clinicians to more effectively implement parent-child intervention program. You will also be entered to win one of ten **$50 Amazon eGift Cards**!

## To Participate in this Study:

- Click on the link below to open a new browser
- This will lead you to a survey that will take approximately 30-45 minutes to complete

[Link here ]

If you are interested in participating in this research project
and would like to learn more please email
**Dr. Jen Theule** at **jen.theule@umanitoba.ca** or call **204-474-7417**

Please feel free to share this information with anyone else you think might be interested!



University of Manitoba



## Appendix B

## Survey Informed Consent

** *This will be on the Psychology faculty letterhead in Qualtrics.*

**Principal Investigator:**
Dr. Jen Theule
University of Manitoba, Department of Psychology
Email: Jen.Theule@umanitoba.ca

This consent form, which you may print for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

The purpose of this study is to gain insight into the relationship between mothers and their children with and without autism spectrum disorders (ASD). Participants will include mothers with children between the ages of 6 to 11 years of age with a diagnosis of ASD, as well as mothers with typically developing sons aged 6 to 11 years. This study is being conducted by Dr. Jen Theule, along with graduate students Michelle Ward, Brenna Henrikson, and Karis Cochrane.

If you agree to participate in this study, you will be asked to complete a survey regarding parenting, your family, as well as yours and your child's development and characteristics. It is anticipated that the entire survey will take approximately 30–45 minutes to complete.

Participation in this study is voluntary. This study will not request any form of self-identification; therefore, your responses to this survey will remain anonymous. Your survey will be coded with a number to ensure confidentiality, and we will not ask you for your name to preserve confidentiality. No individual quantitative results will be reported as findings will be presented in aggregate form, although de-identified direct quotations from the qualitative questions may be utilized. You may complete the survey all at once, or save your responses and come back to complete the survey at any time. You do not have to answer any questions that you don't want to answer for any reason. Further, if you begin the survey and then decide not to finish, you may leave the survey at any time. Any responses collected before leaving, however, will be recorded and may be used as data. The database containing anonymized study data will be stored for an indefinite period, as the study data may be useful for future analyses.

As a participant in this study you are eligible to receive a summary of the results. Upon completion of the survey, a link will be available which will open up a new web browser where

you may provide your email address. Additionally, a second link will be provided for which you may provide your email address to be entered in a draw for one of ten $50 Amazon eGift Cards. The results of this research study may be presented through various outlets, such as conferences and academic journals.

If you have questions about the survey at any time, you may email Dr. Jen Theule at Jen.Theule@umanitoba.ca.

By clicking "I agree to participate in this research study", you are indicating that you have understood to your satisfaction the information regarding participation in the research project and are agreeing to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from this study at any time, for any reason, and you are free to refrain from answering any questions you prefer to omit, without prejudice or consequence. Any responses you provide before withdrawing, however, will be recorded and used as data. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. Should you choose **not** to participate, **do not** click "I agree to participate in this research study" and close the web browser.

The University of Manitoba may look at the research records to see that the research is being done in a safe and proper way.

This research has been approved by Psychology/Sociology Research Ethics Board. If you have any concerns or complaints about this project, you may contact the Human Ethics Coordinator at 204-474-7122 or by email at humanethics@umanitoba.ca. We encourage you to print a copy of this consent form for your records.

- ○ I agree to participate in this research study

## Appendix C

## Demographic Questionnaire

Please Note:
This demographic questionnaire is a sample template. Some of these questions will be worded and branched to fit the responses of each participant (e.g., a parent responding about a child without ASD will not be asked to discuss subsequent ASD diagnostic information).

### General Demographics:

Q1 What is your gender?
- ❍ Male
- ❍ Female
- ❍ I do not identify with the genders listed above
- ❍ I prefer not to answer

Q2 What is your age? _____

Q3 What is your marital status?
- ❍ Single
- ❍ Common-law
- ❍ Married
- ❍ Separated/divorced
- ❍ Widowed

Q4 What is your average household income?
- ❍ 0–40k
- ❍ 40–60k
- ❍ 60–90k
- ❍ 90–125k
- ❍ 125k+

Q5 What ethnicity do you identify with?
- ❍ Asian
- ❍ Black
- ❍ Indigenous
- ❍ White
- ❍ Other (please specify) _____

Q6 What country do you currently live in?
- ❍ Canada
- ❍ United States
- ❍ Other (please specify) _____

Q7 What state, province, or territory do you currently live in (please specify)?
Please specify: _____

Q8 How did you hear about this survey?
- ❍ Social Media (e.g., Facebook, Twitter) (please specify) _____
- ❍ Webpage Posting (please specify) _____
- ❍ ASD Service Organization (please specify) _____
- ❍ Community posting (e.g., in school, community centre, doctor's office) (please specify) _____
- ❍ Participation in previous research (please specify where) _____
- ❍ U of M Participant Subpool
- ❍ Other (please specify) _____

**ASD/ADHD Demographics:**

Q9 Have you ever received a diagnosis of autism spectrum disorder (or Asperger's Disorder, Autistic Disorder, Pervasive Developmental Disorder Not Otherwise Specified)?
- ❍ Yes
- ❍ No

Q10 What autism spectrum diagnosis have you received?
Please specify: _____

Q11 Who did you receive this diagnosis from?
- ❍ Family physician
- ❍ Paediatrician
- ❍ Psychiatrist
- ❍ Clinical Psychologist
- ❍ School Psychologist
- ❍ Other (please specify) _____

Q12 At what age were you diagnosed with ASD?
Please specify: _____

Q13 Have you ever received a diagnosis of attention-deficit/hyperactivity disorder (or attention-deficit disorder)?
- ❍ Yes
- ❍ No

Q14 Who did you receive this diagnosis from?
- ❍ Family physician
- ❍ Paediatrician
- ❍ Psychiatrist
- ❍ Clinical Psychologist

- ❍ School Psychologist
- ❍ Other (please specify) _____

Q15 At what age were you diagnosed with ADHD/ADD?
Please specify _____

**Child Demographics**

Q16 How many children do you have?
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ >5

Q17 Do you have a child between 6 and 11 years of age?
- ❍ Yes
- ❍ No

Q18 How old is your child between 6 and 11 years of age? (if more than one son in this age range, please check multiple)
- ❍ 6
- ❍ 7
- ❍ 8
- ❍ 9
- ❍ 10
- ❍ 11

Q19 Do you have a child (aged 6–11) who has been diagnosed with autism spectrum disorder (or Asperger's Disorder, Autistic Disorder, Pervasive Developmental Disorder Not Otherwise Specified)?
- ❍ Yes
- ❍ No

Q20 How many of your children (age 6–11) have been diagnosed with autism spectrum disorder?
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ >4

***NOTE:***
To allow for parents to adequately respond to questions and measures, parents will be prompted to consider the following questions based on a target child using Qualtrics formatting and branching. The following guidelines will be used:

a) Child aged 6–11 (in families with no children with ASD) **OR** *oldest* child age 6–11 (in families with no children with ASD)
b) Child with ASD aged 6–11 (in families with one child with ASD) **OR** *oldest* child with ASD aged 6–11 (in families with more than one child with ASD)

Parents will be prompted to create a deidentified nickname to assist with orienting the questions towards the target child:

***Please provide a nickname for this child. Try to pick something that will help you, but won't identify the child to others (e.g., "Pumpkin," "Little Man," or you can use your child's first and middle initial).***

**Target Child Diagnostic Questions**

Q21 How old is _____? _____

Q22 What month was _____ born in? _____

Q23 What is your relationship to _____?

- ❍ Biological mother
- ❍ Adoptive mother
- ❍ Foster mother
- ❍ Step-mother
- ❍ Other (please specify) _____

Q24 How many days a week does _____ live with you?

- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6
- ❍ 7

Q25 What autism spectrum diagnosis has _____ received?
Please specify _____

Q26 Who diagnosed _____ with autism spectrum disorder?

- ❍ Family physician
- ❍ Paediatrician
- ❍ Psychiatrist
- ❍ Clinical Psychologist
- ❍ School Psychologist
- ❍ Other (please specify) _____

Q27 How old was _____ when he/she was diagnosed with autism spectrum disorder?
Please specify_____

Q28 Has _____ been diagnosed with attention-deficit/hyperactivity disorder (or attention-deficit
disorder)?

- ❍ Yes
- ❍ No

Q29 Who diagnosed _____ with attention-deficit/hyperactivity disorder (or attention-deficit disorder)?

- ❍ Family physician
- ❍ Paediatrician
- ❍ Psychiatrist
- ❍ Clinical Psychologist
- ❍ School Psychologist
- ❍ Other (please specify) _____

Q30 How old was _____ when he/she was diagnosed with attention-deficit/hyperactivity disorder (or attention-deficit disorder)?
Please specify _____

Q31 Has _____ been diagnosed with an intellectual disability (and/or ID, developmental delay, global developmental delay, mental retardation, cognitive disability)?

- ❍ Yes
- ❍ No

Q32 Who diagnosed _____ with an intellectual disability?

- ❍ Family physician
- ❍ Paediatrician
- ❍ Psychiatrist
- ❍ Clinical Psychologist
- ❍ School Psychologist
- ❍ Other (please specify) _____

Q33 Has _____ been diagnosed with any of the following mental health or developmental conditions?

- ❍ Anxiety Disorder
- ❍ Obsessive Compulsive Disorder
- ❍ Depression
- ❍ Specific Learning Disability (reading, writing, and/or math, also known as dyslexia, dyscalculia)
- ❍ Social (Pragmatic) Communication Disorder
- ❍ Language Disorder
- ❍ Developmental Coordination Disorder
- ❍ Feeding Disorder (e.g., avoidant/restrictive food intake disorder)
- ❍ Oppositional Defiant Disorder
- ❍ Conduct Disorder
- ❍ Other: _____

Q 34 Use the sliding scale below to rank how well you feel your support needs for your child/family are being met:

**Qualitative Questions:**

Q1. What supports are you currently receiving (paid for by yourself, the education system, health care funding, or other government sources)?

Q2. What supports do you feel you need?

Q3. If you wish, please feel free to use the space below to report on any of your personal experiences with parenting.

Q4. Is there anything else you would like to add?

## Appendix D

## Debriefing Information

**This will be viewed at the completion of the survey in Qualtrics

Thank you for your participation in this survey. Your time is greatly appreciated!

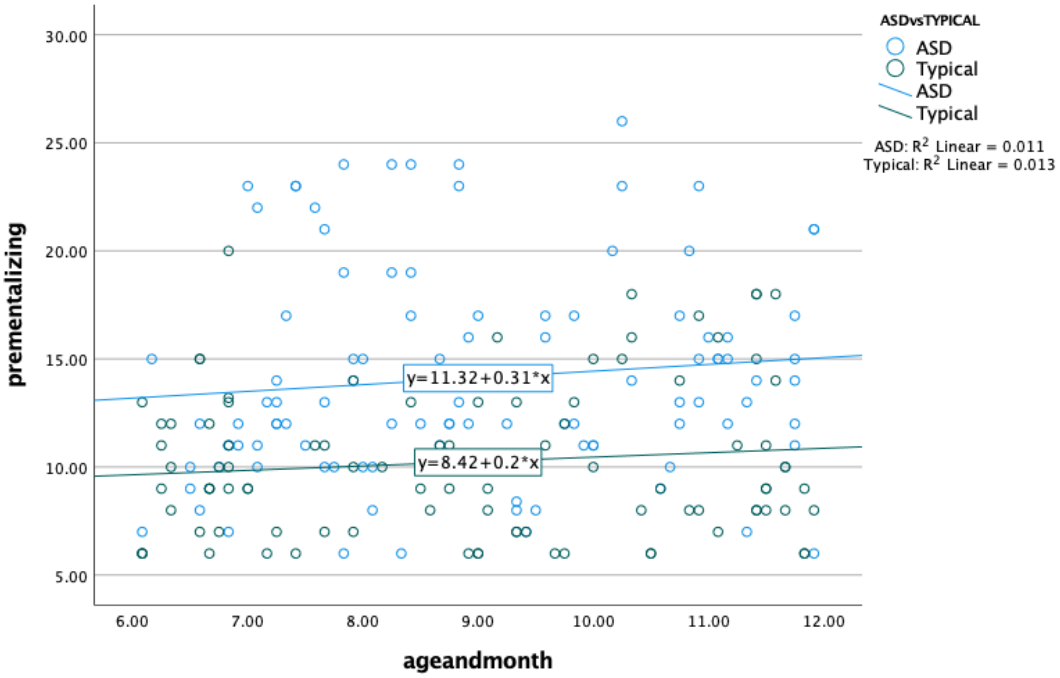
Your answers will help us better understand the experiences and perceptions of mothers of sons around the parent-child relationship and family functioning. We are particularly interested in how similarity between mothers and children, how mothers think about their children, and parenting styles relate to parenting stress, parenting, child behaviors, and family quality of life in families of children with and without Autism Spectrum Disorders. Your contribution today will help to improve the lives of families and allow clinicians to more effectively implement parent-child intervention programs!

[Click here] if you would like to receive a summary of the results of this survey. A new web browser window will open where you may provide your email address. The email address that you provide will not be linked to your survey responses. The summary of the results of this research project will be emailed to you by the end of December 2020.

If you have questions regarding your participation in the study or have other questions about the study, please contact Dr. Jen Theule at Jen.Theule@umanitoba.ca.

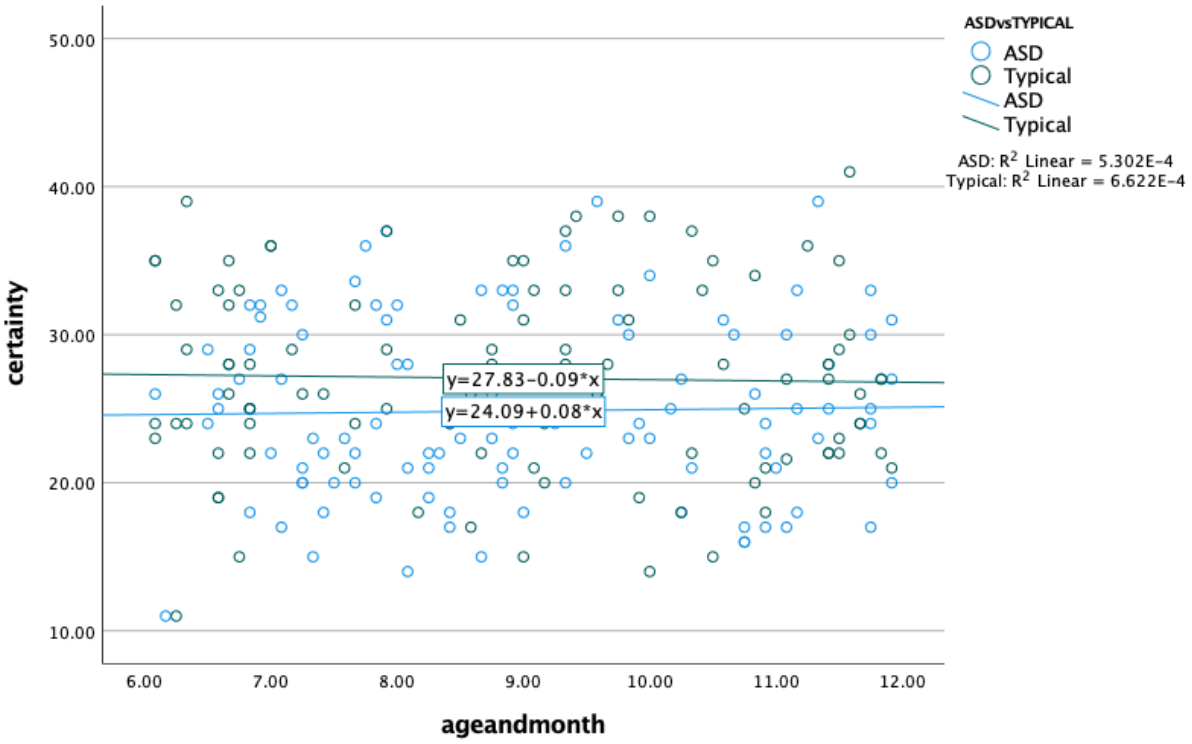
# Appendix E

## Assumption of Linearity and Homogeneity Between Prementalizing and Age



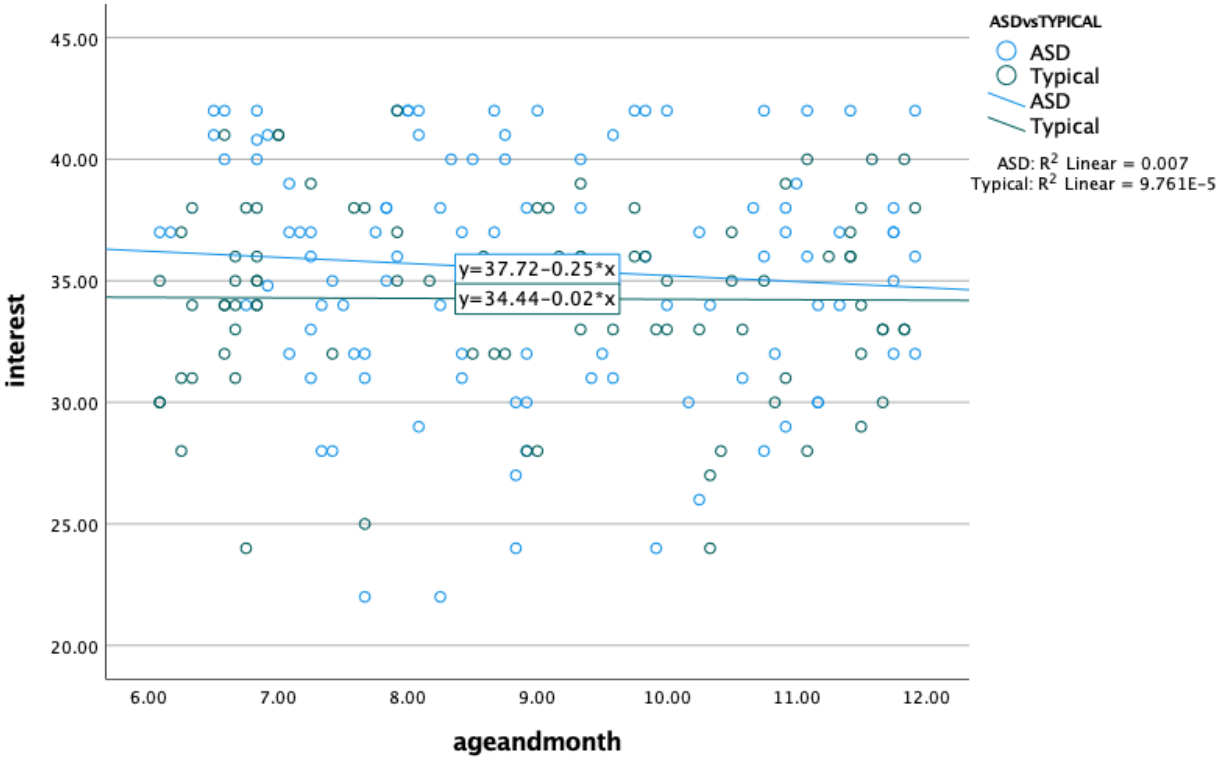
## Appendix F

### Assumption of Linearity and Homogeneity Between Certainty and Age



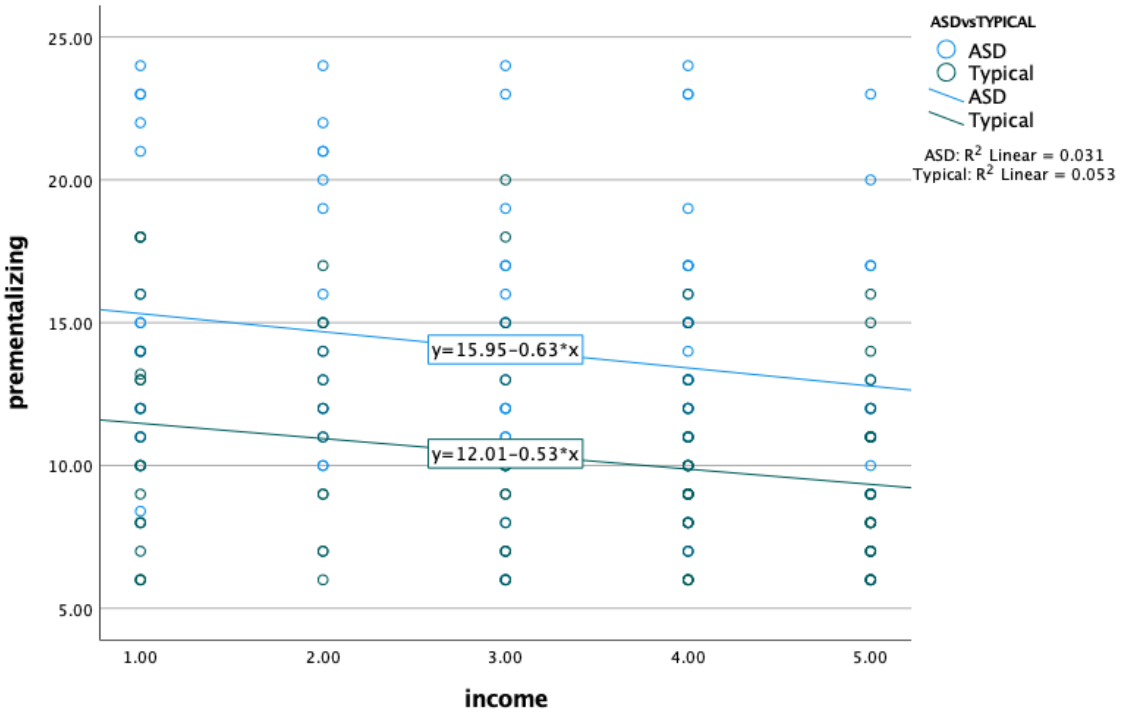
## Appendix G

### Assumption of Linearity and Homogeneity Between Interest and Curiosity and Age



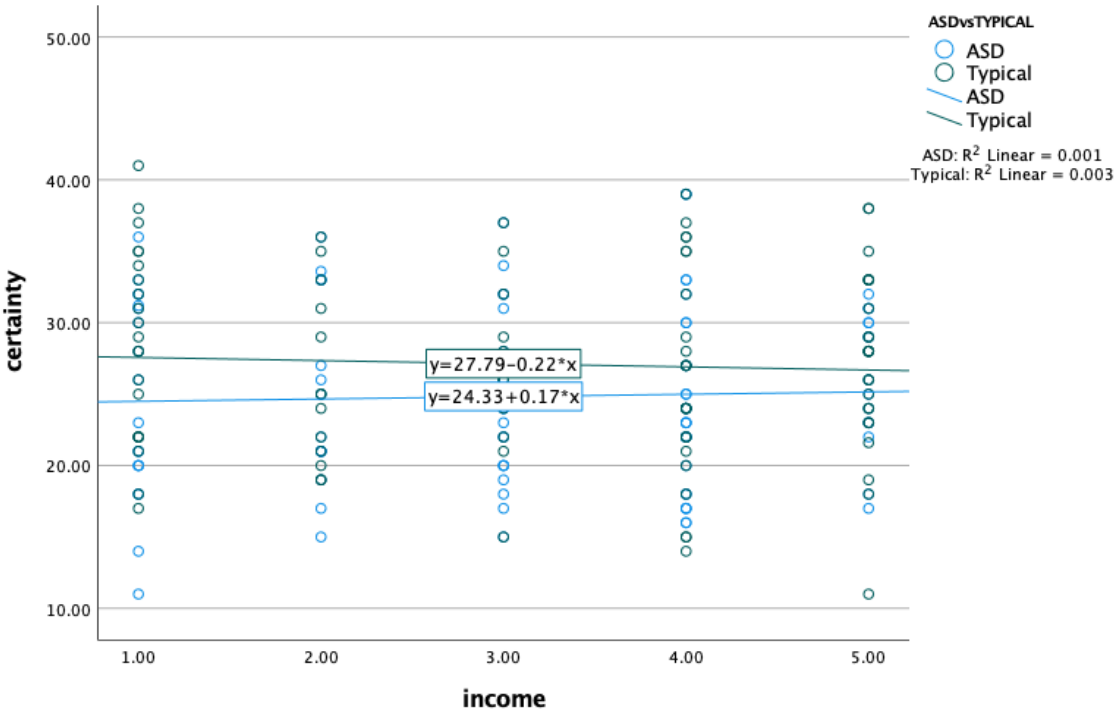
# Appendix H

## Assumption of Linearity and Homogeneity Between Prementalizing and SES



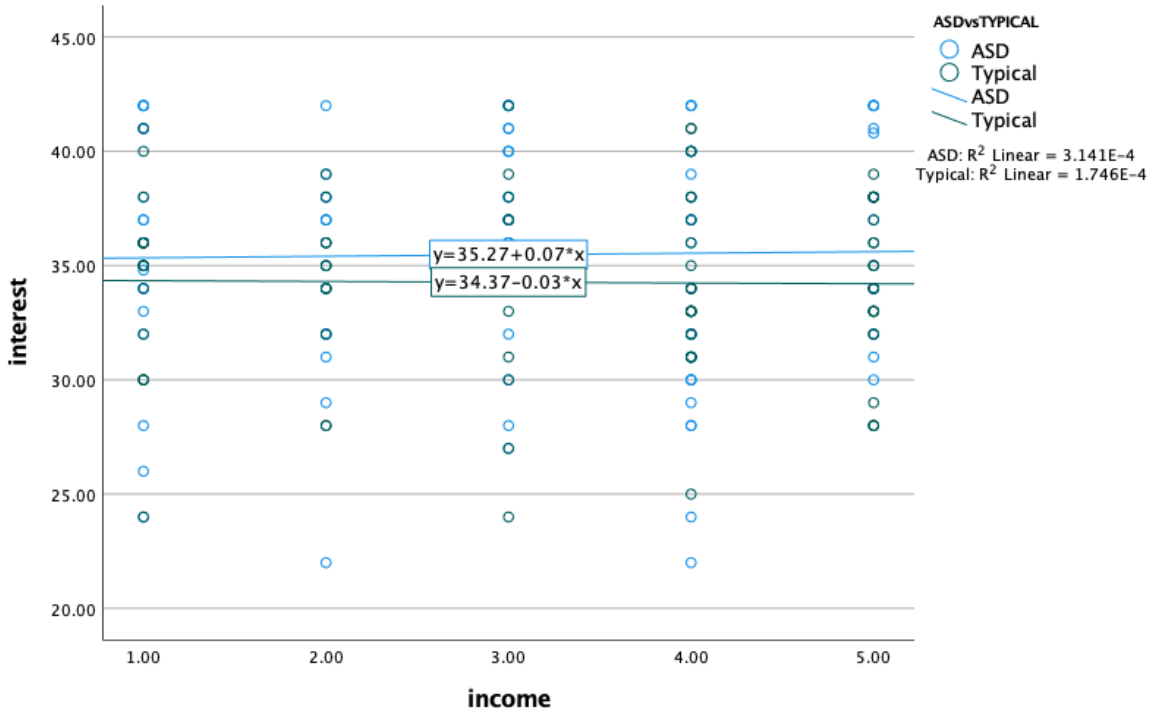
# Appendix I

## Assumption of Linearity and Homogeneity Between Certainty and SES



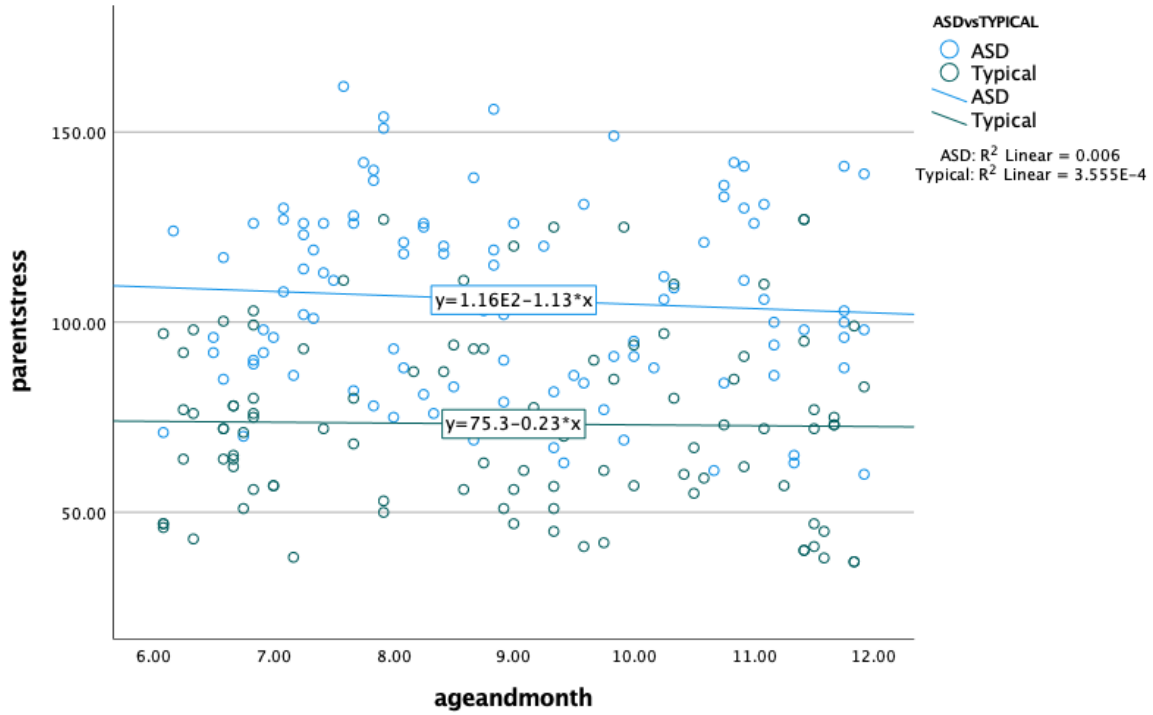
## Appendix J

### Assumption of Linearity and Homogeneity Between Interest and Curiosity and SES



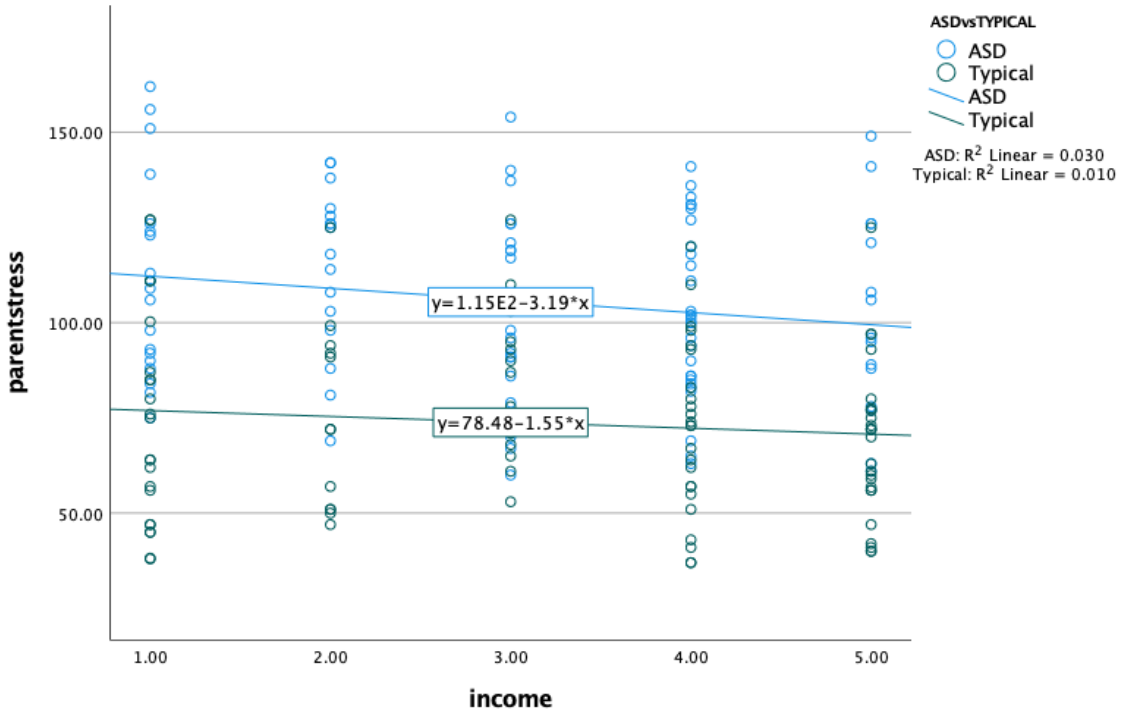
## Appendix K

### Assumption of Linearity and Homogeneity Between Parenting Stress and Age



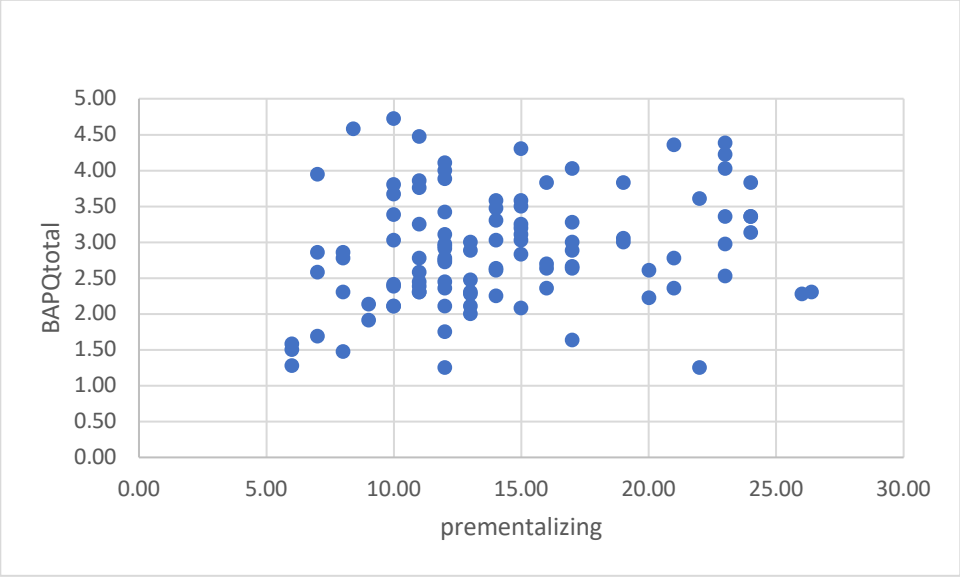
## Appendix L

### Assumption of Linearity and Homogeneity Between Parenting Stress and SES



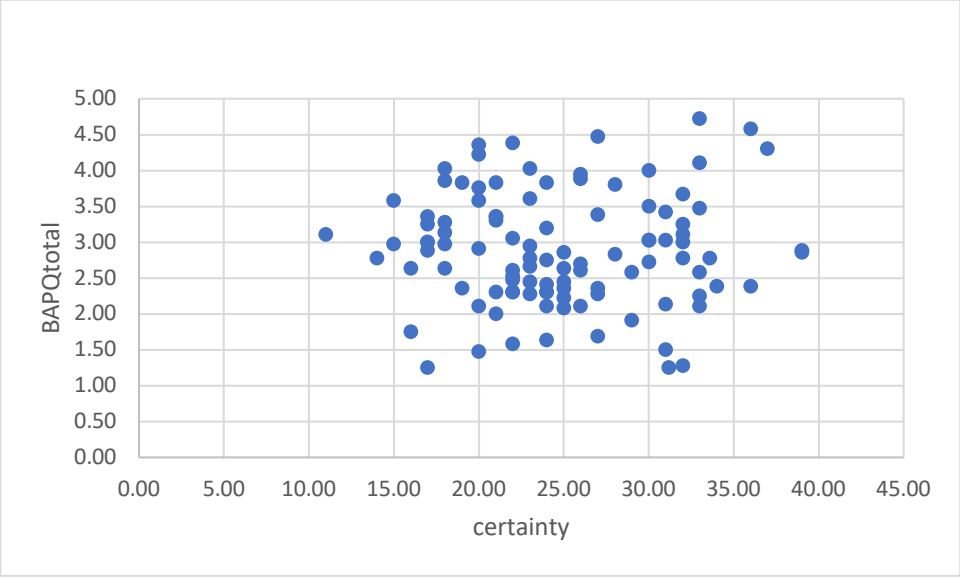
## Appendix M

### Assumption of Monotonicity Between BAPQ Total Scores and Prementalizing



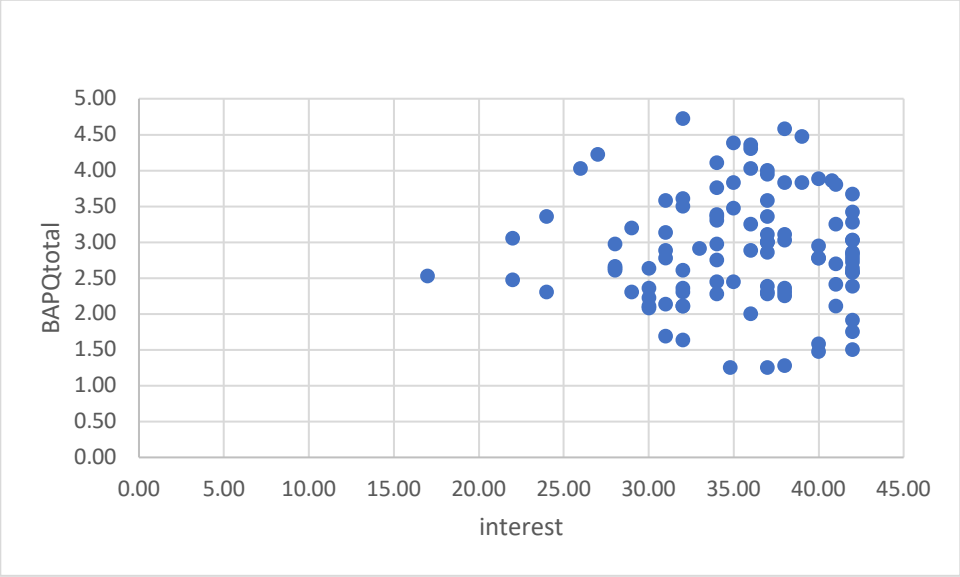
## Appendix N

### Assumption of Monotonicity Between BAPQ Total Scores and Certainty



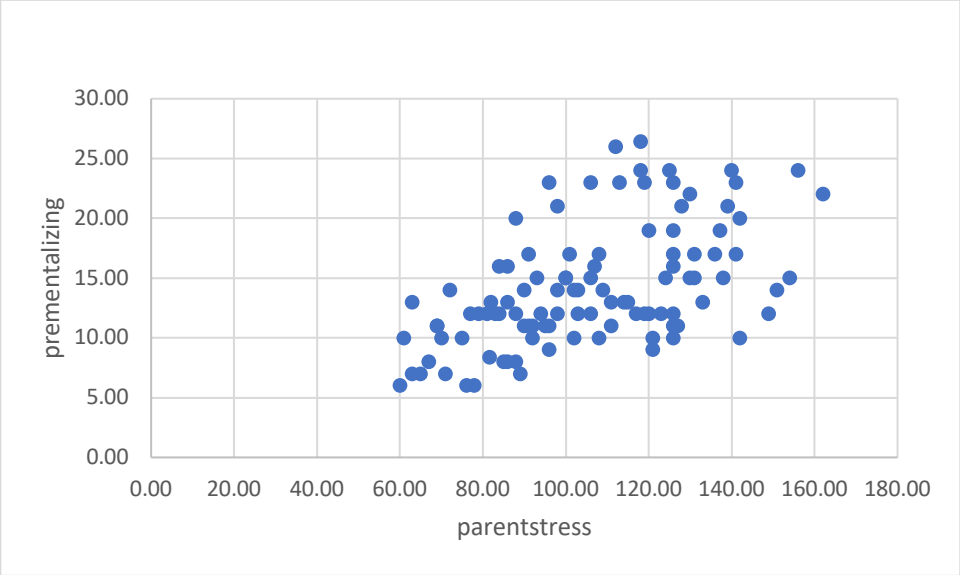
## Appendix O

### Assumption of Monotonicity Between BAPQ Total Scores and Interest and Curiosity



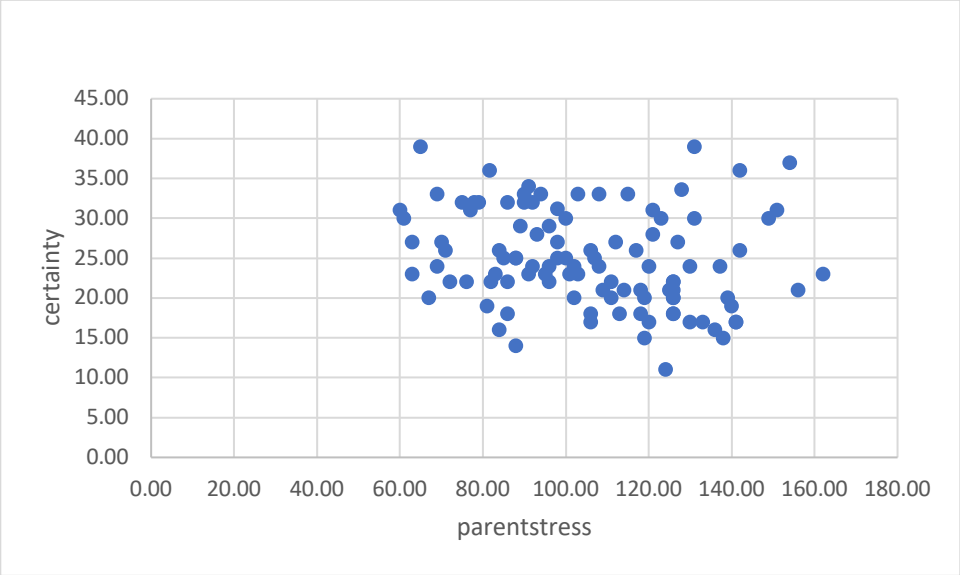
## Appendix P

### Assumption of Linearity Between Prementalizing and Parenting Stress



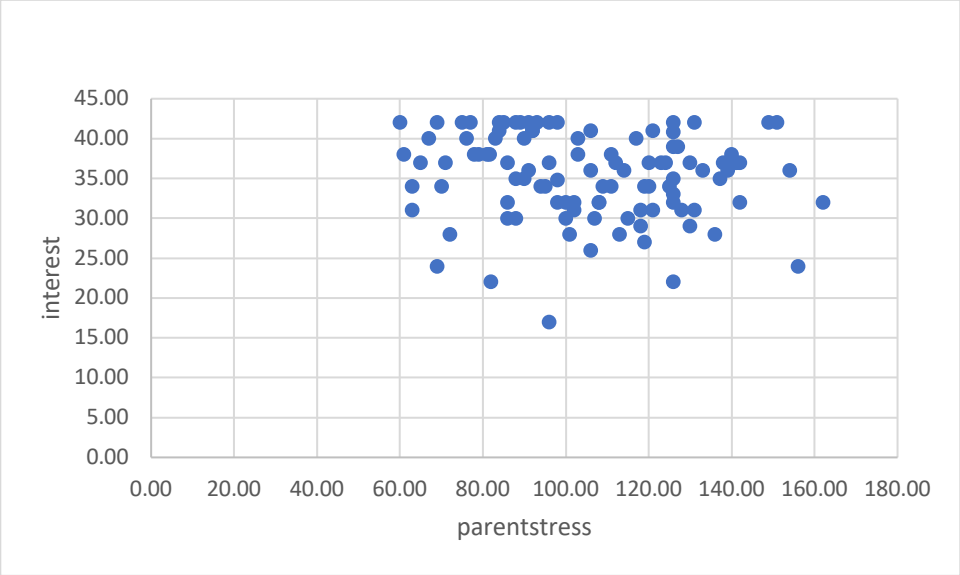
## Appendix Q

### Assumption of Linearity Between Certainty and Parenting Stress



## Appendix R

### Assumption of Linearity Between Interest and Curiosity and Parenting Stress



## Appendix S

### Assumption of Homoscedasticity Between Parenting Stress and PRF

