The Relationship Between Birth Order, Number of Children, and Family Well-Being in Neurodevelopmentally Diverse Families

by

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Abstract

Parenting a child with a neurodevelopmental disorder (NDDs), such as autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD), or intellectual disability (ID) can negatively impact family well-being indices such as family quality of life (FQOL), coparenting quality (CQ), and parenting stress (PS). The limited research examining birth order and number of children in NDD populations suggest that having a child with a NDD earlier in the birth order and having a higher number of children may place more strain on the family system. The current study aimed to explore how birth order and number of children are linked to FQOL, CQ, and PS in neurodevelopmentally diverse families as well as the influence of child group membership on these relationships. Mothers of typically-developing children (n = 56), along with mothers of children with ASD (n = 69), ADHD (n = 127), and/or low intellectual functioning (n = 30) between the ages of 6-12 years old completed an online survey. One-way MANCOVA analyses revealed no significant differences in the ASD, ADHD, or low intellectual functioning groups, however, in the TD group, mothers of children earlier in the birth order reported significantly higher PS. Two-way MANCOVAs showed non-significant interactions between birth order and child clinical group membership in the ASD and ADHD groups, but significant interactions in the low intellectual functioning and TD groups. Regarding the number of children, no significant differences in FQOL, CQ, or PS were found for families of children with ASD, ADHD, or TD children, though mothers of children with low intellectual functioning reported significantly lower CQ when they had fewer children. Finally, a one-way MANCOVA found no significant differences in FQOL, CQ, or PS between families with one child with a NDD versus multiple children with a NDD. Post-hoc analyses revealed significant main effects of child symptomology, indicating that families of children with NDDs are at an increased risk for lower

family well-being. The results of this study highlight the unique needs of families of children with NDDs and families of TD children. Additionally, these findings emphasize the importance of providing additional supports to families of children with NDDs.

Keywords: neurodevelopmental disorders, birth order, number of children, family quality of life, coparenting quality, parenting stress

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Mothers experience a variety of stressors during childrearing (Bourke-Taylor et al., 2010; Nelson, 2002). When raising a child with a neurodevelopmental disorder (NDD), such as autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD), or intellectual disability (ID), mothers experience unique challenges. These challenges include increased stress, mental health concerns (Dovgan & Mazurek, 2018), as well as additional emotional and physical demands (Ayvazoglu. 2015). These families may also experience additional stressors related to the child's diagnosis, such as dealing with challenging behaviors (Robinson & Neece, 2015), as well as financial burdens due to loss of work hours, caretaking hours, and the need for respite and counselling services (Dovgan & Mazurek, 2018). In addition to these unique stressors, raising a child with a NDD may impact various forms of family well-being.

Studies have revealed that raising a child with ASD, ADHD, or ID can negatively impact family well-being indices such as family quality of life (FQOL; Brown et al., 2006; Green et al., 2016), coparenting quality (CQ; Chan & Leung, 2020; Sim et al., 2017, Williamson & Johnston, 2016), and parenting stress (PS; Hayes & Watson, 2012; Hutchison et al., 2016). These family well-being indices are important to consider as previous studies have linked FQOL, CQ, and PS to martial quality, parent-children relationship quality, and overall family functioning (Ding et al., 2022; Hickey et al., 2019; Holland & McElwain, 2013; Ma et al., 2011). Two concepts that are under-explored in the literature regarding family well-being in families of children with NDDs are number of children and birth order.

In families of typically developing (TD) children, birth order and number of children have been linked to higher parental burn-out (Favez et al., 2022), and a variety of parenting

behaviours (Armin et al., 2012; Dunn & Kendrick, 1980; Lawson & Mace, 2009; Price, 2004; Strohchein et al., 2008). In NDD populations, birth order and number of children have been shown to influence parenting behaviors (Armin et al., 2012; Mulroy et al., 2008), family outcomes (Kaminsky & Dewey, 2003; Kimura & Yamasaki, 2019; Mulroy et al., 2008), and behaviors exhibited by the child with a NDD (Ben Itchak et al., 2016; Hsu et al., 2022; Montes, 2018; Tomeny et al., 2014). To date, no study has examined the impact of birth order or number of children on family well-being in neurodevelopmentally diverse families. The current study addressed this gap by investigating how birth order of a TD child or a child with ASD, ADHD, or low intellectual functioning, and number of children are linked to FQOL, CQ, and PS.

Neurodevelopmental Disorders (NDD)

Person-first language will be used to refer to individuals with disabilities as using person-first language is preferred and recommended when referring to individuals with intellectual disabilities (Crocker & Smith, 2019; Schalock, 2017). The American Psychiatric Association (APA) promoted the use of person-first language to reduce prejudice and stigma regarding individuals with disabilities (Dunn & Andrews, 2015). More recently, particularly in ASD and ADHD populations, there has been a wide and ongoing debate surrounding the use of person-first language instead of identity-first language (Botha, 2023; Dunn & Andrews, 2015). Since there is a strong preference to use person-first language in ID populations (Crocker & Smith, 2019; Schalock, 2017), and there is not a consistent recommendation for language choices in ASD and ADHD populations, this manuscript will use person-first language.

NDDs are a category of disorders that are often apparent in early development and limit academic, social, occupational, personal, and social functioning resulting from developmental delays (APA, 2013). This category can include broad difficulties in social skills, social situations

or education, or more specific impairments in learning and executive functioning. NDDs include a wide range of conditions (APA, 2013), however, since previous research has consistently reported that families of children with ASD, ADHD, and ID experience additional stressors such as mental health concerns, lack of support as well as increased emotional and physical demands (Ayvazoglu. 2015; Dovgan & Mazurek, 2018), the current study focused on families of children with ASD, ADHD, and low intellectual functioning.

ASD

ASD is a neurodevelopmental disorder that has a prevalence of 1 in 66 children in Canada (Zwaigenbaum, 2019), and is more frequently diagnosed in males compared to females, with a ratio of 4:1 (APA, 2013). Furthermore, symptoms of ASD are typically noticed between 12 and 24 months of age (APA, 2013), with the average age of diagnosis between 4 and 5 years old (Zwaigenbaum, 2019). ASD is defined by deficits in social interaction and communication, as well as repetitive, restrictive patterns of interests, activities, or behaviors that can produce difficulties in social and occupational functioning (APA, 2013). These deficits in social interaction and communication must be apparent across various social settings to receive a diagnosis and can include failing to respond to social cues or social interaction, lack of nonverbal communication, and difficulty in maintaining eye contact (APA, 2013). These restrictive and repetitive behaviors can include a strong difficulty with changes to routine, fixation on unusual objects, and a need for inflexible rituals (APA, 2013). ASD commonly co-occurs with other neurodevelopmental disorders and mental health disorders such as anxiety and depressive disorders (APA, 2013). One of the most common co-occurring diagnoses for ASD is ADHD (Amr et al., 2012; APA, 2013; Gjevik et al., 2011).

ADHD

ADHD is a neurodevelopmental disorder that has a prevalence rate of 5% in children, and is diagnosed more often in males than females, with a ratio of 2:1 (APA, 2013). Symptoms of ADHD can be noticed early in development but is difficult to distinguish from typical development before the age of 4 years old (APA, 2013). The average age of diagnosis for ADHD is 7 years old (Centers for Disease Control and Prevention, 2023). ADHD is characterized by inattentive, hyperactive, and impulsive behaviors that produce difficulties in academic, social, and occupational functioning (APA, 2013). Inattentive behaviors can include difficulty focusing on tasks or activities, frequently being distracted, and being disorganized. Hyperactive behaviors can include excessive fidgeting, talking, or tapping. Lastly, impulsive behaviours can include frequently interrupting others, or intruding on conversations (APA, 2013). ADHD commonly co-occurs with mental health disorders such as depressive and anxiety disorders, as well as other conditions such as oppositional defiant disorder, tic disorders, and conduct disorder. Similar to ASD, ADHD also co-occurs with other neurodevelopmental disorders, such as ID (APA, 2013).

ID

ID is a neurodevelopmental disorder that has a prevalence rate of approximately 1.83% in children (Maulik et al., 2011). Males are more likely to be diagnosed with ID than females, with a ratio of 1.6:1 for mild ID, and 1.2:1 for severe ID (APA, 2013). The typical age of diagnosis for ID depends on the severity and etiology of the symptoms (APA, 2013; Boat & Wu, 2015). Mild ID may not be noticed until school age and be diagnosed once difficulties in learning and school have been identified, whereas severe ID can be noticed within the first two years of life, due to apparent deficits in social, language, and motor functioning (APA, 2013; Boat & Wu, 2015). ID is characterized by difficulties in intellectual and adaptive functioning during the

developmental period. Intellectual deficits can include difficulty in learning, reasoning, and problem solving. Adaptive functioning deficits refer to those that limit the ability to meet social responsibility and personal independence standards of the developmental stage. Specifically, it can include difficulties in communication, independence, and social participation (APA, 2013). ID is highly comorbid with other mental health disorders such as depressive disorders, anxiety disorders, and bipolar disorders, as well as other neurodevelopmental disorders such as stereotypic movement disorders, impulse-control disorders, and major neurocognitive disorders (APA, 2013).

Family Systems Theory (FST)

FST views the family as a complex interactive system that contains inter-dependent subsystems (Cridland, 2014; Minuchin, 1985). Within this framework, individuals can be better understood as being part of a family system, rather than an individual element (Gardinaer & Larocci, 2012; Minuchin, 1985). In FST, each individual within the family comprises their own subsystem, in addition to larger subsystems such as the parent subsystem, sibling subsystem, spouse subsystem, and parent-child subsystem (Minuchin, 1985). An individual can be a part of multiple sub-systems within the family. A guiding principle in FST is that an individual affects other family members, other subsystems, and the family system (Minuchin, 1985). Family indices such as FQOL, CQ and PS can be examined using FST as it recognizes the family system, coparenting subsystem, and parenting subsystems as interconnected systems that affect one another.

FST can be used to examine the impact of number of children on family factors. FST views the family as an open system that is susceptible to change and transitions that require the family to establish new patterns of interaction and adapt to new circumstances (Minuchin, 1985).

The addition of another child requires the family to adjust their roles and interactions with one another, as well as establish new boundaries (Minuchin, 1985). Additionally, another child would make the family system more complex as it requires a new parent-child subsystem, and a sibling subsystem to be established or expanded. Given that the addition of another child results in more complex family subsystems and requires family members to re-establish roles and boundaries, FST suggests that having more children in the family could elicit more strain on family factors (Minuchin, 1985). The current study applied the FST framework in examining how number of children impacts the family system.

FST can also be used to examine the impact of birth order on family factors. As mentioned previously, FST posits that families are open systems that naturally change and evolve (Minuchin, 1985). The family life cycle refers to these natural changes and developments in family life (Glick et al., 2015). Phases in the family life cycle can include couple with no children, families with young children, families with school aged children, and families with adolescents, etc. (Glick et al., 2015). Moving through different phases of the family life cycle alters the family structure and requires the family to re-organize their interactions, boundaries, and roles (Glick et al., 2015; Minuchin, 1985). This means that these changes in the family life cycle impact all members in the family, and impacts the family system (Minuchin, 1985). In some cases, when families have multiple children or consecutive children spaced apart, families could be navigating challenges from different phases of the family life cycle (Glick et al., 2015). Using the FST framework, birth order can be examined as children in different birth orders will enter the family during different phases of the family life cycle. In various phases of the family life cycle, children will experience differing structures within the family, and different patterns of interaction.

Raising a Child with a NDD

Raising a child with a NDD has been shown to impact a variety of parenting behaviors. Parents of children with a NDD have been shown to exhibit more ineffective parenting, less consistent parenting, and less positive interactions compared to parents of TD children (Armin et al., 2012; Garner et al., 2011). When examining families of children with NDDs, it is important to explore maternal parenting experiences as mothers often have a central role in parenting (Bull & Whelan, 2006; Cronin, 2004; McAuliffe et al., 2019).

Maternal Experiences

When raising a child with a NDD, mothers are more likely to take on the role of the primary caregiver (Bull & Whelan, 2006; Cronin, 2004; McAuliffe et al., 2019), and often report challenges during childrearing. Mothers are also more likely to experience parental burn-out and are at higher risk for depressive symptoms compared to fathers, which is likely due to the high level of caretaking responsibilities taken on by mothers (Favez et al., 2022; Scherer et al., 2019). Mothers of children with a NDD often experience anxiety, and discomfort when raising their child, which ultimately impacts their sense of competency in their role as a parent (Craig et al., 2016). These mothers often report a lack of support from extended family members, reporting that they do not understand their child's diagnosis, and/or feeling that their family rejects their child (Bussing et al., 2009; Fernández-Ávalos et al., 2020; Leitch et al., 2019; Safe et al., 2012). They also report being socially isolated from families of TD children as they struggle to relate and feel that their family dynamics are not the same (Fernández-Ávalos et al., 2020). Furthermore, families of children with NDDs report experiencing a negative impact on their physical and emotional well-being due to insufficient time for self-care, romantic relationships, friendships, or leisure (Bussing et al., 2009; Cronin, 2004; Safe et al., 2012), and feeling they

only get to be caregivers (Fernández-Ávalos et al., 2020). Further understanding maternal experiences provides insight into how the coparent subsystem, child subsystems, and family system interact and affect one another when raising a child with a NDD. Therefore, since mothers are more likely to experience parental burn-out (Favez et al., 2022), take on more caregiving responsibilities (Bull & Whelan, 2006; Cronin, 2004; McAuliffe et al., 2019), and have a higher risk of developing depressive symptoms (Scherer et al., 2019) compared to fathers, it is essential to further understand family well-being indices from a mother's perspective.

Maternal ASD/ADHD

Maternal ASD/ADHD symptomology is an important factor to consider as there is a high genetic and heritability factor for child ASD and ADHD (APA, 2013). Specifically, studies have found that parents of children with ASD and/or ADHD are more likely to exhibit ASD and ADHD symptoms themselves (Lau et al., 2016, Kleppesto et al., 2024). Parental ASD/ADHD has also been found to affect family experiences and potentially place additional strain on the family system.

Previous research has suggested that maternal ASD and ADHD symptomology can impact parenting experiences when raising a child with a NDD. Studies have found that maternal ASD and ADHD symptomology increases depressive symptoms (Steijn, 2014), CQ (Williamson et al., 2016) and PS (Perez Algota et al., 2018; Steijn, 2014; William & Johnston, 2019). Maternal ASD symptomology has also been found to negatively impact family relationships such as parent-child relationships, and spousal relationships (Steijn et al., 2015). Maternal ADHD symptomology is associated with difficulties in family structure and organization (Steijn et al., 2015), which could be due to mothers taking on more household and caretaking responsibilities. Given that maternal ASD and ADHD symptomology impacts various family relationships (Steijn

et al., 2015), CQ (Williamson et al., 2016), PS (Perez Algota et al., 2018; Steijn, 2014; William & Johnston, 2019), and family structure (Steijn et al., 2015), maternal ASD/ADHD diagnosis was used as a control variable in this study.

Number of Children in a Family

The resource dilution hypothesis (Blake, 1981) is a common framework used to examine how number of children in the family impact various outcomes. The resource dilution model was originally researched in educational and achievement settings. Applied to families, within this framework, parents' resources are viewed as limited, and as the number of children in the family increase, it requires these resources to be divided amongst more children (Blake, 1989; Downey, 2001). Such resources include parental time, physical and emotional energy, attention, and ability to interact with each child (Blake, 1989). Since the number of resources parents have are finite, having more children in the family leads to a decreased number of resources that each child receives (Downey, 2001). Studies have generally supported this framework in relation to parenting behaviors (Dunn & Kendrick, 1980); however, Stroschein et al. (2008) found mixed support in applying the resource dilution hypothesis to parenting behaviors after the arrival of another child. They suggested that rather than the addition of another child diluting the parental resources, another child requires parents to effectively reallocate their available resources to meet each family member's needs (Strohschein et al., 2008).

The number of children within a family has been shown to impact a variety of parenting behaviors in families of TD children. A higher number of children in the family is associated with less perceived prosocial behaviors from parents (Santos-Nunes et al., 2018), less positive interactions between mother and child (Strohschein et al., 2008), less maternal attention (Dunn & Kendrick, 1980), and higher levels of parent-child confrontation (Dunn & Kenrick, 1980). An

increased number of children in the family is also associated with higher levels of differential parenting (Jenkins et al., 2003), higher chance of parental burnout (Favez et al., 2022), and parents providing lower quality care to each child (Lawson & Mace, 2009). Consistent with the resource dilution hypothesis, it has been suggested that higher levels of differential parenting, and lower quality of care in families with more children could be due to the limited resources available to parents, and the need for them to reallocate their resources to one specific child (Jenkins et al., 2003; Lawson & Mace, 2009). In families of TD children, studies have consistently shown that a higher number of children in the family negatively impacts parenting behaviors; however, when examining this relationship in families with a child with a NDD, studies have yielded conflicting results.

In neurodevelopmentally diverse families, some studies have revealed that having a higher number of children negatively impacts family outcomes. Kimura and Yamasaki (2019) compared families of children with ID. They compared one-child families, and families who had multiple children including a child with ID. It was found that in families with multiple children, mothers were more likely to report financial burdens compared to mothers with one child (Kimura & Yamasaki, 2019). Additionally, mothers with one child were less likely to have a second child due to fear of lack of support and having another child with a disability (Kimura & Yamasaki, 2019). Alternatively, some studies have reported that having a higher number of children in neurodevelopmentally diverse families can have a positive impact on the family.

Studies have found that the number of children can have positive impacts on family outcomes in families of children with Down Syndrome and ASD. In families of children with Down Syndrome, it was found that having a larger family size was associated with parents reporting more benefits and less difficulties (Mulroy et al., 2008). It was suggested that in

families with more children, the caregiving duties can be shared between the siblings and parents, and alleviate difficulties within the family (Mulroy et al., 2008). Similarly, in families of children with ASD, a higher number of children was associated with positive impacts. Having a larger family size is related to the siblings of a child with ASD having better psycho-social adjustment (Kaminsky & Dewey, 2003). This finding may be due to siblings in larger families acting as a source of social support for one another. In larger families, siblings may feel less pressure and burden in their responsibility to take care of their sibling (Kaminsky & Dewey, 2003). Given that studies examining the impact of number of children in families of children with a NDD have reported conflicting results (Kaminsky & Dewey, 2003; Kimura & Yamasaki, 2019; Mulroy et al., 2008), it is imperative to further understand how number of children impact family indices in neurodevelopmentally diverse families. To date no study has examined the relationship between number of children and family indices such as FQOL, CQ, and PS in neurodevelopmentally diverse families. The current study addressed this gap by exploring how number of children is related to family well-being and provide further understanding on how number of children affects the family system in NDD populations.

Multiple Children with NDDs in a Family

When examining etiology for NDDs such as ASD, ADHD, and ID, genetics and heritability is an important factor to consider. For ASD, there is an estimated hereditability rate ranging from 37-90%, and a genetic mutation has been linked to approximately 15% of ASD diagnoses (APA, 2013). ADHD has also been found have a heritability rate ranging from 77-88% (Grimm et al., 2020), and various genes have been linked to ADHD (APA, 2013). Lastly, ID has a high genetic factor as cognitive ability has a heritability rate ranging from 41-66% (Haworth et at., 2010). ID has also been linked to a variety of genetic syndromes (APA, 2013)

with the most common inherited cause of ID being Fragile X Syndrome (Saldarriaga et al., 2014). Given the prevalence of genetic and heredity factors in the etiology of ASD, ADHD, and ID, it is likely that families could have multiple children with a NDD.

Mothers of multiple children with NDDs experience a variety of challenges and difficulties in childrearing. Mothers report feeling mentally and physically fatigued when caring for multiple children with disabilities (Kimura & Yamazaki, 2013). They often felt they had a lack of support from family members and their partners, which exacerbated the mental and physical fatigue in caregiving and increased their feelings of burden (Kimura & Yamazaki, 2013). This lack of support also contributed to mothers feeling that they were unable to take a break or rest from caregiving, and that their responsibilities were endless. Mothers also had a difficulty in meeting the unique needs of each child's diagnosis. They reported that they had multiple children exhibiting difficult behaviors, and they often experienced challenges in dealing with these behaviors (Kimura & Yamazaki, 2013).

There is a lack of research examining the differences between families of multiple children with NDDs and families with one child with a NDD. Additionally, studies that have examined these differences have yielded conflicting results. Some studies suggest that mothers raising multiple children with disabilities report more depressive and anxiety symptoms, as well as higher negative affect when compared to mothers with only one child with a disability (Ha et al., 2008; Orsmond et al., 2007). Additionally, these studies report that mothers of multiple children with a disability report lower family adaptability and less family cohesion (Orsmond et al., 2007). In contrast, other studies have found no significant differences in depressive symptoms, anxiety symptoms, or psychological stress between mothers with one child with a disability and mothers with multiple children with a disability (Stanford et al., 2022). Given

these mixed findings, it is unclear if families who have one child with a disability have different experiences compared to families of multiple children with disabilities. The current study addressed this gap in literature by examining differences in family well-being indices across families with one child with a NDD and families with multiple children with a NDD.

Birth Order

Birth order refers to the "order in which children are born into the family" (Strohchein et al., 2008, p. 673). The oldest or first-born child is referred to as being earlier or lower in the birth order, whereas the youngest or later-born child is referred to as being later or higher in the birth order. Birth order is an important concept within the family that has been used to examine the various experiences of first-born children and later-born children. Studies have found that parents interact with their first-born and later-born children differently.

In TD populations, birth order has been shown to impact parenting behaviors and experiences. Children later in the birth order experience fewer positive interactions with their parents (Armin et al., 2012; Strohchein et al., 2008), more ineffective parenting (Armin et al., 2012), and less quality time with their parents (Price, 2004) when compared to children earlier in the birth order. It has been suggested that parents may spend less quality time with later-born children because they become more time-efficient with certain caretaking tasks (Price, 2004). Older siblings may also provide guidance and support for their younger siblings, which requires the parents to spend less time with their younger child (Price, 2004).

In contrast to families of TD children where studies suggest that children later in the birth order experience more ineffective parenting, in families of children with NDDs, the opposite effect is found. First-born children with NDDs experience more ineffective parenting compared to later-born children (Armin et al., 2012). Additionally, when the first-born child has a NDD,

families are more likely to report difficulties and less likely to report benefits within the family compared to families with a later-born child with a NDD (Mulroy et al., 2008). It has been suggested that when families have later-born children with a NDD, they may be able to adjust better (Mulroy et al., 2008).

The birth order of a child with ASD is linked to family functioning as well as behaviors exhibited by both the child with ASD and their TD sibling. Studies have shown that having a child with ASD earlier in the birth order is associated with more distress in the parent-sibling system (Di Biasi et al., 2015), and lower levels of positive behavior in the child with ASD, and their TD sibling (Bontinck, 2018). The birth order of a child with ASD can also impact their behaviors, and their siblings' behaviors. Children with ASD are more likely to exhibit anxiety, depression, ADHD, and behavioral problems when they are the oldest child in the family (Montes, 2018). Children with ASD being earlier in the birth order is also associated with higher externalizing behaviors and behavioral problems being presented by the child with ASD as well as their younger TD sibling (Tomeny et al., 2014). In families of children with ASD, having a TD sibling earlier in the birth order has been shown to have a positive impact. Younger children with ASD who have an older TD sibling present increased social communication skills (Ben Itchak et al., 2016). Having an older TD sibling may provide the child with ASD more opportunities to increase social interaction and enhance their social communication skills (Ben Itchak et al., 2016). Given that birth order of a child diagnosed with ASD has been shown to exacerbate difficult behaviors exhibited by themselves and their TD sibling (Montes, 2018; Tomeny et al., 2014), parents may experience increased stress and difficulty in childrearing. In families of children with ASD, studies have consistently revealed that having a child with ASD earlier in the birth order can negatively impact the family.

There is a paucity of research examining the impact of birth order in families of children with ADHD and ID. Similar to the effect seen for ASD, these limited studies suggest that having a child with ADHD earlier in the birth order can negatively impact the family. For instance, children with ADHD who are earlier in the birth order are more likely to exhibit severe externalizing and internalizing behaviors compared to children with ADHD born later in the birth order (Hsu et al., 2022). This could be due to the natural changes and challenges first-born children experience such as their parents being less experienced in childrearing duties, adjustment to having a sibling, and the change of interactions between parent and first-born after the arrival of new child (Hsu et al., 2022). Additionally, having a child with ADHD earlier in the birth order has been associated with lower marital quality (Jahangir et al., 2017). In families of children with ID, the birth order of the child with ID has been found to have positive and negative effects on sibling relationships. Specifically, having a child with ID earlier in the birth order was associated with increased intimacy-companionship and more arguing between the child with ID and their sibling (Hayden & Bailey, 2023). This could be due to younger siblings spending more time with their older sibling with ID and having more opportunities for arguments and bonding (Hayden & Bailey, 2023). Given the impact birth order of a child with ASD, ADHD, and ID has on the parent-sibling system (Di Biasi et al., 2015), their siblings' behaviors (Bontinck, 2018: Hayden & Bailey, 2023), and their own behaviors (Ben Itchak et al., 2016; Hsu et al., 2022; Montes, 2018; Tomeny et al., 2014), the birth order of a child diagnosed with a NDD may also impact various family indices.

Family Quality of Life (FQOL)

Quality of life (QoL) was first introduced in the medical literature and can be defined as "the degree of need and satisfaction within the physical, psychological, social, activity, material

and structural area" (Post, 2014, p. 171). QoL involves an individual's interpretation and the extent to which a person is satisfied with various health dimensions in their life (Boelesma et al., 2017; Post, 2017). In the field of intellectual and developmental disabilities there has been extensive research about the conceptual framework for QoL, and these studies have identified life domains which include physical well-being, emotional well-being, social health, and material well-being (Boelesma et al., 2017; Samuel et al., 2012; Schalock, 2004). A relatively new concept that has emerged as an extension of QoL is FQOL, which can be defined as a "dynamic sense of well-being of the family, collectively and subjectively defined and informed by its members in which individual and family level needs interact" (Zuna et al., 2010, p. 262). FQOL differs from QoL by focusing on the entire family's view of their QoL as a whole rather than focusing on an individual's QoL from their view (Boelsma et al., 2017; Samuel et al., 2012).

Zuna et al., (2010) proposed a unified theory of FQOL, which posits that the quality of family life includes each member's view of family life, either positive or negative, and the degree to which each family member feels their needs are being met by the family. This theory views the family as a collective unit that is responsible for meeting the needs of the individual family members. Consistent with FST, FQOL views the family unit as being unique, and better understood by examining the family rather than individual family members (Minuchin, 1985; Zuna et al., 2011). FQOL has commonly been researched in families with a child with a disability, as these families are required to provide more support and care (Brown et al., 2003). Given that families of children with a disability are more relied on for support, and that mothers take on more caregiving responsibilities in families of children with NDDs (Bull & Whelan, 2006; Cronin, 2004; McAuliffe et al., 2019), it is crucial that a mother's perspective of FQOL is examined in neurodevelopmentally diverse families.

The literature on FQOL in families of children with NDDs supports that these families report lower FQOL. Families of children with ASD (Brown et al., 2006) and ADHD (Green et al., 2016) report lower levels of FQOL compared to families of TD children. In families of children with ID, both formal and informal supports, and problem behaviors negatively impact FQOL (Luitwieler et al., 2021). Given that families of children with NDDs report a lack of support (Fernández-Ávalos et al., 2020), it is possible that families of children with ID are at risk for lower levels of FQOL as well.

When examining differences in FQOL in NDD populations, studies report conflicting results. For instance, Brown et al. (2006) compared FQOL levels amongst families of children with ASD, families of children with Down Syndrome, and families of TD children. It was reported that families of children with ASD report the lowest levels of FQOL, followed by families of children with Down Syndrome, and then families of TD children (Brown et al., 2006). Both families of children with ASD and families of children with Down Syndrome report a lack of support from friends and community members, and a lack of time to enjoy leisure activities (Brown et al., 2006). However, when examining FQOL in families of children with ASD and families of children with ADHD studies report no significant differences (Sipos et al., 2012; Romaniuk et al., 2022). Due to these conflicting findings in NDDs populations (Brown et al., 2006; Sipos et al., 2012; Romaniuk et al., 2022), the role of child diagnosis in FQOL is unclear.

The literature on the relationship between FQOL, birth order, and number of children is very limited. The birth order of a child diagnosed with a NDD has only been studied in relation to individual QoL and suggests that having a sibling with ID earlier in the birth order is related to higher QoL reported by TD siblings (Wakimizu et al.., 2020). To date no study has examined the

impact of birth order of a child diagnosed with a NDD on FQOL. Regarding number of children, only one study has examined the impact of number of children on FQOL in families of children with NDDs. This study revealed that in families of children with ASD, there is a non-significant relationship between the number of children and FQOL (Schlebusch et al., 2017). Additionally, when comparing families with one child with ASD, and families with multiple children with ASD, it was revealed that there were no significant differences in FQOL (McStay et al., 2014). To date, no study has examined the impact of number of children on FQOL in families of children with ADHD or ID. Since there is very limited research about the impact of birth order and number of children on FQOL in ASD populations, and no studies examining this relationship in ADHD or ID populations, it is imperative that this relationship is further examined in neurodevelopmentally diverse families. The current study examined how the birth order of a TD child, or a child diagnosed with a NDD, and number of children are linked to FQOL in neurodevelopmentally diverse families as well as compare levels of FQOL in families with multiple children with NDDs, and families with one child with a NDD.

Coparenting Quality (CQ)

CQ refers to "the ways that parents and/or parental figures relate to each other in the role of a parent" (Feinberg, 2003, p. 96). Coparenting only pertains to a shared childrearing responsibility between the parents; it does not include sexual, romantic, emotional, financial, or legal relationships between the parents (Feinberg, 2003). Although the coparenting relationship is based on a shared responsibility of childrearing, it does not require or assert that parenting responsibilities are equal amongst the parents. The degree to which each parent takes on caretaking and parenting responsibilities is defined by the coparents (Feinberg, 2003). Feinberg (2003) proposed a conceptual model that views coparenting as comprised of four interconnected

components: agreement or disagreement on childrearing issues, division of labor, support or undermining, and the joint management of family interactions (Feinberg, 2003).

The first component, agreement or disagreement on childrearing issues, encompasses the extent to which topics such as a child's moral values, discipline, safety, standards for the child, emotional needs, and priorities for the child are agreed upon my both parents. Having a high amount of disagreement regarding childrearing issues has been linked to negative family outcomes and child behavior problems (Feinberg, 2003).

The second component, division of labor, refers to how parents divide responsibilities within the household including, childcare, household tasks, as well as any medical, financial, or legal responsibility related to the child. This component does not require parents to equally share childcare responsibility; it encompasses the extent to which parents are satisfied with how their responsibilities are divided. When parents are not satisfied with the division of labour or it does not align with what the parent expected, this dissatisfaction can contribute to poor martial adjustment, and increased parental stress (Feinberg, 2003).

The third component involves two opposing concepts, support, and undermining. Supportiveness refers to parents reassuring each other's competency as a parent, being respectful of one another, and both parents implementing childcare decisions they agreed upon. Conversely, undermining refers to the extent that parents contradict one another, criticize each other, and blame each other during childrearing. The extent to which parents support or undermine each other has been linked to parenting stress and child behavior problems (Feinberg, 2003).

The last component, joint family management, encompasses three major responsibilities for coparents. The first is the parents being aware of and taking accountability for how they are

interacting with each other, as hostile and negative interactions between parents can have negative effects on both the parents and their children. The second is setting clear boundaries within the coparenting relationship about topics to not involve their children in and setting boundaries for topics that should include the children. The third is balancing interactions amongst both parents and children, ensuring that both parents are involved, and that they are not competing for time with their children (Feinberg, 2003).

Maintaining high CQ is an important factor within the family system as CQ has been linked to child adjustment, parent adjustment, parental burn-out (Favez et al., 2022), and martial quality (Feinberg, 2003; Holland & McElwain, 2013). Parents who demonstrate high CQ support each other, work together as a team, maintain a level of respect and support during disagreements, and reassure one another's competency as a parent (Feinberg, 2003; Solymeyer & Feinberg, 2011; Stright & Bales, 2004). Alternatively, parents who demonstrate low CQ undermine and criticize each other and contradict joint childrearing decisions (Feinberg, 2003; Solymeyer &Feinberg, 2011; Stright & Bales, 2004). It is important to study CQ in neurodevelopmentally diverse families as these parents experience a lack of support (Bussing et al., 2009; Fernández-Ávalos et al., 2020; Leitch et al., 2019; Safe et al., 2012), exhibit more ineffective parenting behaviors (Armin et al., 2012; Garner et al., 2011), and experience additional challenges in childrearing (Ayvazoglu. 2015; Dovgan & Mazurek, 2018; Robinson & Neece, 2015), which could lead these families to experience difficulties in the coparenting relationship.

CQ has been shown to be negatively affected in families of children with NDDs. Families of children with ASD report experiencing challenges in parenting their child's difficult behaviors, which contribute to more negative interactions with their coparent and more

coparental conflict (Chan & Leung, 2020). Additionally, parents of children with ASD report difficulties in the coparenting relationship due to increased family stress, and increased stress on their relationship with their TD child (Sim et al., 2017). Studies have also shown that there is a negative relationship between child ADHD symptomology and CQ, however, the directionality of this relationship is unclear. Some studies suggest that child ADHD symptoms can predict lower CQ reported by mothers (Williamson & Johnston, 2016). Alternatively, other studies have found that problems in the coparenting relationship can lead to more intensified ADHD symptoms in the child as they get older (Umeura et al., 2015). In families of children with ID there has been a lack of research about CQ; however, it was found that families of children with ID report lower levels of CQ compared to families of TD children (Norlin & Broberg, 2013). Since child ASD and ADHD symptomology (Chan & Leung, 2020; Sim et al., 2017; Williamson & Johnston, 2016) has been shown to have deleterious impacts on CQ, and families of children with ID report low levels of CQ (Norlin & Broberg, 2013), it is important to further understand the role of child diagnosis in CQ, and other potential factors that contribute to lower CQ in families of children with NDDs.

One potential factor that has been linked to CQ in TD populations is number of children in the family. There is limited research on this relationship, and these studies present conflicting findings. Some studies found that having more children in the family is associated with more coparenting conflict, and decreased coparental cooperation (Kuo et al., 2017). In contrast, other studies have found that families with one child present higher levels of intrusive or undermining coparenting compared to families with two or more children (Lindsey et al., 2005). Due to conflicting finings, the relationship between number of children and CQ in TD populations is unclear, and to date there has been no study examining this relationship in families of children

with NDDs. Additionally, no study has examined the impact of birth order on CQ in NDD populations. Given that birth order of a child diagnosed with a NDD and number of children in the family influence parenting behaviors (Armin et al., 2012; Mulroy et al., 2008) and family outcomes (Kaminsky & Dewey, 2003; Kimura & Yamasaki, 2019; Mulroy et al., 2008), birth order and number of children may also impact how parents support and coordinate together during childrearing, ultimately contributing to CQ in NDD populations. The current study examined how birth order and number of children are linked to CQ in families of children with ASD, ADHD, low intellectual functioning, and TD children, as well as compared levels of CQ in families with multiple children with NDDs, and families with one child with a NDD.

Parenting Stress (PS)

PS refers to the extent that the parent views the responsibilities in their childrearing role as exceeding the resources that are available to them (Deater-Deckard, 2004). These responsibilities can include meeting their child's emotional, physical, and behavioral needs (Deater-Deckard, 2004). The resources available to the parent can include tangible resources such as housing, finances, instrumental support, as well as non-tangible resources such as emotional support, feelings of competence, and knowledge (Deater-Deckard, 2004)

Abidin (1992) proposed a theoretical perspective that posits PS is influenced by parent characteristics and child characterises and that both domains contribute to the total stress experienced by the parent (Abidin, 1995). Parent domain stress encompasses characteristics of the parent that could interfere in their parental role, such as personality characteristics and perceived competency. Child domain stress encompasses characteristics of the child that could contribute to the parent having difficulties during childrearing, which includes behaviors exhibited by the child (Abidin, 1995).

PS is a crucial factor to consider as it has been linked to variety of family outcomes and family factors. Specifically, high levels of PS contribute to deleterious effects on family functioning (Ma et al., 2011), martial quality (Ding et al., 2022), parental competence (Berryhill, 2016), and parent-child relationship quality (Hickey et al., 2019). Mothers often report higher levels of PS compared to fathers (Dabrowska & Pisula, 2010; Hickey et al., 2019; Ma et al., 2011; Pisula et al., 2017), potentially due to taking on more parenting responsibilities. Given that mothers of children with NDD report experiencing additional challenges during childrearing (Bussing et al., 2009; Chu et al., 2020; Cronin, 2004; Johnston & Mash, 2001; Leitch et al., 2019; Ludlow et al., 2012; Nicholas et al., 2016; Safe et al., 2012), and a difficulty in dealing with challenging behaviors exhibited by the child (Robinson & Neece, 2015), it is important to examine PS in neurodevelopmentally diverse families.

Studies have consistently shown that parents of children with NDDs experience high levels of PS. Parents of children with ASD (Belinda et al., 2016; Dabrowska & Pisula, 2010; Hutchinson et al., 2016; Mayes & Watson, 2012; Miranda et al., 2015; Pisula et al., 2017), ADHD (Hutchinson et al., 2016; Miranda et al., 2015; Theule et al., 2013), and ID (Baker et al., 2003) experience significantly higher levels of PS compared to parents of TD children. When comparing PS in neurodevelopmentally diverse families, the results are conflicting. Some studies have found that parents of children with ASD and parents of children with ADHD do not significantly differ in PS (Hutchinson et al., 2016). In contrast, other studies suggest that neurodevelopmentally diverse families experience PS differently. Specifically, studies have found that parents of children with ASD report higher PS levels compared to parents of children with other disabilities (Belinda et al., 2016; Dabrowska & Pisula, 2010). Another study found that parents of children with ADHD report more PS related to attachment and bonding issues, as

well as depression compared to parents of children with ASD (Miranda et al., 2015). Since studies have consistently shown that parents of children with NDDs experience higher levels of PS (Baker et al., 2003; Belinda et al., 2016; Dabrowska & Pisula, 2010; Hutchinson et al., 2016; Mayes & Watson, 2012; Miranda et al., 2015; Pisula et al., 2017; Theule et al., 2013) and there are conflicting findings when comparing PS in neurodevelopmentally diverse families (Belinda et al., 2016; Dabrowska & Pisula, 2010; Miranda et al., 2015), it is important to further understand the role of a child diagnosis in PS, and identify other potential factors that place these families at increased risk for high PS.

Based on previous research conducted in China regarding TD populations, one potential factor that could impact PS is the number of children in the family. In TD populations, families with two children report higher PS than families with one child (Hong & Liu, 2021; Liu et al., 2020; Qian et al., 2021). This suggests that parenting two children may require more time and energy from the parent and elicit additional challenges such as sibling conflict and meeting the demands of the unique needs of each child (Hong & Liu, 2021; Qian et al., 2021). Aligning with FST, having more children in the family makes the parent-child subsystem more complex, and requires more time and energy from the parent to a maintain parent-child relationships with each child, and foster positive sibling relationships (Qian et al., 2021). However, in the context of families with three children, some studies do not reveal a positive association between number of children and PS. It has been suggested that families with three children may adapt to these additional challenges associated with more children in the family and enhance their psychological resiliency to better adapt to PS (Liu et al., 2020). In families of TD children, studies suggest that there is a positive relationship between number of children and PS (Hong & Liu, 2021; Liu et al., 2020; Qian et al., 2021); however, this relationship is unclear in families

with three or more children (Liu et al., 2020). Furthermore, since families of children with NDDs experience higher levels of PS (Baker et al., 2003; Belinda et al., 2016; Dabrowska & Pisula, 2010; Hutchinson et al., 2016; Mayes & Watson, 2012; Miranda et al., 2015; Pisula et al., 2017; Theule et al., 2013), it is crucial to further examine this relationship in neurodevelopmentally diverse families.

There is a lack of research examining the relationship between number of children and PS in NDD populations. The limited findings suggest that there is a positive relationship, such that a higher number of children contributes to higher PS levels (Dabrowska & Pisula, 2010; Warfield, 2005). However, these studies have only examined this relationship in families of children with ASD, families of children with Down Syndrome, and using a mixed sample of families of children with various diagnoses. To date, this relationship has not been examined in families of children with ADHD or ID. Given that families of children with ADHD and ID experience high levels of PS (Baker et al., 2003; Hutchinson et al., 2016; Miranda et al., 2015; Theule et al., 2013, it is important to further understand potential factors that contribute to PS. Studies also reveal conflicting findings when comparing PS levels in families with multiple children with NDDs, and families with one child with a NDD. Some studies suggest there are no significant differences in PS levels (McStay et al., 2014), whereas other studies suggest that families with multiple children with NDDs experience significantly more PS than families with one child with a NDD (Dukmak & Alkhatib, 2021). Given that there is a positive relationship between number of children and PS in families with one child with a NDD (Dabrowska & Pisula, 2010; Warfield, 2005), it is important to further understand if families of multiple children with NDDs experience higher levels of PS.

Based on studies in ADHD and TD populations, another potential factor that could impact PS is birth order. Studies suggest that when the TD child or child with ADHD is earlier in the birth order, parents' experience higher PS (Jahangir et al., 2017; Qian et al., 2021). This relationship between birth order and PS has yet to be examined in families of children with ASD and ID. Due to a lack of research, it is unclear the impact of birth order and number of children on PS in neurodevelopmentally diverse families and whether families with multiple children with a NDD and families with one child with a NDD differ in PS. The current study examined how birth order and number of children are linked to PS in families of TD children and children with ASD, ADHD, low intellectual functioning as well as compared levels of PS in families with multiple children with NDDs, and families with one child with a NDD.

The Current Study

The current study adds to the existing literature on families of children with NDDs by examining the impact of birth order and number of children on the family well-being indices of FQOL, CQ, and PS. It is crucial to examine these indices in neurodevelopmentally diverse families, as studies have revealed that child symptomology negatively impacts CQ (Chan & Leung, 2020; Sim et al., 2017; Williamson & Johnston, 2016) and that these families experience low FQOL (Brown et al., 2006; Green et al., 2016) and high PS (Baker et al., 2003; Belinda et al., 2016; Dabrowska & Pisula, 2010; Hutchinson et al., 2016; Mayes & Watson, 2012; Miranda et al., 2015; Pisula et al., 2017; Theule et al., 2013). Number of children within the family is an important factor to consider as it has been shown to influence parenting behaviors (Dunn & Kendrick, 1980; Lawson &Mace, 2009), CQ (Kuo et al., 2017; Lindsey et al., 2008) and PS (Hong & Liu, 2021; Liu et al., 2020; Qian et al., 2021) in TD populations, however, due to a lack of research the impact of number of children on FQOL, CQ, and PS in NDD populations is

unclear. Lastly, birth order is an important factor to consider in NDD populations as studies have shown that having a child with ASD, ADHD, and ID earlier in the birth order is associated with exacerbated behaviors by the child with NDD (Hsu et al., 2022; Montes, 2018; Tomeny et al., 2014), increased stress on the parent-child subsystem (Di Biasi et al., 2015), and higher levels of sibling disagreements (Hayden & Bailey, 2023). Given that mothers are more likely to experience parental burn-out (Favez et al., 2022), take on the role as a primary caregiver (Bull & Whelan, 2006; Cronin, 2004; McAuliffe et al., 2019), and have a higher risk for developing depressive symptoms (Scherer et al., 2019), mothers were the focus of the current study.

Objectives

The current study had five main objectives. The first was to examine how birth order of a TD child or a child with ASD, ADHD, or low intellectual functioning is linked to FQOL, CQ, and PS, while controlling for child ASD/ADHD symptom severity and maternal ASD/ADHD diagnoses. The second objective was to examine how child group membership affects the relationship between birth order and FQOL, CQ, and PS in families of children with NDDs, while controlling for child ASD/ADHD symptom severity and maternal ASD/ADHD diagnoses. The third objective was to examine how number of children in a family is linked to FQOL, CQ, and PS in families of children with a NDD, and families of TD children, while controlling for child ASD/ADHD symptom severity and maternal ASD/ADHD diagnoses. The fourth objective was to examine how child group membership affects the relationship between number of children and FQ, CQ, and PS, while controlling for child ASD/ADHD symptom severity and maternal ASD/ADHD diagnoses. Lastly, I sought to examine if families of multiple children with a NDD and families with one child with a NDD significantly differ in FQOL, CQ, and PS

levels, while controlling for child ASD/ADHD symptom severity and maternal ASD/ADHD diagnoses. The current study sought to answer the following research questions:

Birth order

1. Is the birth order of a child diagnosed with ASD linked to a) FQOL, b) CQ, or c) PS?
2. Is the birth order of a child diagnosed with ADHD linked to a) FQOL, b) CQ, or c) PS?
3. Is the birth order of a child diagnosed with ID linked to a) FQOL, b) CQ, or c) PS?
4. Is the birth order of a TD child linked to a) FQOL, b) CQ, or c) PS?
5. Does child ASD group membership affect the relationship between birth order and a) FQOL, b) CQ, or c) PS?
6. Does child ADHD group membership affect the relationship between birth order and a) FQOL, b) CQ, or c) PS?
7. Does child low intellectual functioning group membership affect the relationship between birth order and a) FQOL, b) CQ, or c) PS?
8. Does having a TD child affect the relationship between birth order and a) FQOL, b) CQ, or c) PS?

Number of Children

9. In families with a child with ASD, is the number of children in the family linked to a) FQOL, b) CQ, or c) PS?
10. In families with a child with ADHD, is the number of children in the family linked to a) FQOL, b) CQ, or c) PS?
11. In families with a child with an ID, is the number of children in the family linked to a) FQOL, b) CQ, or c) PS?

12. In families with TD children, is the number of children in the family linked to a) FQOL, b) CQ, or c) PS?
13. Does child ASD group membership affect the relationship between number of children and a) FQOL, b) CQ, or c) PS?
14. Does child ADHD group membership affect the relationship between number of children and a) FQOL, b) CQ, or c) PS?
15. Does child low intellectual functioning group membership affect the relationship between number of children and a) FQOL, b) CQ, or c) PS?
16. Does having a TD child affect the relationship between number of children and a) FQOL, b) CQ, or c) PS?

Families with One Child with NDD and Families with Multiple Children with NDDs

17. Do families with one child with a NDD and families with multiple children with NDDs significantly differ in FQOL?
18. Do families with one child with a NDD and families with multiple children with NDDs significantly differ in CQ?
19. Do families with one child with a NDD and families with multiple children with NDDs significantly differ in PS?

Hypotheses

Birth order

1. A child with ASD being born earlier in the birth order will be linked to a) lower FQOL, b) lower CQ and c) higher PS.
2. A child with ADHD being born earlier in the birth order will be linked to a) lower FQOL, b) lower CQ and c) higher PS.

3. A child with ID being born earlier in the birth order will be linked to a) lower FQOL, b) lower CQ and c) higher PS.
4. A TD child being born earlier in the birth order will be linked to a) higher FQOL, b) higher CQ and c) lower PS.
5. There will be an interaction effect between birth order and ASD group membership, such that mothers of children with ASD earlier in the birth order would report a) lower FQOL b) lower CQ and c) higher PS compared to mothers in the not ASD group, and mothers of children with ASD later in the birth order.
6. There will be an interaction effect between birth order and ADHD group membership, such that mothers of children with ADHD earlier in the birth order would report a) lower FQOL b) lower CQ and c) higher PS compared to mothers in the not ADHD group, and mothers of children with ADHD later in the birth order.
7. There will be an interaction effect between birth order and child low intellectual functioning group membership, such that mothers of children with low intellectual functioning earlier in the birth order would report a) lower FQOL b) lower CQ and c) higher PS compared to mothers in the not low intellectual functioning group, and mothers of children with low intellectual functioning later in the birth order.
8. There will be an interaction effect between birth order and having a TD child, such that mothers of children with TD earlier in the birth order would report a) higher FQOL b) higher CQ and c) lower PS compared to mothers in the not TD group, and mothers of TD children later in the birth order.

Number of Children

9. In families of children with ASD, a higher number of children will be linked to a) lower FQOL, b) lower CQ, and c) higher PS.
10. In families of children with ADHD, a higher number of children will be linked to a) lower FQOL, b) lower CQ, and c) higher PS.
11. In families of children with ID, a higher number of children will be linked to a) lower FQOL, b) lower CQ, and c) higher PS.
12. In families with TD children, a higher number of children will be linked to a) lower FQOL, b) lower CQ, and c) higher PS
13. There will be an interaction effect between number of children and ASD group membership, such that in families with a child with ASD, mothers of three or more children would report a) lower FQOL b) lower CQ and c) higher PS than mothers in the not ASD group.
14. There would be an interaction effect between number of children and ADHD group membership, such that in families with a child with ADHD, mothers of three or more children would report a) lower FQOL b) lower CQ and c) higher PS than mothers in the not ADHD group.
15. There would be an interaction effect between number of children and child low intellectual functioning group membership, such that in families with a child with ID, mothers of three or more children would report a) lower FQOL b) lower CQ and c) higher PS than mothers in the not low intellectual functioning group.
16. There would be an interaction effect between number of children and having a TD child, such that in TD families, mothers of three or more children would report a) higher FQOL b) higher CQ and c) lower PS than mothers in the not TD group.

Families with One Child with NDD and Families with Multiple Children with NDDs

17. Families of multiple children with NDDs will report lower levels of FQOL compared to families of one child with a NDD.
18. Families of multiple children with NDDs will report lower levels of CQ compared to families of one child with a NDD.
19. Families of multiple children with NDDs will report higher levels of PS compared to families of one child with a NDD.

Method

Research Design

The current study used secondary data from a larger study called Family Experiences with Neurodevelopmental Disorders (FEND). For descriptions of the projects that utilized this dataset, see Appendix A. FEND was a cross-sectional study and consisted of an online survey delivered through Prairie Research Associates (PRA). For the current study, the independent variables were the birth order of a TD child, or a child with ASD, ADHD, or low intellectual functioning and number of children within the family. The number of children was examined in two ways, the first being the total number of children in the family and the second being the number of children diagnosed with an NDD in the family. The independent variables were measured ordinally. Birth order consisted of two levels, oldest or not oldest. The number of children consisted of three levels: only child, two children, and three or more children. The dependent variables are the level of FQOL, CQ, and PS. The dependent variables were measured continuously. Lastly, child clinical group membership was measured in four ways: ASD group membership, ADHD group membership, low intellectual functioning group membership, and TD group membership (i.e., absence of significant ASD symptomology, ADHD symptomology and

low intellectual functioning). The control variables were child ASD and ADHD symptom severity and maternal ASD/ADHD diagnosis, as they have been found to impact FQOL, CQ, and PS (Chan et al., 2020; Hu et al., 2012; Luitwieler et al., 2021; May et al., 2015; Perez-Algota et al., 2018; Williamson & Johnston, 2019; Williamson et al., 2016). Ethics for FEND was approved by the Research Ethics Board (REB) 1. Given that the current study consisted of secondary data analysis, it was not required to receive ethical approval.

Participants

Eligibility

As previously mentioned, the current study utilized data from a larger project. Caregivers were eligible to participate in FEND if they identified as either a mother or a father, resided within Canada or the United States, and had a child between the ages of 2-18 years old. If parents had more than one child between the ages of 2 and 18, they were informed to complete the survey regarding a specific child. In families with TD children and a child with ASD and/or ADHD, parents were asked to complete the survey regarding their child with ASD and/or ADHD. For the first half of recruitment, if parents had multiple TD children or children with ASD and/or ADHD in the eligible age range, they were asked to complete the survey regarding their youngest eligible child. Conversely, during the second half of recruitment, if parents had multiple children in the eligible age range, they were asked to complete the survey regarding their eldest eligible child.

Using data from FEND, the current study included mothers residing in Canada or the United States that have a TD child or a child with ASD, ADHD, or low intellectual functioning between the ages of 6-12 years old. To be eligible, mothers had to self-report as having a coparent who they share parenting responsibilities with. Mothers were to have custody of their

children 50% or more of the time and have their coparent living within the same household at least 50% of the time to be included in this study. Additionally, children had to be singleton births, with multiple births (e.g., twins) being excluded.

Mothers were placed in either the ASD group, ADHD group, low intellectual functioning group, or TD group. For mothers included in the ASD group, their child met the standard cut-off on the ASD symptomology measure (detailed below). For mothers included in the ADHD group, their child met the standard cut-off on the ADHD symptomology measure (detailed below). For mothers included in the low intellectual functioning group, their child met the standard cut-off on the intellectual functioning measure (detailed below). For mothers included in the TD group, their child was below the standard cut-offs on the ASD and ADHD measures, and above the standard cut-off on the intellectual functioning measure.

Comparison groups consisted of the not ASD group, not ADHD group, not low intellectual functioning group, and not TD group. For mothers in the not ASD group, their child's ASD symptoms were below the standard cut-off. For mothers in the not ADHD group, their child's ADHD symptoms were below the standard cut-off. For mothers in the not low intellectually functioning group, their child's intellectual functioning was above the standard cut-off. For mothers in the not TD group, their child's symptoms were above the standard cut-off for the ASD symptoms measure, or the ADHD symptom measure, or below the standard cut-off for the intellectual functioning measure.

Previous research has shown that large birth spacing between siblings increases birth order differences and impacts the quality of time parents spend with each child (Price, 2004). The current study used a birth spacing cut-off of 6 years (Price, 2004). If a mother reported a birth spacing of consecutive children being more than 6 years apart, they were excluded.

Recruitment

The FEND study recruited participants from across Canada and the United States. Various online resources for parents of children with neurodevelopmental disorders such as Facebook groups (e.g., Delaware Special Needs Parent Group, Moms of Special Needs Kids, Parents of children with disabilities) and support blogs (e.g., Autism Speaks Blog, Parenting ADHD and Autism, Parenting Now) were contacted. The study poster was also circulated in Facebook groups specifically for parents of children with ASD (e.g., Parents of Autistic and Special Needs Children, Autism Manitoba-for parents and caregivers), ADHD (e.g., ADHD Support Group of Manitoba, Raising a child with ADHD), and ID (e.g., Intellectual Disability Parent/Guardian Support Group, Developmental Delays in Children). Recruitment also consisted of paid online Facebook advertisements that were targeted for parents of children within the eligibility age range. Organizations were contacted to circulate the study poster, including those within Canada (e.g., Autism Canada, Autism Speaks Canada, Canadian ADHD Resource Alliance) and the United States (e.g., Autism Speaks, Autism Society of America, Parents USA). Physical posters and online advertisements were also posted at local organizations such as St. Amant Centre, New Directions, and Special Services for Children and Youth (SSCY).

Sample size

G *Power 3.1 software (Faul et al., 2007) was used to determine the required sample size in order to have adequate power to observe a significant effect for the MANCOVA analysis. In the power analysis, a medium effect size of Cohens $f^2 = .15$ was used, power was set at .80, and alpha level was set at .05. Based on the power analysis, the current study required at least 47 mothers in each group.

Data Collection Procedure

For the FEND study, participants were presented with a link to the online survey via online posters (see Appendix B) or provided with a QR code that could be scanned to access the online survey from physical posters. After accessing the online survey, participants were presented with a consent form (see Appendix C) that provided details about the purpose of the study, as well as the potential risks and benefits of participation. The participant then clicked "I agree to participate" or chose to not participate and exited the survey. Once the participants agreed to participate, they completed the survey, which took approximately 30-45 minutes. When the participant completed the survey, they were presented with a debriefing form that outlined detailed information about the study variables and provided another survey link. This link then directed them to another survey delivered through Qualtrics that asked if they would like to have the results of the study shared with them, as well as gave them an opportunity to provide their email to be entered into a draw to win one of ten $50 Amazon eGift cards.

Once data analysis was complete, infographics describing the results of all projects within the larger study were sent to parents through email. These infographics were also posted on the Family and Developmental Psychopathology lab website and social media sites including Facebook and Instagram.

Measures

The larger study included measures that were not used in the current study, these measures are listed in Appendix A.

Demographic Questionnaire

The demographic questionnaire (see Appendix D) was filled out by the mother and contains questions about themselves and their child. Mothers were asked questions regarding

age, ethnicity, income, marital status, residing country, and if they have received any formal diagnoses. Questions relating to the child included self-reporting ASD, ADHD, or ID diagnoses, and child age. The demographic questionnaire was used to measure birth order, number of children in the family, number of children with NDDs, and maternal ASD and/or ADHD diagnosis. Birth order and number of children was measured by the mother providing the age and diagnoses of each child in the family.

Social Communication Questionnaire

The Social Communication Questionnaire (SCQ) Lifetime-Form was used to measure ASD symptomology in the current study. The Lifetime Version of the SCQ was used because it is based on the child's behavior throughout their life, and it useful for children aged 4 years or older (Hollocks et al., 2019; Witwer & Lecavalier, 2007). The SCQ is a parent-completed measure that consists of 40-items about their child's behavior in social interaction, stereotyped/repetitive behavior, communication, and language domains (Witwer & Lecavalier, 2007). Example items include "Has she/he ever said the same thing over and over in exactly the same way or insisted that you say the same thing over and over again?", "Has she/he ever had any complicated movements of her/his whole body, such as spinning or repeatedly bouncing up and down?". Parents respond to each item with either *yes* (1) or *no* (0), with a total score ranging between 0 and 40. The items on the SCQ have high internal consistency (Cronbach's $\alpha = .90$; Berument et al., 1999). In order to be included in the ASD group, a child must receive a score of 15 or above due to its high sensitivity (.96; Berument et al., 1999) and specificity (.80; Berument et al., 1999).

ADHD Rating Scale-IV: Home Version

The ADHD Rating Scale-IV: Home Version was used to measure ADHD symptomology in this study. This measure is a parent-completed measure that is based on ADHD symptomology criteria outlined in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; DuPaul et al., 1998; DuPaul et al., 2015). The ADHD Rating Scale-IV: Home Version consists of 18 items in total, and contains a 9-item Inattention subscale and a 9-item Hyperactivity-Impulsivity subscale (DuPaul et al., 1998). For the current study, only the total score was used. This measure utilizes a 4-point Likert scale (0 = *Never or Rarely*, 1 = *Sometimes*, 2 = *Often*, 3 = *Very Often*) where a higher total score indicates higher ADHD symptomology. Example items include "Leaves seat in classroom or in other situations in which remaining seated is expected", "Runs about or climbs excessively in situation in which it is inappropriate", and "Loses things necessary for tasks or activities". Parents respond to each item about how often that behavior occurred within the last 6 months. This measure has high test-retest reliability (Cronbach's α for Total Score = .85) and high internal consistency (Cronbach's α for Total Score = .92). In order to be included in the ADHD group, children must score at the 80^{th} percentile or higher.

Developmental Profile-4: Cognitive Scale

The Developmental Profile – 4 (DP-4) Parent/Caregiver Checklist was used to measure child intellectual functioning (Alpern, 2020). The DP-4 contains 190-items which measure development across five scales including physical, adaptive behavior, social-emotional, cognitive, and communication (Western Psychological Services, 2020). The current study only used the cognitive scale, which contains 42-items (Alpern, 2020). Parents respond to each item as either *yes* (1) or *no* (0). Example items include "Does your child usually look or turn toward

the source of a sound, such as a person who is beginning?", "Does your child correctly classify things using size words (large or big, and little or small)?", and "Does your child read a simple story aloud so that someone who is only listening can follow the story?" (Alpern, 2020). The DP-4 is validated for children from birth to 21 years of age. The DP-4 Parent/Caregiver Checklist has high internal consistency (Cronbach's α Cognitive Scale = .82-.95) and good test-retest reliability (Cronbach's α Cognitive Scale = .83; Western Psychological Services, 2020). In order to be included in the low intellectual functioning group, the child must have scored 75 or lower due to its high specificity (Cronbach's α Cognitive Scale = .98) and sensitivity (Cronbach's α Cognitive Scale = .68; Western Psychological Services, 2020). The DP-4 also is strongly correlated with Bayley Scales of Infant and Toddler Development, Fourth Edition (r = .70; Stephenson et al., 2024).

The Beach Centre Family Quality of Life Scale

The Beach Center Family Quality of Life Scale was used to measure FQOL (Beach Center on Disabilities, 2006). This measure was created to measure FQOL in families of children with disabilities (Summers et al., 2005). The Beach Center Family Quality of Life Scale is a parent-completed questionnaire that contains 25-items that measure five different domains including Family Interaction, Emotional Well-being, Parenting, Physical/Material Well-being, and Disability Related Support. The current study only used the total score to measure FQOL. Parents respond to each item using a 5-point Likert scale (1 = *Very Dissatisfied*, 2 = *Dissatisfied*, 3 = *Neither*, 4 = *Satisfied*, 5 = *Very Satisfied).* Example items include "My family has the support we need to relieve stress", "My family members talk openly with each other", and "My family member with a disability has support to make friends". The Beach Center Family Quality of Life Scale has high internal consistency (Cronbach's α = .93; Jenaro et al., 2020). It also has good

convergent validity as it is highly correlated with the Family Resource Scale, and the Family APGAR (Hoffman et al., 2006).

Coparenting Relationship Scale

The Coparenting Relationship Scale (CRS) was used to measure CQ. The CRS is a 35-item parent-completed questionnaire that contains a total score as well seven domains of coparenting including, Agreement, Parenting-based Closeness, Exposure to Conflict, Endorse Partner Parenting, Support for Partner, Undermining, and Division of Labour (Feinberg, 2012). The current study only used the total score to measure CQ. For the first 30-items on the CRS, parents are asked about how they work with their partner in their role as a parent using a 7-point Likert scale (0 = *Not true of us*, 2 = *A little bit true of us*, 4 = *Somewhat true of us*, 6 = *Very true of us*; Feinberg at al., 2012). Examples of these items include "I believe my partner is a good parent" and "We often discuss the best way to meet our child's needs." For the last 5-items, parents are asked about how they interact with their partner in front of their child using a 7-point Likert scale (0 = *Never*, 2 = *Sometimes*, 4 = *Often*, 6 = *Very Often*). Example of these items include "Argue with your partner about your child, in the child's presence?" and "Yell at each other within earshot of the child?" (Feinberg, 2012). The CRS has good internal consistency (Cronbach's α = .91; Feinberg, 2012). The CRS also has good convergent validity as it was related to quality of marriage (r = .64 -.71), couple efficacy (r = .61-.65), and couple love (r = .60-.71; Feinberg, 2012).

Parenting Stress Index, Fourth Edition – Short Form

The Parenting Stress Index, Fourth Edition- Short Form (PSI-4-SF) was used to measure PS. The PSI-4-SF is a parent-completed questionnaire that consists of 36-items that measure total stress, with higher scores indicating more PS. It also includes scores for the parent distress,

parent-child dysfunctional interactions, and difficult child domains (Abidin, 2012). The current study only used the total score from the PSI-4-SF to measure PS. Parents respond to each item using a 5-point Likert scale (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Not Sure*, 4 = *Agree,* 5 = *Strongly Agree*). Example items include "I feel trapped by my responsibilities as a parent", "My child rarely does things for me that make me feel good", and "My child seems to cry or fuss more often than most children" (Abidin, 2012). The PSI-4-SF has been validated for parents of children between 1 month and 12 years of age (Hayes & Watson, 2013), and has high internal consistency (Cronbach's α for Total Score = .89-.93; Barroso et al., 2016; Touchèque et al., 2016), and good test-retest reliability (Total Score r = .75; Haskett et al., 2006).

Analytic Strategy

Following data collection for the FEND study, data was transferred to the Statistical Package for the Social Sciences (SPSS) for analysis. An SPSS file including the complete de-identified dataset from FEND was stored on a secure lab computer. To complete data analysis for the current study, I had complete access to the FEND dataset. After accessing the complete dataset, participants were excluded based on the eligibility criteria previously described. After ineligible participants were excluded, descriptive statistics were calculated (e.g., age of child, age of mothers, ethnicity, marital status, family income etc.) using the data from the demographic questionnaire. Next, the assumptions for a MANCOVA were tested, which included multivariate normality, homogeneity of variances and covariances, multicollinearity, relationships between covariates and dependent variables, outliers, and homogeneity of regression slopes (results are further described below). It is important to note that I originally proposed conducting a moderation analysis, with birth order and number of children as predictors, child diagnostic group (i.e., ASD, ADHD, ID, and TD) as the moderator variable, and FQOL, CQ, and PS as the

dependent variables. I originally planned to group mothers in either ASD, ADHD, ID, or TD groups, and exclude children with co-occurring symptomology. However, a large portion of the participants had co-occurring symptomology, therefore, mothers were grouped in either the ASD or not ASD group, ADHD or not ADHD group, low intellectual functioning or not low intellectual functioning group, and TD or not TD group. Overall, analyses included nine one-way MANCOVA's and eight two-way MANCOVA's. Specifically, four one-way MANCOVA's examined the link between birth order and FQOL, CQ, and PS, and four one-way MANCOVA's examined the link between number of children and FQOL, CQ, and PS. Four two-way MANCOVA's examined the effects of child group membership (i.e., ASD, ADHD, low intellectual functioning, TD) on the relationship between birth order and FQOL, CQ, and PS. Four two-way MANCOVA's examined the effects of child clinical group membership (i.e., ASD, ADHD, low intellectual functioning, TD) on the relationship between number of children and FQOL, CQ, and PS. Lastly, a one-way MANCOVA was conducted to assess differences in FQOL, CQ and PS across families of multiple children with NDDs and families of one child with a NDD.

Results

Participants

A total of 922 participants were recruited for the larger study. However, 711 participants were excluded from the current study due to not identifying as a mother (n = 281), having a child outside the age range (n = 370), not having a coparent (n = 30), not residing in the same household with their coparent at least 50% of the time (n = 21), having a birth order spacing of more than 6 years (n = 1), families of twins (n = 2), outliers (n = 4), and missing data (n = 2). The total sample for the current study consisted of 211 mothers (N = 211). The age of mothers

who participated ranged from 25 to 54 years old (*M* = 38.83 years old, *SD* = 5.42), and the age of the target child ranged from 6 to 12 years old (*M* = 8.75 years old, *SD* = 2.05). The majority of mothers were married (*n* = 182; 85%) and had two children (*n* = 109; 50.9%). Additionally, most mothers were white (*n* = 172; 80.4%), had completed post-secondary education (*n* = 178; 83.2%), and resided in Canada (*n* = 164; 76.6%). For the total sample, scores for the Beach Center Family Quality of Life Scale ranged from 2.20 to 5.00 (*M* = 3.90, *SD* = .615), scores for the CRS ranged from 1.03 to 6.00 (*M* = 4.27, *SD* = 1.07), and scores for the PSI-4-SF ranged from 36 to 161 (*M* = 96.55, *SD* = 24.99). See Table 1 for descriptive information for ASD, ADHD, low intellectual functioning, and TD subsamples.

Group Sample Sizes

Sample sizes for each child symptomology group were calculated. There were 69 mothers in the ASD sample, 127 mothers in the ADHD sample, 30 mothers in the low intellectual functioning sample, and 56 mothers in the TD sample. For analyses that examined the effects of child ASD group membership, 69 mothers were included in the ASD group, and 126 mothers were included in the not ASD group. For analyses that examined the effects of child ADHD group membership, 127 mothers were included in the ADHD group, and 67 mothers were included in the not ADHD group. For analyses that examined the effects of low intellectual functioning group membership, 30 mothers were included in the low intellectual functioning group, and 163 mothers were included in the not low intellectual functioning group. For analyses that examined the effects of having a TD child, 56 mothers were included in the TD group and 155 mothers were included in the not TD group.

Assumptions

Normality

Multivariate normality was assessed by using the Shapiro-Wilks test and analyzing histogram graphs and Q-Q plots of the dependent variables across all levels of the independent variables. A Shapiro-Wilks test was significant for FQOL (p = .008), CQ (p < .001), and non-significant for PS (p =.630), indicating that the assumption of multivariate normality was met for PS but violated for FQOL and CQ. It is recommended to assess normality both by inspecting graphs such as histogram graphs and Q-Q plots, as well as the use of statistical tests. Inspecting graphs allows for more practical interpretation and provides a better understanding of the distributions of the variables (Mishra et al., 2019). There are also limitations with using statistical tests for normality as they are sensitive to sample size (Ghasemi & Zahediasi, 2012). Given that the total sample size used in the current study is considered large, small deviations may contribute to a significant result in a statistical test such as the Shapiro Wilks Test (Ghasemi & Zahediasi, 2012). Therefore, upon further inspection of the histogram graphs and receiving feedback from a statistics consultant, a MANCOVA was deemed an appropriate approach for data analysis.

Homogeneity of Variances and Covariances

The Levene's test was used to assess the homogeneity of variances. The Levene's test was non-significant for CQ (p = .481) and PS (p = .463), and significant for FQOL (p = .011). Results indicate that the homogeneity of variance assumption was met for CQ and PS but violated for FQOL.

The Box's M test was used to assess the homogeneity of covariances. All of Box's M tests were non-significant, indicating that this assumption was met.

Multicollinearity

Multicollinearity was assessed by examining a correlation matrix that included all study variables. Correlations between FQOL, CQ, and PS were below .90 (Tabachnick & Fidell, 2013), indicating that the multicollinearity assumption was met.

Relationships between Covariates and Dependent Variables

A correlation matrix was used to assess the relationship between covariates and dependent variables. Based on the correlation matrix, child ASD symptoms were significantly associated with PS, and child ADHD symptoms were significantly associated with FQOL and PS. Maternal ASD/ADHD diagnoses were non-significantly associated with FQOL, CQ, and PS. Given that child ASD and ADHD symptoms were significantly associated with some dependent variables, post-hoc analyses which did not covary child ASD and ADHD symptom severity were conducted additionally.

Outliers

There were a total of four outliers identified in the total sample. The first outlier was identified as a low score for FQOL, a low score for CQ, and a high score for PS. The second outlier was identified as a high score for CQ and PS. The third outlier was identified as a high score for PS, and the fourth outlier was identified as a low score for FQOL. The histograms of the dependent variables were visually examined across all levels of the independent variables, both with and without the inclusion of outliers. Upon visual inspection, histograms of the dependent variables excluding outliers appeared to be closer to a normal distribution, therefore, the four identified outliers were excluded from analyses. For further descriptions of outliers, see Appendix E.

Homogeneity of Regression Slopes

General linear models (GLMs) were used to assess the homogeneity of regression slopes. The interaction terms between all independent variables were assessed. All interaction terms were non-significant, except for the interaction between birth order, child low intellectual functioning group membership, maternal ASD/ADHD diagnoses for FQOL (p = .001) and CQ (p = .010), as well as the interaction between number of children, child low intellectual functioning group membership, maternal ASD/ADHD diagnoses for FQOL (p = .040), and CQ (p = .001). Therefore, post-hoc analyses investing the three-way interactions between birth order, low intellectual functioning group membership, and maternal ASD/ADHD diagnoses, as well as number of children, low intellectual functioning group membership, and maternal ASD/ADHD diagnoses were conducted.

Correlations

Total Sample

In the total sample, birth order was not significantly correlated with FQOL (r = .09, p = .214), CQ (r = .13, p = .059), or PS (r = -.10, p = .141). Number of children in the family also was not significantly correlated with FQOL (r = -.06, p = .396), CQ (r = .11, p = .125), or PS (r = .04, p = .524). Similarly, number of children with NDDs was not significantly correlated with FQOL (r = -.02, p = .810) or PS (r = -.03, p = .712), but was significantly associated with CQ (r = .21, p = .023), such that having multiple children with NDDs resulted in higher CQ. It is important to note that child ADHD symptomology was strongly associated with FQOL (r = -.36, p <.001) and PS (r = .58, p <.001), meaning that higher child ADHD symptomology resulted in lower FQOL and higher PS. See Table 2 for further details about correlations among study variables for the total sample.

ASD Sample

In the ASD sample, birth order was not significantly correlated with FQOL (r = .08, p = .487) or PS (r = -.007, p = .956), and was significantly correlated with CQ (r = .30, p = .011), such that having a child with ASD later in the birth order was associated with higher CQ. Number of children in the family was not significantly correlated with FQOL (r = -.11, p = .335), CQ (r = .22, p = .061), or PS (r = .07, p = .547). Number of children with NDDs was not significantly correlated with FQOL (r = .02, p = .895) or PS (r = -.12, p = .357), but was significantly correlated with CQ (r = .32, p = .008), such that having multiple children with NDDs resulted in higher CQ. Additionally, child ASD symptomology was not significantly correlated with FQOL (r = .02, p = .841) or PS (r = -0.5, p = .665), but was significantly correlated with CQ (r =.-30, p = .011), such that a child having more ASD symptoms was related to lower CQ. See Table 3 for further details about correlations among study variables for the ASD sample.

ADHD Sample

In the ADHD sample, birth order was not significantly correlated with FQOL (r = .03, p = .755), CQ (r = .14, p = .101), or PS (r = -.05, p = .594). Similarly, number of children in the family was not significantly correlated with FQOL (r = -.09, p = .274), CQ (r = .11, p = .219), or PS (r = .04, p = .685). Number of children with NDDs was not significantly correlated with FQOL (r = -.08, p = .437), CQ (r = .17, p = .092), or PS (r = -.00, p = .990). Additionally, child ADHD symptomology was significantly correlated with FQOL (r = -.21, p = .015) and PS (r = .31, p <.001), but was not significantly correlated with CQ (r = .12, p = .172), meaning that a child having more ADHD symptoms is associated with lower FQOL and higher PS. See Table 4 for further details about correlations among study variables for the ADHD sample.

Low Intellectual Functioning Sample

In the low intellectual functioning sample, birth order was not significantly correlated with FQOL (r = -.001, p = .994) or PS (r = -.28, p = .112), and was significantly correlated with CQ (r = .50, p = .003), such that having a child with low intellectual functioning later in the birth order is associated with higher CQ. Similarly, number of children in the family was not significantly correlated with FQOL (r = -.22, p = .201) or PS (r = -.10, p = .570), and was significantly correlated with CQ (r = .57, p < .001), meaning in families of children with low intellectual functioning, having more children is associated with higher CQ. Number of children with NDDs was not significantly correlated with FQOL (r = .01, p = .955), CQ (r = .33, p = .088), or PS (r = -.33, p = .092). Additionally, child intellectual functioning was not significantly correlated with FQOL (r = -.25, p = .143), CQ (r = -.04, p = .841), or PS (r = .32, p = .073). See Table 5 for further details about correlations among study variables for the low intellectual functioning sample.

TD Sample

In the TD sample, birth order was not significantly correlated with FQOL (r = 22, p =.089) or CQ (r = .07, p = .609), and was significantly correlated with PS (r = -.40, p = .002), such that having a TD child later in the birth order is associated with lower PS. Number of children in the family was not significantly correlated with FQOL (r = .09, p = .516), CQ (r = .06, p =.652), or PS (r = -.08, p = .526). See Table 6 for further details about correlations among study variables for the TD sample.

Birth Order

Research Questions 1-4

Four one-way MANCOVAs were conducted to examine the link between birth order and FQOL, CQ, and PS in families of TD children as well as children with ASD, ADHD, and low

intellectual functioning. In the ASD sample, there were no significant differences in FQOL (F(1, 67) = .479, p = .492), CQ (F(1, 67) = 2.01, p = .161), or PS (F(1, 67) = .003, p = .957) across birth order groups. In the ADHD sample, there were no significant differences in FQOL (F(1, 125) = .002, p = .966), CQ (F(1, 125) = .792, p = .375), or PS (F(1, 125) = .713, p = .400) across birth order groups. In the low intellectual functioning sample, there were no significant differences in FQOL (F(1, 28) = .553, p = .464), CQ (F(1, 28) = 1.60, p = .218), or PS (F(1, 28) = 2.37, p = .136) across birth order groups. In the TD sample, there were no significant differences in FQOL (F(1, 54) = 1.54, p = .220) or CQ (F(1, 54) = .033, p = .857) across birth order groups. However, there was a significant difference in PS across birth order groups, F(1, 54) = 9.64, p = .003. Specifically, mothers of TD children earlier in the birth order reported significantly higher PS than mothers of TD children later in the birth order.

Research Questions 5-8

Four two-way MANCOVAs were conducted to examine the effects of birth order and child clinical group membership (i.e., ASD vs not, ADHD vs not, low intellectual functioning vs not, TD or not) on FQOL, CQ, and PS. When examining the effects of birth order and ASD group membership, the interaction effect was non-significant for FQOL (F(1,193) = 0.02, p = .020), CQ (F(1, 193) = 2.94, p = .088), and PS (F(1, 193) = .094, p =.760). There was a non-significant main effect of birth order for FQOL (p =.403), CQ (p =.102), and PS (p =.079). Lastly, there was a non-significant main effect of ASD group membership for FQOL (p =.813), CQ (p =.846), and PS (p =.548).

When examining the effects of birth order and ADHD group membership, the interaction effect was non-significant for FQOL (F(1, 192) = 1.30, p = .255), CQ (F(1, 192) = .002, p = .961), and PS (F(1, 192) = .920, p =.339). There was a non-significant main effect of birth order

for FQOL (p =.229) and CQ (p =.193). However, there was a significant main effect of birth order for PS (p =.043), indicating that mothers experience differences in PS birth order groups. Finally, while there was a non-significant main effect of ADHD group membership on FQOL (p = .111) and PS (p = .130), a significant main effect of child ADHD group membership was found for CQ (p = .047). This suggests that mothers in the ADHD and not ADHD reported differences in CQ.

When examining the effects of birth order and low intellectual functioning group membership, the interaction effect was significant for CQ (F(1, 191) = 6.73, p = .010) and PS (F(1, 191) = 5.97, p =.015). This indicates that the effect of birth order on mothers' reported CQ and PS levels differs depending on whether the child has low intellectual functioning or not. However, the interaction effects of birth order and low intellectual functioning group membership were non-significant for FQOL (F(1, 191) = .190, p =.663). Further descriptions of interaction effects are included below in the section on post-hoc analyses.

When examining the effects of birth order and having a TD child, the interaction effect was significant for PS (F(1, 209) = 5.27, p =.023), which indicates that the effect of birth order on mothers' reported PS differs depending on whether the child is TD or not. There were no significant interaction effects for FQOL (F(1, 209) = 1.28, p =.260) and CQ (F(1, 209) = .143, p =.705). Further descriptions of the interaction effect are included below in the section on post-hoc analyses.

Number of Children

Research Questions 9-12

Four one-way MANCOVAs were conducted to examine the link between number of children in the family and FQOL, CQ, and PS in families of TD children as well as children with

ASD, ADHD, and low intellectual functioning. In the ASD sample, there were no significant differences in CQ ($F(2, 66) = 1.83$, $p = .169$) or PS ($F(2, 66) = .149$, $p = .862$) based on the number of children in the family, however, there was a significant difference in FQOL ($F(2, 66) = 3.45$, $p = .038$). Specifically, mothers of three or more children reported significantly lower FQOL compared to mothers of two children ($p = .022$). Given that ASD symptomology was weakly associated with FQOL and number of children, these results should be interpreted with caution. In the ADHD sample, there were no significant differences in FQOL ($F(2, 124) = 1.85$, $p = .161$), CQ ($F(2, 124) = .624$, $p = .538$), or PS ($F(2, 124) = .156$, $p = .856$) based on the number of children in the family. In the low intellectual functioning sample, there were no significant differences in FQOL ($F(2, 27) = 2.17$, $p = .093$) or PS ($F(2, 27) = 2.17$, $p = .780$) based on the number of children in the family. There was a significant difference in CQ ($F(2, 27) = 4.53$, $p = .021$). Mothers with one child reported significantly lower CQ compared to mothers of two children ($p = .035$) and mothers of three or more children ($p = .001$). In the TD sample, there were no significant differences in FQOL ($F(2, 53) = .291$, $p = .749$), or CQ ($F(2, 53) = .020$, $p = .980$) or PS ($F(2, 53) = .152$, $p = .859$) based on number of children in the family.

Research Questions 13-16

Four two-way MANCOVA's were conducted to examine the effects of number of children and child clinical group membership (i.e., ASD vs not, ADHD vs not, low intellectual functioning vs not) on FQOL, CQ, and PS. When examining the effects of number of children and ASD group membership, the interaction effect was non-significant for FQOL ($F(2, 192) = 1.14$, $p = .321$), CQ ($F(2, 192) = .652$, $p = .522$), and PS ($F(2, 192) = .001$, $p = .999$). There was a non-significant main effect of number of children for FQOL ($p = .125$), CQ ($p = .156$) and PS (p

=.535). Lastly, there was a non-significant main effect of ASD group membership for FQOL (p =.667), CQ (p =.289), and PS (p =.547).

When examining the effects of number of children and ADHD group membership, the interaction effect was non-significant for FQOL ($F(2, 191) = .439$, $p = .645$), CQ ($F(2, 191) = .395$, $p = .674$), and PS ($F(2, 191) = .113$, p =.894). There was a non-significant main effect of number of children for FQOL (p =.417), CQ (p =.299), and PS (p =.417). Lastly, there was a non-significant main effect of ADHD group membership for FQOL (p =.215), and PS (p =.166). There was a significant main effect of child ADHD group membership for CQ (p =.037), indicating that mothers in the ADHD group and not ADHD group reported differences in CQ.

When examining the effects of number of children and low intellectual functioning group membership, the interaction effect was significant for CQ ($F(2, 190) = 4.76$, $p = .010$) and PS ($F(2, 190) = 3.26$, p =.041). This indicates that the effect of the number of children on mothers' reported CQ and PS differs depending on whether the child has low intellectual functioning or not. However, the interaction effects of number of children and low intellectual functioning group membership were non-significant for FQOL ($F(2, 192) = .746$, p =.476). Further descriptions of interaction effects are included in post-hoc analyses reported below.

When examining the effects of the number of children and having TD children, the interaction effect was non-significant for FQOL ($F(2, 208) = .554$, $p = .576$), CQ ($F(2, 208) = .211$, $p = .810$), and PS ($F(2, 208) = .060$, p =.942). There was a non-significant main effect of number of children for FQOL (p =.382), CQ (p =.643), and PS (p =.576). There was a significant main effect of child clinical group membership (i.e., TD or not) for CQ (p =.028), indicating that mothers in the TD group and not TD group reported differences in CQ. However, there was a non-significant main effect of child group membership for FQOL (p =.281), and PS (p =.101).

Number of Children with NDD's

Research Questions 17-19

A one-way MANCOVA was conducted to examine if levels of FQOL, CQ, and PS differed among families with one child with a NDD and families with multiple children with a NDD. No significant differences in FQOL ($F(1, 153) = .024$, $p = .878$), CQ ($F(1, 153) = .830$, $p = .082$), or PS ($F(1, 153) = .024$, $p = .364$) were revealed.

Post-hoc analyses

Given that child ASD and ADHD symptomology were associated with some dependent variables, post hoc analyses excluding child ASD and ADHD symptom severity as covariates were conducted. Additionally, interaction effects are further described below.

Post-hoc Analyses: Birth Order

Four one-way MANCOVAs were conducted to examine the link between birth order and FQOL, CQ, and PS in families of TD children as well as children with ASD, ADHD, and low intellectual functioning, while only controlling for maternal ASD/ADHD diagnoses. In the ASD sample, there were no significant differences in FQOL ($F(1, 67) = .584$, $p = .447$) or PS ($F(1, 67) = .138$, $p = .712$) across birth order groups. There was a significant difference in CQ ($F(1, 67) = 5.74$, $p = .019$), indicating that mothers of children with ASD earlier in the birth order reported significantly lower CQ compared to mothers of children with ASD later in the birth order. In the ADHD sample, there were no significant differences in FQOL ($F(1, 125) = .064$, $p = .800$), CQ ($F(1, 125) = 2.08$, $p = .151$), or PS ($F(1, 125) = .215$, $p = .644$) across birth order groups. In the low intellectual functioning sample, there were no significant differences in FQOL ($F(1, 28) = .008$, $p = .931$) across birth order groups. There were significant differences in CQ ($F(1, 28) = 8.50$, $p = .007$) and PS ($F(1, 28) = 5.13$, $p = .031$) across birth order groups. Mothers of children

with low intellectual functioning earlier in the birth order reported significantly lower CQ and higher PS compared to mothers of children with low intellectual functioning later in the birth order. In the TD sample, there were no significant differences in FQOL ($F(1, 54) = 2.67$, $p = .108$) or CQ ($F(1, 54) = .052$, $p = .821$) across birth order groups. However, there was a significant difference in PS across birth order groups, $F(1, 54) = 13.8$, $p < .001$. Specifically, mothers of TD children earlier in the birth order reported significantly higher PS than mothers of TD children later in the birth order.

Given that some families had multiple children with NDDs, an additional one-way MANCOVA was conducted to examine the link between the birth order of a child with a NDD and FQOL, CQ, and PS in families with more than one child with a NDD. There were no significant differences in FQOL ($F(1, 18) = .129$, $p = .724$), CQ ($F(1, 18) = .196$, $p = .665$), or PS ($F(1, 18) = .1.06$, $p = .319$) across birth order groups.

Four two-way MANCOVAs were conducted to examine the effects of birth order and child clinical group membership (i.e., ASD vs not, ADHD vs not, low intellectual functioning vs not) on FQOL, CQ, and PS, while only controlling for maternal ASD/ADHD diagnoses. When examining the effects of birth order and ASD group membership, the interaction effect was non-significant for FQOL ($F(1,193) = .026$, $p = .872$), CQ ($F(1, 193) = 3.58$, $p = .060$), and PS ($F(1, 193) = .421$, $p = .517$). There was a non-significant main effect of birth order for FQOL ($p = .489$), CQ ($p = .844$), and PS ($p = .187$). Lastly, there was a non-significant main effect of child ASD group membership for FQOL ($p = .489$) and CQ ($p = .844$), however, there was an observed main effect of ASD group membership for PS ($p < .001$), suggesting that mothers in the ASD group and not ASD group reported differences in PS. Specifically, mothers of children in the

ASD group reported significantly higher PS compared to mothers in the not ASD group ($p <$ .001; See Figures 1, 2 and 3).

When examining the effects of birth order and ADHD group membership, while only controlling for maternal ASD/ADHD diagnoses, the interaction effect was non-significant for FQOL ($F(1, 192) = 1.58$, $p = .242$), CQ ($F(1, 192) = .083$, $p = .774$) and PS ($F(1, 192) = 2.09$, $p = .150$). There was a non-significant main effect of birth order for FQOL ($p = .137$), CQ ($p = .153$), and PS ($p = .066$). Finally, there was a significant main effect of child ADHD group membership on FQOL ($p < .001$), CQ ($p = .022$), and PS ($p < .001$), indicating that mothers in the ADHD group and not ADHD group reported differences FQOL, CQ, and PS within this subsample. Specifically, mothers in the ADHD group reported significantly lower FQ ($p < .001$), lower CQ ($p = .022$), and higher PS ($p < .001$) compared to mothers in the not ADHD group (See Figures 4, 5 and 6).

When examining the effects of birth order and low intellectual functioning group membership, while only controlling for maternal ASD/ADHD diagnoses, the interaction effects were non-significant for FQOL ($F(1, 191) = .130$, $p = .719$) and PS ($F(1, 191) = 2.16$, $p = .144$). The interaction effect was significant for CQ ($F(1, 191) = 7.24$, $p = .008$; See Figures 7, 8 and 9). Further descriptions of interaction effects are reported below.

When examining the effects of birth order and having a TD child, while only controlling for maternal ASD/ADHD diagnoses, the interaction effect was significant for PS ($F(1, 209) = 6.51$, $p = .011$), which indicates that the effect of birth order on mothers' reported PS differs depending on whether the child is TD or not. There were no significant interaction effects for FQOL ($F(1, 209) = 1.29$, $p = .257$) and CQ ($F(1, 209) = .470$, $p = .257$; See Figures 10, 11 and 12). Further descriptions of the interaction effects are included below.

Post-hoc Analyses: Number of Children

Four one-way MANCOVAs were conducted to examine the link between number of children in the family and FQOL, CQ, and PS in families of TD children as well as children with ASD, ADHD, and low intellectual functioning, while only controlling for maternal ASD/ADHD diagnoses. In the ASD sample, there were no significant differences in CQ ($F(2, 66) = 2.00$, $p = .143$) or PS ($F(2, 66) = .219$, $p = .804$) based on the number of children in the family, however, there was a significant difference in FQOL ($F(2, 66) = 3.24$, $p = .045$). Mothers of three or more children reported significantly lower FQOL compared to mothers of two children. Given that ASD symptomology was weakly associated with FQOL and number of children, these results should be interpreted with caution. In the ADHD sample, there were no significant differences in FQOL ($F(2, 124) = .670$, $p = .514$), CQ ($F(2, 124) = .1.31$, $p = .273$), or PS ($F(2, 124) = .004$, $p = .996$) based on the number of children in the family. In the low intellectual functioning sample, there were no significant differences in FQOL ($F(2, 27) = .536$, $p = .591$) or PS ($F(2, 27) = 1.12$, $p = .341$) based on the number of children in the family. There was a significant difference in CQ ($F(2, 27) = 8.60$, $p = .001$). Mothers with one child reported significantly lower CQ compared to mothers of two children ($p = .035$) and mothers of three or more children ($p = .001$). In the TD sample, there were no significant differences in FQOL ($F(2, 53) = .329$, $p = .721$), CQ ($F(2, 53) = .044$, $p = .957$) or PS ($F(2, 53) = .290$, $p = .750$) based on the number of children in the family.

Four two-way MANCOVA's were conducted to examine the effects of number of children and child clinical group membership (i.e., ASD vs not, ADHD vs not, low intellectual functioning vs not) on FQOL, CQ, and PS. When examining the effects of number of children and ASD group membership, while only controlling for maternal ASD/ADHD diagnoses, the interaction effect was non-significant for FQOL ($F(2, 192) = 1.62$, $p = .200$), CQ ($F(2, 192) =$

.841, p = .433), and PS (F(2, 192) = .506, p =.604). There was a non-significant main effect of number of children for FQOL (p =.140), CQ (p =.135) and PS (p =.796). Lastly, there was a significant main effect of ASD group membership for PS (p < .001), however, there was a non-significant main effect of ASD group membership for FQOL (p =.386), and CQ (p =.163). These results suggest that mothers in the ASD group and not ASD group reported differences in PS. Specifically, mothers of children in the ASD group reported significantly higher PS compared to mothers in the not ASD group (p < .001; See Figures 13, 14 and 15).

When examining the effects of number of children and ADHD group membership, while only controlling for maternal ASD/ADHD diagnoses, the interaction effect was non-significant for FQOL (F(2, 191) = .259, p = .772), CQ (F(2, 191) = .375, p = .688), and PS (F(2, 191) = .560, p =.572). There was a non-significant main effect of number of children for FQOL (p =.667), CQ (p =.257), and PS (p =.623). Lastly, there was a significant main effect of ADHD group membership for FQOL (p < .001), CQ (p =.025), and PS (p < .001), indicating mothers in the ADHD group and not ADHD reported differences in FQOL, CQ and PS. Specifically, mothers in the ADHD group reported significantly lower FQOL (p < .001), lower CQ (p = .025), and higher PS (p < .001) compared to mothers in the not ADHD group (See Figures 16, 17 and 18).

When examining the effects of number of children and low intellectual functioning group membership, the interaction effect was significant for CQ (F(2, 190) = 4.79, p = .009). However, the interaction effects of number of children and low intellectual functioning group membership were non-significant for FQOL (F(2, 192) = .677, p =.510) and PS (F(2, 190) = 1.26, p =.286; See Figures 19, 20 and 21). Further descriptions of interaction effects are reported below.

When examining the effects of the number of children and having a TD child, the interaction effect was non-significant for FQOL ($F(2, 208) = .389$, $p = .678$), CQ ($F(2, 208) = .445$, $p = .642$), and PS ($F(2, 208) = .324$, $p = .724$). There was a non-significant main effect of number of children for FQOL ($p = .652$), CQ ($p = .554$) and PS ($p = .784$). There was a significant main effect of child symptomology (TD or not) for FQOL ($p = .003$), CQ ($p = .015$), and PS ($p < .001$), indicating that mothers in the TD group and not TD group reported differences in FQOL, CQ and PS. Specifically, mothers of TD children reported significantly higher FQOL ($p = .003$), higher CQ ($p = .015$), and lower PS ($p < .001$) compared to mothers in the not TD group (See Figures 22, 23 and 24).

Post-hoc Analyses: Number of Children with NDDs

A one-way MANCOVA was conducted to examine if levels of FQOL, CQ, and PS differed among families with one child with a NDD and families with multiple children with a NDD, while only controlling for maternal ASD/ADHD diagnoses. No significant differences in FQOL ($F(1, 153) = .080$, $p = .777$) or PS ($F(1, 153) = .189$, $p = .665$) were revealed. However, there was a significant difference in CQ ($F(1, 153) = .4.08$, $p = .046$). Specifically, mothers of multiple children with a NDD reported significantly higher CQ compared to mothers of one child with a NDD (See Figures 25, 26 and 27).

Post-hoc Analyses: Interaction Effects for Birth Order and Low Intellectual Functioning Group Membership

When examining the effects of birth order and low intellectual functioning group membership, while controlling for child ASD and ADHD symptom severity as well as maternal ASD/ADHD diagnoses, the interaction effect was significant for CQ ($F(1, 191) = 6.73$, $p = .010$) and PS ($F(1, 191) = 5.97$, $p = .015$). Pairwise comparisons revealed that in the not low intellectual

functioning group, mothers of children did not differ in CQ and PS levels across birth order groups. However, there were significant differences in CQ and PS observed across birth order groups in the low intellectual functioning group. Mothers of children with low intellectual functioning earlier in the birth order reported significantly lower CQ and higher PS compared to mothers of children with low intellectual functioning later in the birth order.

Additional post hoc analyses examining the effects of birth order and low intellectual functioning group membership were conducted while only controlling for maternal ASD/ADHD diagnoses. Similarly, the interaction was significant for CQ ($F(1, 191) = 7.24$, $p = .008$) and revealed that mothers of children with low intellectual functioning earlier in the birth order reported lower CQ compared to mothers of children with low intellectual functioning later in the birth order. In contrast, in the post-hoc analyses, the interaction effect was non-significant for PS ($F(1, 191) = 2.16$, $p = .144$).

Lastly, when testing the assumption of homogeneity of regression slopes, a significant three-way interaction between birth order, low intellectual functioning group membership, and maternal ASD/ADHD diagnoses was revealed, indicating that the assumption was violated. Therefore, a post-hoc analysis including the three-way interaction was conducted. The interaction term between birth order, low intellectual functioning group membership, and maternal ASD/ADHD diagnoses was non-significant for CQ ($F(1, 191) = 1.65$, $p = .179$) or PS ($F(1, 191) = .648$, $p = .585$). However, there was a significant three-way interaction for FQOL ($F(1, 191) = 3.95$, $p = .009$), indicating that maternal ASD/ADHD diagnoses may influence the relationship between birth order and low intellectual functioning group membership. Consistent with other results in the post hoc analyses, in this model there was a significant two-way interaction between birth order and low intellectual functioning group membership for CQ (F(1,

191) = 4.57, p = .034) indicating that mothers of children with low intellectual functioning earlier in the birth order reported lower CQ compared to mothers of children with low intellectual functioning later in the birth order. However, the interaction effect was non-significant for FQOL (F(1, 191) = .106, p = .745) and PS (F(1, 191) = 2.82, p = .095).

Post-hoc Analyses: Interaction Effects for Number of Children and Low Intellectual Functioning Group Membership

When examining the effects of number of children and low intellectual functioning group membership, while controlling for child ASD and ADHD symptom severity as well as maternal ASD/ADHD diagnoses, the interaction effect was significant for CQ (F(2, 190) = 4.76, p = .010) and PS (F(2, 190) = 3.26, p =.041). For CQ, pairwise comparisons revealed that in the not low intellectual functioning group, mothers' reports of CQ did not differ based on the number of children in the family. In the low intellectual functioning group, mothers of one child reported significantly lower CQ compared to mothers of two children and three or more children. For PS, pairwise comparisons revealed that in the low intellectual functioning group, mothers of three or more children reported significantly lower PS compared to mothers of one child or two children. No significant differences were observed in the not low intellectual functioning group based on the number of children in the family.

Additional post hoc analyses examining the effects of number of children and low intellectual functioning group membership were conducted while only controlling for maternal ASD/ADHD diagnoses. The interaction was significant for CQ (F(2, 190) = 4.79, p = .009) and revealed that in the low intellectual functioning group, mothers of one child reported significantly lower CQ compared to mothers of two children and three or more children. In

contrast, in the post-hoc analyses, the interaction effect was non-significant for PS ($F(2, 190) = 1.62$, $p = .286$).

Lastly, during assumption testing, a three-way interaction between number of children, low intellectual functioning group membership, and maternal ASD/ADHD diagnoses was revealed, indicating the assumption of homogeneity of regression slopes was violated. Thus, an additional post-hoc analysis, including a three-way interaction was conducted. In this model, there was a significant three-way interaction between number of children, low intellectual functioning group membership, and maternal ASD/ADHD diagnoses for CQ ($F(2, 190) = 2.488$, $p = .033$), indicating that maternal ASD/ADHD diagnoses may influence the relationship between number of children and child low intellectual functioning group membership. However, the three-way interaction was non-significant for FQOL ($F(2, 190) = 1.52$, $p = .185$) and PS ($F(2, 190) = .831$, $p = .529$). In this model, there was a significant two-way interaction between number of children and low intellectual functioning group membership for CQ ($F(2, 190) = 2.49$, $p = .033$), revealing that in the low intellectual functioning group, mothers of one child reported significantly lower CQ compared to mothers of two children and three or more children. However, there was a non-significant interaction effect for FQOL ($F(2, 190) = .747$, $p = .475$) and PS ($F(2, 190) = 2.90$, $p = .058$).

Post-hoc Analyses: Interaction Effects for Birth Order and Having a TD Child

When examining the effects of birth order and having a TD child, while only controlling for maternal ASD/ADHD diagnoses, the interaction effect was significant for PS ($F(1, 209) = 6.51$, $p = .011$). Pairwise comparisons revealed that in the not TD group, mothers did not report differences in PS across birth order groups. In the TD group, mothers of TD children later in the

birth order reported significantly lower PS compared to mothers of TD children earlier in the birth order.

Additional post hoc analyses examining the effects of the number of children and having a TD child were conducted while only controlling for maternal ASD/ADHD diagnoses. The interaction was significant for PS ($F(1, 209) = 6.51$, $p = .011$) and revealed that in the TD group, mothers of a TD child later in the birth order reported significantly lower PS compared to mothers of a TD child earlier in the birth order.

Discussion

There is a paucity of literature investigating the relationships between birth order, number of children, number of children with NDDs, and family well-being indices. Additionally, the limited literature reports conflicting findings regarding the effects of birth order and number of children in the family. The current study sought to address these gaps in the literature by examining the link between birth order, number of children, and family well-being indices. The current study also sought to examine if child clinical group membership influences these relationships. Lastly, the current study examined if mothers of multiple children with a NDD differed in family well-being indices compared to mothers of one child with a NDD. The findings reveal that birth order and number of children are weakly associated with FQOL, CQ, and PS in the total sample and ADHD sample. The only significant relationships found were between birth order and CQ in the ASD and low intellectual functioning samples, between birth order and PS in the TD sample, as well as between number of children and CQ in the low intellectual functioning sample. These findings reveal that birth order, number of children and number of children with NDDs have limited effects on family well-being indices in neurodevelopmentally diverse families, which partially aligns with the conflicting literature.

Birth Order

This study sought to examine the link between birth order and family well-being indices in families of TD children as well as families of children with ASD, ADHD, and low intellectual functioning. Unexpectedly, in families of children with ASD, ADHD, and low intellectual functioning, mothers did not report differences in FQOL, CQ, or PS across birth order groups. In families of TD children, mothers of children earlier in the birth order reported higher PS than mothers of children later in the birth order. This finding is not consistent with the hypothesis and research suggesting that children later in birth order experience fewer positive interactions with their parents, and more ineffective parenting behaviours (Armin et al., 2012; Strohchein et al., 2008). However, this finding does align with Qian and colleagues' (2021) findings that suggest that parents of TD children earlier in the birth order report higher PS. These findings also partially align with the FST framework and the various stages of the family life cycle. Through a family cycle lens, children earlier in the birth order initiate significant changes in the family dynamic and initiate changes in the family life cycle; for instance, the first-born child initiates family life cycle phases such as families with young children and families with school-aged children (Glick et al., 2015). Furthermore, with children earlier in the birth order, parents are less experienced in navigating these changes of the family life cycle and have less experience re-organizing and managing challenges associated with different family life cycle phases. With later-born children, parents may have more experience navigating these changes and managing challenges in each stage of the family life cycle. Thus, based on FST a child earlier in the birth order may elicit more strain and stress on the parenting subsystem. The current study did not examine which phase of the family life cycle children in various birth orders entered the family in. Future studies should consider further examining specific phases of the family life cycle that

participants are currently in, as well as which phase the child was born into to better conceptualize and understand families' experiences across birth order groups.

Post-hoc analyses excluding child ASD and ADHD symptom severity as covariates revealed that in families of children with ASD, mothers of children earlier in the birth order reported lower CQ compared to mothers of children with ASD later in the birth order, which is consistent with the hypothesis. These findings also align with studies reporting that having a child with ASD earlier in the birth order is associated with more behavioural problems exhibited by the child with ASD, as well as their TD sibling (Bontinck, 2018; Tomeny et al., 2014). These increased behavioural problems may then place stress on the coparenting subsystem and lead to more coparental disagreements. Post-hoc analyses for the low intellectual functioning sample revealed that families of children with low intellectual functioning earlier in the birth order report lower CQ and higher PS compared to mothers of children with low intellectual functioning later in the birth order. These findings are consistent with the hypothesis and with previous research suggesting that children with a NDD earlier in the birth order experience more ineffective parenting (Armin et al., 2012).

This study also examined the effects of birth order and child clinical group membership on family well-being indices. Contrary to my hypotheses, there was no interaction between birth order and child ASD or ADHD group membership, indicating that a child's birth order did not have a significant impact on FQOL, CQ, or PS, regardless of whether the child has ASD, ADHD or not. Findings reveal a significant interaction effect between birth order and low intellectual functioning group membership for CQ and PS. Mothers of children with low intellectual functioning earlier in the birth order reported lower CQ and higher PS, which supports the hypothesis. This finding also aligns with studies suggesting that having a child with ID earlier in

the birth order is associated with increased intimacy-companionship and more arguing amongst siblings (Hayden & Bailey, 2023). Research has also found that increased sibling conflict is negatively associated with supportive coparenting (Chen et al., 2019) and positively associated with undermining coparenting (Chen et al., 2018; Chen et al., 2019). Therefore, having a child with low intellectual functioning earlier in the birth order may increase sibling conflict, and in turn, lead to less supportive coparenting. It is important to note that the low intellectual functioning sample only included 30 mothers, which is less than the 47 mothers required in each group according to the power analysis. Therefore, analysis including the low intellectual functioning group may have been underpowered, and some smaller effects may have been missed due to a lower sample size.

Finally, results indicate a significant interaction effect between birth order and having a TD child. This finding indicates that the relationship between birth order and PS depends on whether the child is TD or not. In the not TD group, birth order did not have an impact on the level of PS experienced by mothers. In the TD group, mothers of TD children later in the birth order reported lower PS compared to mothers of TD children earlier in the birth order. In these analyses, mothers in the not-TD group included mothers of children with ASD, ADHD, and low intellectual functioning. Thus, these results highlight that birth order may be a more relevant factor for TD families compared to families of children with NDDs. These results also indicate that families of children with NDDs report higher PS regardless of the birth order of the child with a NDD.

Number of Children

This study aimed to examine the link between number of children and family well-being indices in families of TD children as well as families of children with ASD, ADHD, and/or low

intellectual functioning. Mothers of children with ADHD and TD children did not report differences in FQOL, CQ, or PS based on number of children, which is inconsistent with the hypotheses. In families of children with ASD, mothers of three or more children reported lower FQOL compared to mothers of two children, which supports the hypotheses. However, given that the number of children and FQOL are weakly associated in the ASD sample (r = .08), these results should be interpreted with considerable caution. In families of children with low cognitive functioning, mothers with one child reported lower CQ compared to mothers of two children and mothers of three or more children. These findings are inconsistent with the hypothesis, as well as the resource dilution hypothesis (Blake, 1981), suggesting that having more children in the family would lead to fewer resources being available to each child. These results also conflict with FST suggesting that having more children in the family results in a more complex parent-child system and requires the family to readjust their roles, which in turn places more strain on the family system (Minuchin, 1985). These findings align with research indicating that having more children in the family may allow siblings to help with caretaking duties and therefore increase support available to parents (Mulroy et al., 2008).

This study also examined the effects of number of children and child clinical group membership on family well-being indices. Contrary to the hypotheses, there was no interaction effect between number of children and ASD or ADHD group membership. This finding indicates that the number of children in the family does not have a significant impact on FQOL, CQ, or PS, regardless of whether the child has ASD or ADHD. These findings somewhat align with the conflicting literature regarding the effects of number of children on the family system in neurodevelopmentally diverse families (Kaminsky & Dewey, 2003; Kimura & Yamasaki, 2019; Mulroy et al., 2008). In contrast, there was a significant interaction between child low

intellectual functioning group membership and number of children for both CQ and PS. Contrary to my hypothesis, in the low intellectual functioning sample, mothers of one child reported lower CQ compared to mothers of two children and mothers of three or more children. This finding aligns with research in families of TD children, which reports that families with one child exhibit higher levels of intrusive and undermining coparenting (Lindsey et al., 2005). Similarly, in the low intellectual functioning sample, mothers of three or more children reported lower PS compared to mothers of one child, and mothers of two children. This finding aligns with Liu and colleagues' (2020) findings that families of three or more children report less PS as these families adapt to changes and enhance their psychological resiliency. Collectively, these results do not provide support for the resource dilution hypothesis (Blake, 1981), as these results indicate positive effects of having more children in the family. These findings partially align with Stroschein et al.'s (2008) conceptualization of the resource dilution hypothesis, suggesting that resources are reallocated rather than decreased with more children in the family. From a resource perspective, having more children in the family could increase a family's resources as siblings can help with childcare duties and act as an additional support system for parents.

Number of Children with NDDs

Lastly, the current study examined if levels of FQOL, CQ, and PS differed across families with one child with a NDD and families with multiple children with a NDD. Unexpectedly, no differences in FQOL, CQ, or PS were revealed between families with multiple children with a NDD and families with one child with a NDD. There is limited literature investigating the effects of having multiple children with a NDD on family well-being indices, and studies reveal conflicting findings. However, these results align with some studies reporting no significant

differences in FQOL or PS amongst families with one child with a NDD and families with multiple children with a NDD (McStay et al., 2014).

Post-hoc analyses excluding both child ASD and ADHD symptom severity as covariates reveal that mothers of multiple children with a NDD report higher CQ than mothers of one child with one NDD. These findings do not align with my hypothesis nor some studies suggesting that having multiple children with NDDs is associated with less family cohesion and lower family adaptability (Orsmond et al., 2007). There are two possible reasons that might explain mothers of multiple children with NDDs reporting higher CQ. First, it may be due to the consistency of parenting practices used. Effective parenting practices for children with NDDs include clear routines, structured environments, and consistency. These effective parenting practices are somewhat uniform and similar for children with different NDDs. Therefore, having clear and reliable parenting practices that coparents can use for multiple children in the family may result in fewer coparenting conflicts and a better understanding of their parenting roles, and in turn, may increase CQ. Second, parents of multiple children with NDDs may have more experience in managing and navigating challenging behaviours exhibited by their child. With more experience, parents can become more effective and consistent in managing challenging behaviours. This consistency, along with a deeper understanding of effective strategies, may lead to a stronger understanding of their parenting roles, ultimately enhancing CQ.

Child Symptomology

The current study examined the effects of birth order, number of children, and child clinical group membership on family well-being indices. These findings revealed significant main effects for both child ASD and ADHD group membership. The main effect of child ASD group membership was significant for PS, indicating that mothers of children with ASD report

higher PS than mothers of children who do not have ASD, regardless of birth order or number of children in the family. This can also be seen correlationally, as child ASD group membership was significantly positively associated with PS in the total sample. There was also an observed main effect of child ADHD group membership for FQOL, CQ, and PS. These findings indicate that regardless of birth order or number of children in the family, mothers of children with ADHD report lower FQOL, lower CQ, and higher PS compared to families of children who do not have ADHD. These findings can also be seen correlationally, as child ADHD group membership was negatively associated with FQOL and CQ, and positively associated with PS. Finally, findings indicate that mothers of TD children report higher FQOL, higher CQ, and lower PS compared to mothers of children with NDDs (i.e., ASD, ADHD, low intellectual functioning).

Although investigating level of FQOL, CQ, and PS across child clinical group membership was not included in the study aims, it is important to note that the main effects of child ASD and ADHD group membership in the post-hoc analyses are consistent with previous literature reporting that families of children with ASD and ADHD report lower FQOL, lower CQ, and higher PS than families of TD children (Brown et al., 2006; Chan & Leung, 2020; Green et al., 2016; Hayes & Watson, 2012; Hutchison et al., 2016; Sim et al., 2017, Williamson & Johnston, 2016). Altogether, these findings also support a large body of research indicating that having a child with a NDD places more strain on the family system and puts these families at increased risk for lower family well-being.

Strengths

A primary strength of the current study was the novel contribution to the literature. There is a paucity of research examining the relationships between birth order, number of children, and

family well-being indices in neurodevelopmentally diverse families. Furthermore, the limited research on birth order and number of children reveals conflicting findings. This study was the first to examine the effects of birth order and number of children across NDD and TD populations, as well as provide information regarding the effects of birth order, number of children, and child symptomology. Another strength of the current study was the use of a homogenous sample. This was achieved by having strict eligibility criteria, as only mothers were included in the study, and children had to be between 6 and 12 years old. Utilizing a homogenous sample is viewed as a strength as it minimizes variation in sociodemographic variables (Bornstein et al., 2013). A third strength was the use of strict criteria for birth order spacing. To be included in the birth order analyses, siblings had to have a birth order spacing of 6 years or less. Using this eligibility criterion is viewed as a strength as older children spend less quality time with their parents, therefore, having a large birth spacing between siblings can increase birth order differences (Price, 2004).

Limitations and Future Directions

The current study also had several limitations. First, the reliance on self-report measures. All data in the current study relied on mothers accurately reporting their experiences and their child's behaviours. Using self-report measures can lead to biased reporting or social desirability bias (Kreuter et al., 2008).

Another limitation of the current study was only including mothers, which elicits generalizability issues. Given that this study only included mothers, these results cannot be generalized to fathers' experiences or other caregiving roles within the family. Future research should include both mothers and fathers and examine whether the effects of birth order and number of children differ across caregiving roles. Another issue with only including mothers is

that it conflicts with the FST framework. Especially when examining family well-being indices, it is important to note that FQOL and CQ in this study are only from the mother's perspective; therefore, these results cannot be generalized to perceptions of the whole family. Future research should consider having multiple informants from the family when examining indices such as FQOL and CQ, as would be consistent with the FST framework and provide an overall perception of family experiences.

Another limitation of this study is the sample size. Although the total sample size was sufficient and had adequate power, some of the groups for analyses involving the ASD, low intellectual functioning, and TD groups had smaller sample sizes. With smaller sample sizes in these groups, a larger effect can be detected but smaller effects could be missed (Verma & Verma, 2020). Given that both birth order and number of children were weakly associated with family well-being indices across samples, some small effects across birth order groups or number of children groups may not have been detected, ultimately, increasing the chance of Type II error and decreasing power (Verma & Verma, 2020). Future studies should include larger sample sizes across groups in order to have more power and the ability to detect small effects.

Another limitation of this study was the criteria used to form the child clinical groups. For the current study, to meet the criteria for a child clinical group, children only had to score above or below the cut-off on the corresponding child symptomology measure. Due to the sole use of child symptomology measures to form clinical groups, some children may not have met full criteria for a NDD. Regarding the low intellectual functioning group, there was the absence of an adaptive functioning measure to determine eligibility. In the current study, to be included in the low intellectual functioning group, a child had to receive a score of 75 or below on the DP-4. This eligibility criteria does not align with the Diagnostic Statistical Manual 5th edition Text

Revision (DSM-5-TR), which specifies that to meet the criteria for an ID a child must have deficits in cognitive functioning as well as adaptive functioning (APA, 2022). Future research should include measures for both cognitive and adaptive functioning to be more confident in the effects of birth order, number of children in families of children with low cognitive functioning, as well as allow studies to make inferences of family experiences in families of children with ID. In terms of the ADHD group, according to the DSM-5-TR, children's symptoms must be present in at least two distinct settings to meet criteria for a diagnosis of ADHD (APA, 2022). However, in the current study, children only had to score above a cut-off on an ADHD symptomology measure pertaining to their behaviours at home. Future research studies should include measures for child ADHD symptoms in both home and school settings, to ensure that children meet diagnostic criteria. Lastly, in the ASD group children only had to score above a cut-off on an ASD symptomology measure; the participants were not required to receive a formal diagnosis or have undergone a formal assessment completed by a trained professional. Additionally, to gather more reliable information regarding child and parent diagnoses, future studies should consider utilizing health administration data. Another limitation regarding the formation of child clinical groups was the high co-occurrence of child symptomology within each child clinical group. For instance, there were only three children in the low intellectual functioning group who did not meet criteria for the ASD and/or ADHD groups, and there were only nine children in the ASD group who did not meet criteria for the ADHD and/or low intellectual functioning groups. Although including children with co-occurring symptomology is more representative of the NDD populations, studies have consistently shown that children with co-occurring ASD and ADHD present more intensified behaviours (Avni et al., 2018; Dellapiaza et al., 2021; Guttmann-Steinmetz et al., 2009; Rao & Landa, 2014). Therefore, families of children with co-

occurring symptomology have may reported lower family well-being. Future studies should consider having more strict criteria in forming child clinical groups to better understand the effects of specific child symptomology on family well-being.

Lastly, it is important to acknowledge additional factors that may have influenced the results of the current study. First is child age, as studies have found differences in parenting experiences across child age groups, and that parents of younger children experience more stress in their parenting role (Nomaguchi, 2012; Stone et al., 2016). It would be important for future studies to control for the potential effects of child age to better understand the relationship between birth order, number of children and family well-being indices. Second is social support, as previous studies have found that higher levels of social support are related to higher FQOL, higher CQ, and lower PS (Lei et al., 2022; Pardo-Salamanca et al., 2024; Poblete & Gee, 2018). Especially when examining family well-being indices in families of children with NDDs, social support is an important factor to consider, as these families often report lower social support (Bussing et al., 2009; Fernández-Ávalos et al., 2020; Leitch et al., 2019; Safe et al., 2012). Future research should include a social support measure and investigate social support as a potential mediator or moderator of the relationships between birth order, number of children and family well-being indices. Additionally, some previous studies have suggested that having more children in the family could result in siblings helping with caregiving duties (Mulroy et al., 2008). It would be important to further understand how sibling support and the role of siblings also impact these relationships. Therefore, to further understand the role of sibling support and social support on the relationships between birth order, number of children, and family well-being indices, future studies should consider including a measure for various forms of social support. An additional factor that was not considered in the current study was culture. For the

current study, participants were only recruited from Canada and the United States, which are individualistic cultures. Research on collectivist cultures have noted that prominent values and beliefs rooted in collectivist cultures, such as conforming to norms and placing a high value on group identity versus individual identity, may impact parent experiences when raising a child with a NDD (Porter et al., 2022; Shorey et al., 2020). It is suggested that the high emphasis on conforming to the group and maintaining social harmony may place additional stress on parents when raising a child with a NDD. Given these potential differences in family experiences of neurodevelopmentally diverse families across collectivist and individualist cultures, it is important for future studies to examine the relationships between birth order, number of children, and family well-being indices within a collectivist culture. Lastly, given that the current study consisted of predominately white and well-educated mothers, the results from the current study are most representative of these families. Future studies should examine these relationships using a culturally diverse and lower socio-economic status sample. Additionally, given the importance of further understanding family well-being indices, it would be important for national surveys to include variables such as FQOL, CQ, and PS to further understand various factors that can impact family well-being.

Implications

The current study adds to the literature regarding birth order and number of children in the family. This was the first study to examine the link between birth order, number of children, and family well-being indices using a neurodevelopmentally diverse sample. This was also the first study to examine the effects of birth order, number of children, and child clinical group membership on family well-being indices. Lastly, this was the first study to compare family

well-being indices in families of multiple children with a NDD and families with one child with a NDD.

The current study expands researchers' and clinicians' understanding of family systems in NDD populations. Previous studies have examined how birth order and number of children are linked to smaller subsystems within the family such as the individual parent subsystems (Dunn & Kendrick, 1980; Lawson &Mace, 2009), child subsystems (Hsu et al., 2022; Montes, 2018; Tomeny et al., 2014), and parent-child subsystems (Di Biasi et al., 2015), however, no study has examined this relationship in broader subsystems or the family system. The current study expanded upon previous research by examining the effects of birth order and number of children on larger systems such as the family system, coparenting subsystem, and parenting subsystem. Results from the current study suggest that birth order and number of children have limited effects on these larger systems in the family.

This study also provided insight into how these family systems and subsystems are affected when raising multiple children with NDDs by comparing levels of FQOL, CQ, and PS among families with one child with a NDD and families with multiple children with a NDD. Findings from this study indicate that the coparenting subsystem is somewhat impacted by having multiple children with a NDD, as post-hoc analyses revealed that families of multiple children with a NDD reported higher CQ.

Collectively, findings from the current study reveal that birth order and number of children in the family have limited impacts on FQOL, CQ, and PS. However, results also align with literature consistently reporting that families of children with NDDs report lower FQOL, lower CQ, and higher PS, as post-hoc analyses showed main effects for child ASD and ADHD symptomology for family well-being indices. These findings suggest that having a child with a

NDD in the family places strain and stress on the family system, regardless of the child's birth order or the number of children in the family.

The results from this study ultimately highlight the importance of providing additional support for families of children with NDDs as these families are at an increased risk for lower family well-being. These results also highlight the need for clinicians and researchers to tailor interventions to the specific needs of these families. Furthermore, these results suggest that birth order may be a more relevant factor for clinicians working with TD populations rather than NDD populations, as mothers of TD children reported higher PS regarding their child earlier in the birth order.

These results could also better inform mothers of neurodevelopmentally diverse children. These results could help mothers further understand their experiences during parenting, as well as better understand their relationship with their child and coparent. The current study could educate parents on unfamiliar concepts such as CQ and FQOL, as well as how these indices can affect family experiences and relationships (See Appendix F). These results may also empower mothers to seek support when raising a child with an NDD, as these findings highlight the unique needs of these families and the additional strain that raising a child with an NDD can place on the family system.

Conclusions

The current study was the first to examine the relationships between birth order, number of children, and family well-being indices in neurodevelopmentally diverse families. Given that there is limited research examining birth order and number of children in NDD populations, the current study filled important gaps in the literature. Findings from this study highlight that birth order and number of children have limited effects on family well-being in families of children

with NDDs. However, when working with families of TD children, birth order may be a more relevant factor to consider when viewing PS or strain on the family system. Lastly, these findings emphasize the need for additional support for families of children with NDDs, as results showed that regardless of birth order or number of children, families of children with NDDs are at an increased risk for lower family well-being.

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Table 1

Demographic Characteristics by Child Group Membership

Demographic Characteristics	ASD *n* = 69	ADHD *n* = 127	Low Intellectual Functioning *n* = 30	TD *n* = 56
Mother's Age (years) *M (SD)*	38.6 (5.68)	38.94 (5.23)	36.03 (5.60)	38.85 (5.50)
Child's Age (years) *M (SD)*	9.62 (2.11)	9.44 (2.03)	8.97 (2.26)	8.70 (2.05)
Birth Order				
Oldest	67.5%	72.5%	63.9%	73.3%
Not Oldest	32.5%	27.5%	36.1%	26.7%
Number of Children in the Family *M* (*SD*), Range	2.36 (1.20), 1-6	2.24 (1.11), 1-6	2.14 (1.07), 1-5	2.00 (.74), 1-4
One Child	23.4%	24.5%	33.3%	21.7%
Two Children	40.3%	46.0%	33.3%	61.7%
Three or more children	36.4%	29.5%	33.3%	16.7%
Number of children with NDDs				
One Child	67.5%	83.8%	74.2%	87.5%
More than One Child	23.4%	16.2%	25.8%	12.5%
ASD Symptomology *M* (*SD*)	21.8 (5.74)	14.0 (8.91)	22.1 (7.04)	5.12 (4.20)
ADHD Symptomology *M* (*SD*)	29.8 (13.0)	31.3 (9.69)	31.6 (12.1)	8.05 (5.48)
Child Intellectual Functioning *M* (*SD*)	82.30 (25.8)	95.28 (24.4)	57.1 (12.8)	116.1 (16.6)
Family Quality of Life *M* (*SD*)	3.84 (.62)	3.75 (.59)	3.78 (.63)	4.15 (.59)
Coparenting Quality *M* (*SD*)	4.19 (1.08)	4.10 (1.04)	4.00 (1.18)	4.62 (1.00)
Parenting Stress *M (SD)*	107.1 (23.4)	105.9 (21.4)	111.3 (24.1)	77.2 (21.1)
Marital Status				
Single	0.0%	0.70%	0.0%	0.0%
Common-law	9.10%	10.8%	13.9%	16.7%
Married	90.9%	86.3%	86.1%	81.7%

Separated/divorced	0.0%	0.70%	0.0%	1.7%
Household Income ($)				
0-40K	6.50%	3.60%	8.30%	5.00%
40-60K	14.3%	12.2%	13.9%	8.30%
60-90K	20.8%	21.6%	22.2%	30.0%
90-125K	24.7%	29.5%	27.8%	35.0%
125K+	29.9%	30.2%	27.8%	18.3%
Country of Residence				
Canada	63.6%	75.5%	55.6%	91.7%
United States	36.4%	24.5%	44.4%	8.30%
Ethnicity				
Asian	7.80%	5.80%	8.30%	1.70%
Black	6.50%	4.30%	13.9%	8.30%
First Nations	6.50%	0.70%	11.1%	3.30%
Inuit	1.30%	3.60%	2.80%	0.0%
Métis	1.30%	2.9%	0.0%	0.0%
Native Hawaiian or other Pacific Islander	2.60%	0.0%	5.60%	0.0%
White	72.7%	79.9%	58.3%	83.3%
Other	0.0%	0.70%	0.0%	3.30%
Highest Level of Education				
Highschool	3.90%	4.30%	2.80%	1.70%
Some post-secondary education	18.2%	12.9%	19.4%	15.0%
Completed post-secondary education	77.9%	82.0%	77.8%	83.3%

Note. ASD = autism spectrum disorder; ADHD = attention-deficit/hyperactivity disorder; TD = typically developing

Table 2

Correlation Matrix for the Total Sample

Variable	1	2	3	4	5	6	7	8	9	10
1.Birth Order	1	.35**	.37**	.09	.13	-.10	.15*	.01	-.04	-.07
2.Number of children		1	.29**	-.06	.11	.04	.16*	.09	-.04	-.04
3.Number of children with a NDD			1	-.02	.21*	-.03	.32**	.14	-.18*	-.07
4.FQOL				1	.48**	-.49**	-.08	-.38**	.15*	-.11
5.CQ					1	-.38**	-.02	-.12	.15*	.02
6.PS						1	.35**	.58**	-.29**	.17*
7.ASD Symptoms							1	.42**	-.58**	.13
8.ADHD Symptoms								1	-.32**	.31**
9.Intellectual Functioning									1	.09
10.Maternal ASD/ADHD Diagnoses										1

Note. *$p < .05$, **$p < .001$

Table 3

Correlation Matrix for ASD Sample

Variable	1	2	3	4	5	6	7	8	9	10
1.Birth Order	1	.46**	.49**	.08	.30*	-.01	.40**	.10	-.14	.03
2.Number of children		1	.34**	.11	.22	.07	.33**	.20	.02	-.01
3.Number of children with a NDD			1	.02	.32**	-.12	.30*	.16	-.08	-.07
4.FQOL				1	.35**	-.47**	.02	-.38**	.10	-.18
5.CQ					1	-.40**	.30*	.03	.01	.06
6.PS						1	-.05	.46**	.04	.11
7.ASD Symptoms							1	.26*	-.40*	.08
8.ADHD Symptoms								1	-.04	.23
9. Intellectual Functioning									1	-.12
10.Maternal ASD/ADHD Diagnoses										1

Note. *$p < .05$, **$p < .001$

Table 4

Correlation Matrix for ADHD Sample

Variable	1	2	3	4	5	6	7	8	9	10
1.Birth Order	1	.38**	.38**	.03	.14	-.05	.20	.06	-.15	-.13
2.Number of children		1	.29**	-.09	.11	.04	.24**	.05	-.09	-.06
3.Number of children with a NDD			1	-.08	.17	-.00	.31**	.22*	-.19*	-.08
4.FQOL				1	.41**	-.41**	.04	-.21*	.06	-.08
5.CQ					1	-.30**	.10	.12	.01	-.00
6.PS						1	.21*	.31**	-.23**	.03
7.ASD Symptoms							1	.30**	-.56**	.05
8.ADHD Symptoms								1	.16	.32**
9 Intellectual Functioning									1	-.12
10.Maternal ASD/ADHD Diagnoses										1

Note. *$p < .05$, **$p < .001$

Table 5

Correlation Matrix for Low Intellectual Functioning Sample

Variable	1	2	3	4	5	6	7	8	9	10
1.Birth Order	1	.64**	.74**	-.00	.50**	-.28	.50**	.25	-.22	-.12
2.Number of children		1	.46**	-.22	.57**	-.10	.53**	.45**	-.02	.07
3.Number of children with a NDD			1	.01	.33	-.33	.37*	.22	-.12	-.25
4.FQOL				1	.30	-.38	.17	-.28	-.25	-.45**
5.CQ					1	-.39*	.64**	.31	-.04	-.25
6.PS						1	-.31	.41*	.32	.35*
7.ASD Symptoms							1	.27	-.21	-.13
8.ADHD Symptoms								1	.13	.19
9. Intellectual Functioning									1	.05
10.Maternal ASD/ADHD Diagnoses										1

Note. *$p < .05$, **$p < .001$

Table 6

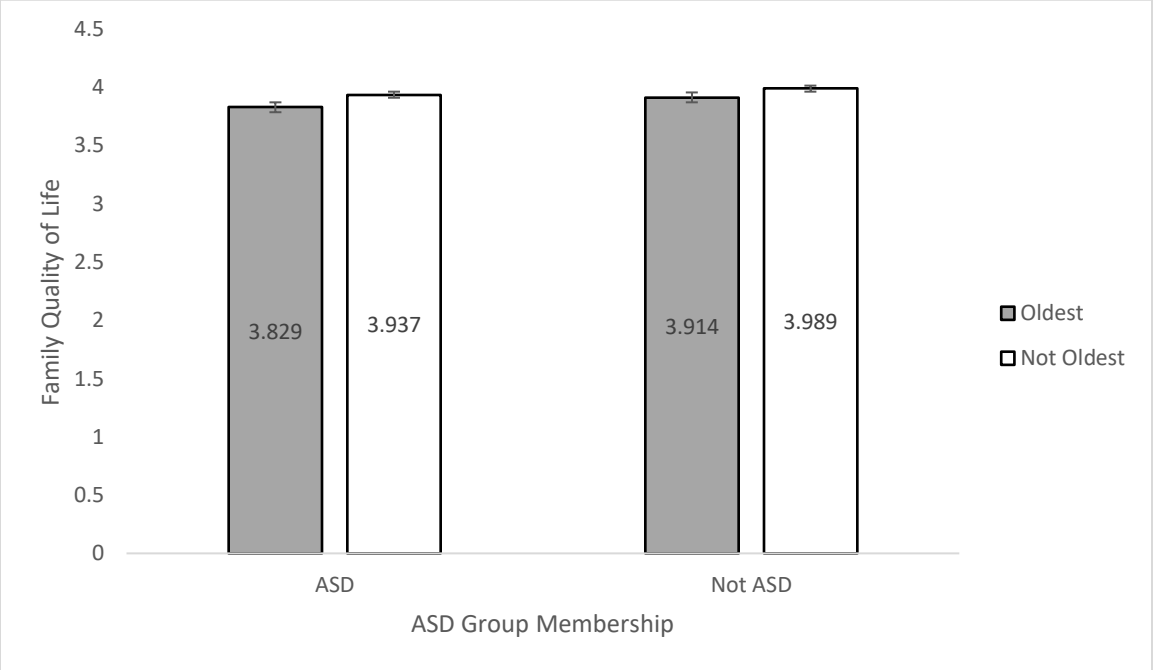
Correlation Matrix for TD Sample

Variable	1	2	3	4	5	6	7	8	9
1.Birth Order	1	.23	.22	.07	-.40**	.00	-.26*	.25	.06
2.Number of children		1	.09	.06	-.08	-.19	-.11	.03	-.07
3.FQOL			1	.61**	-.48**	-.02	-.23	.16	-.01
4.CQ				1	-.29*	-.04	-.00	.32*	.25
5.PS					1	.32*	.52**	-.24	.33*
6.ASD Symptoms						1	.16	.11	.30*
7.ADHD Symptoms							1	-.15	.18
8. Intellectual Functioning								1	.11
9.Maternal ASD/ADHD Diagnoses									1

Note. *$p < .05$, **$p < .001$

Figure 1

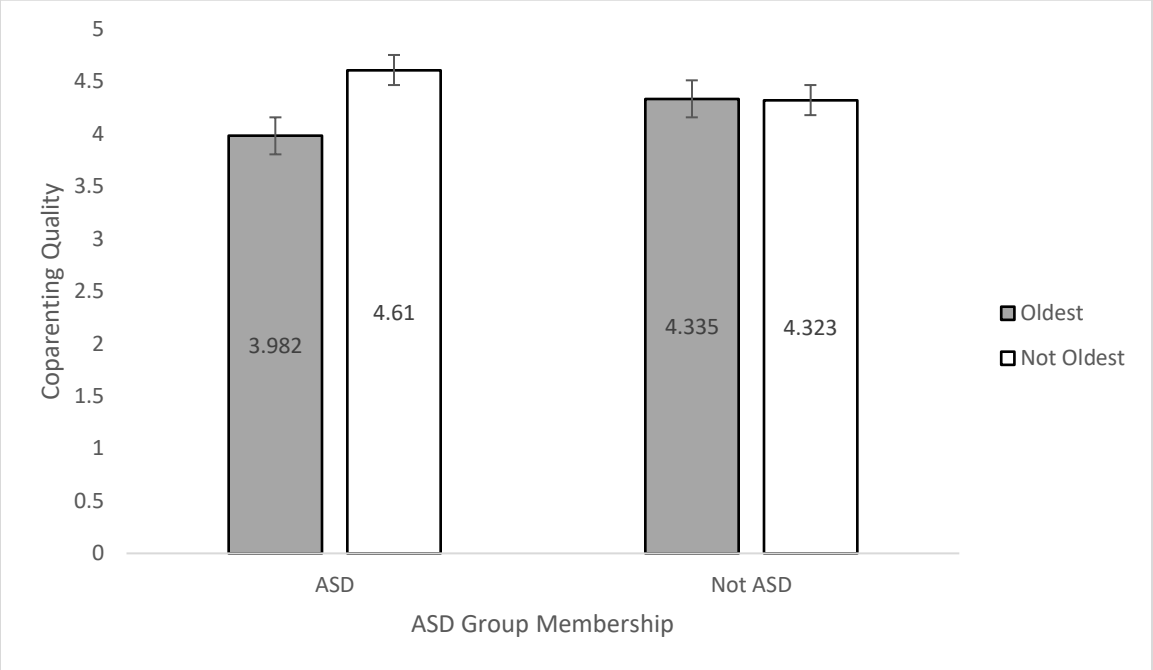
Estimated Marginal Means of Family Quality of Life by Birth Order and ASD Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 2

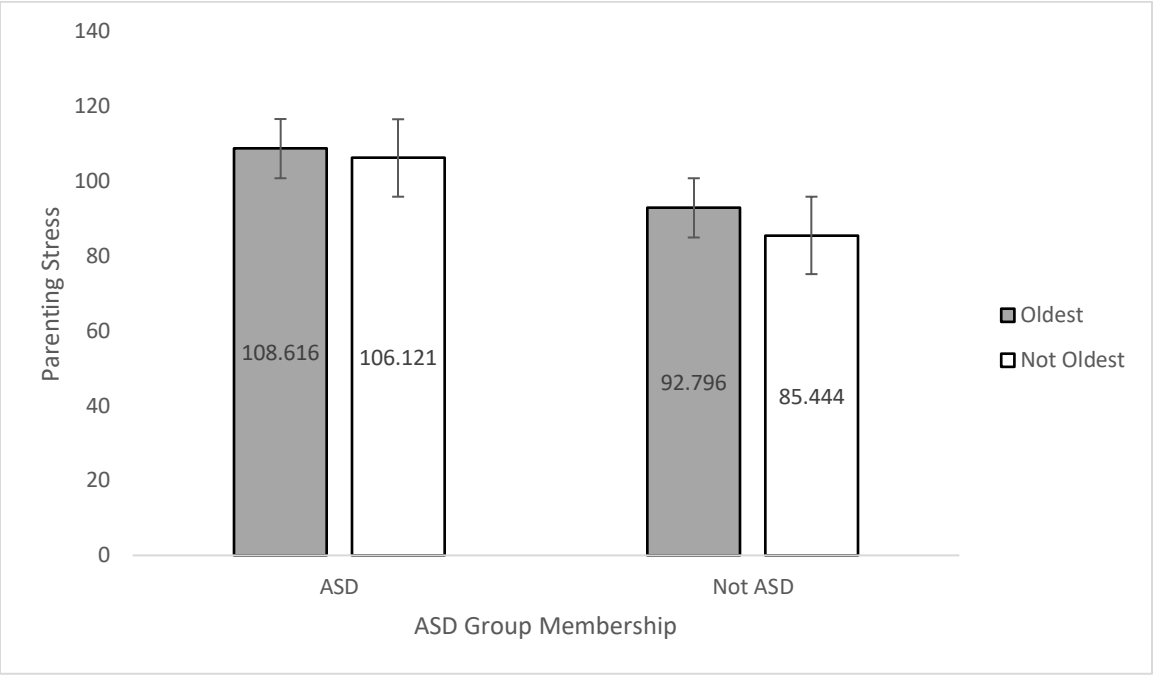
Estimated Marginal Means of Coparenting Quality by Birth Order and ASD Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 3

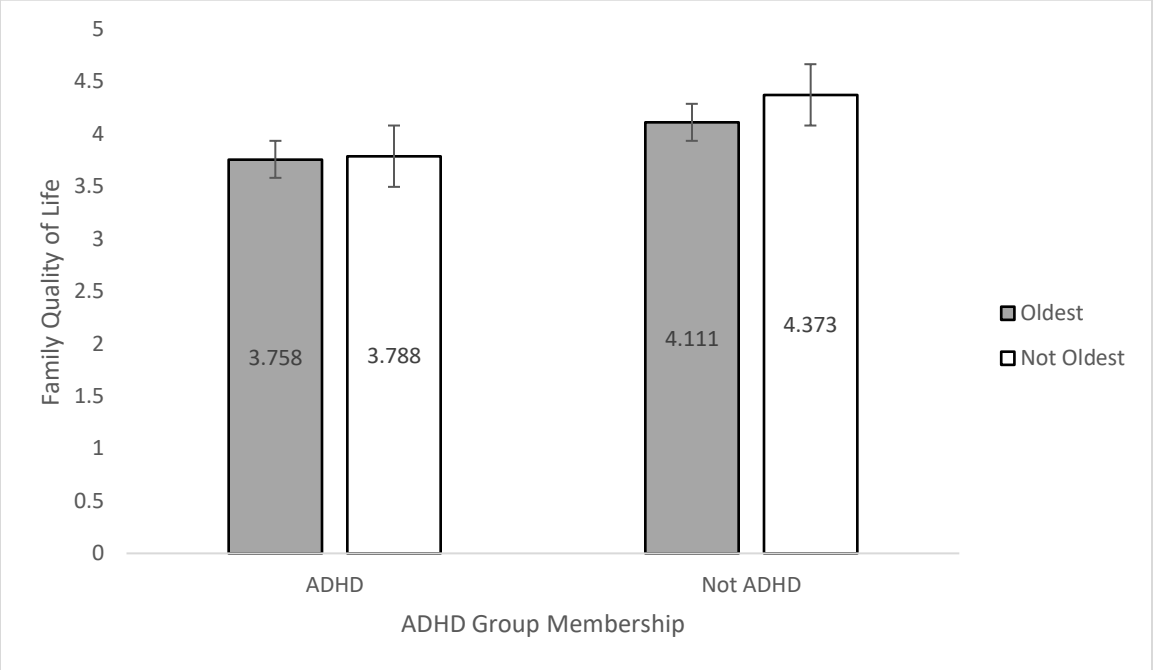
Estimated Marginal Means of Parenting Stress by Birth Order and ASD Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 4

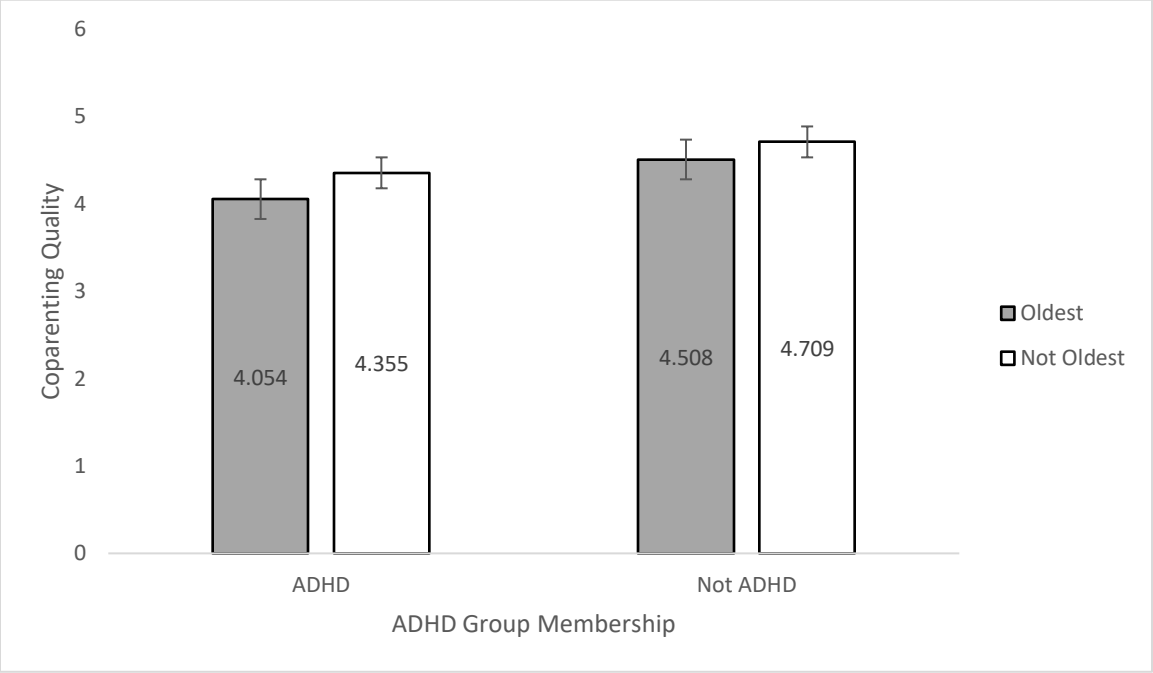
Estimated Marginal Means of Family Quality of Life by Birth Order and ADHD Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 5

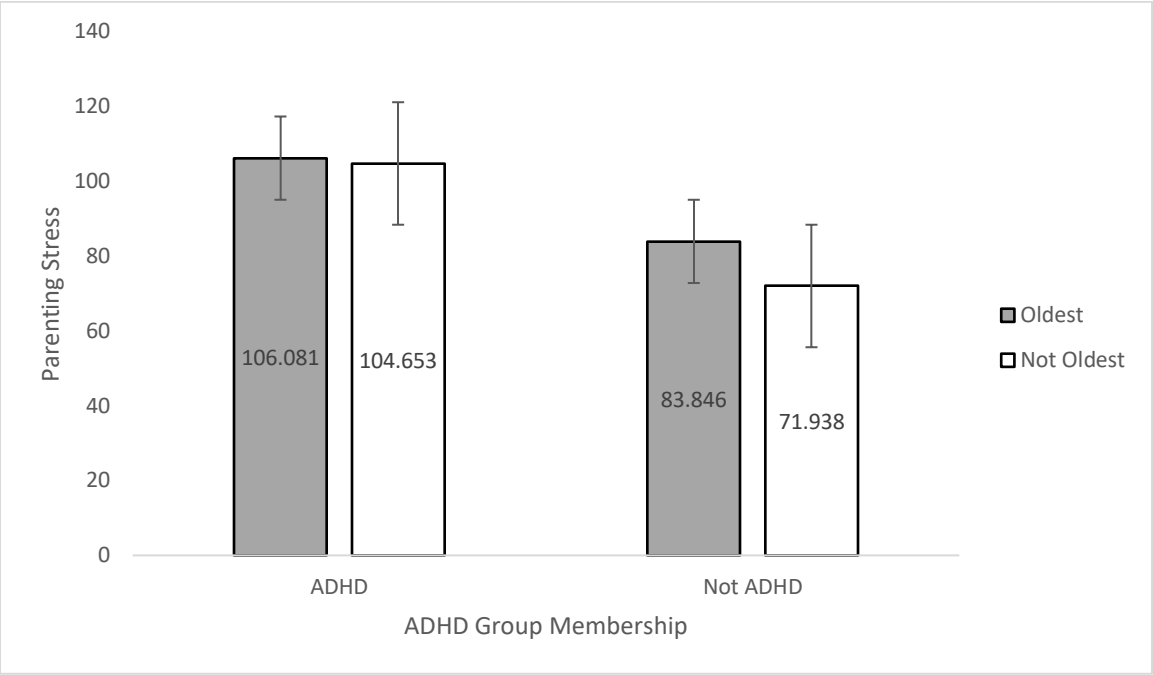
Estimated Marginal Means of Coparenting Quality by Birth Order and ADHD Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 6

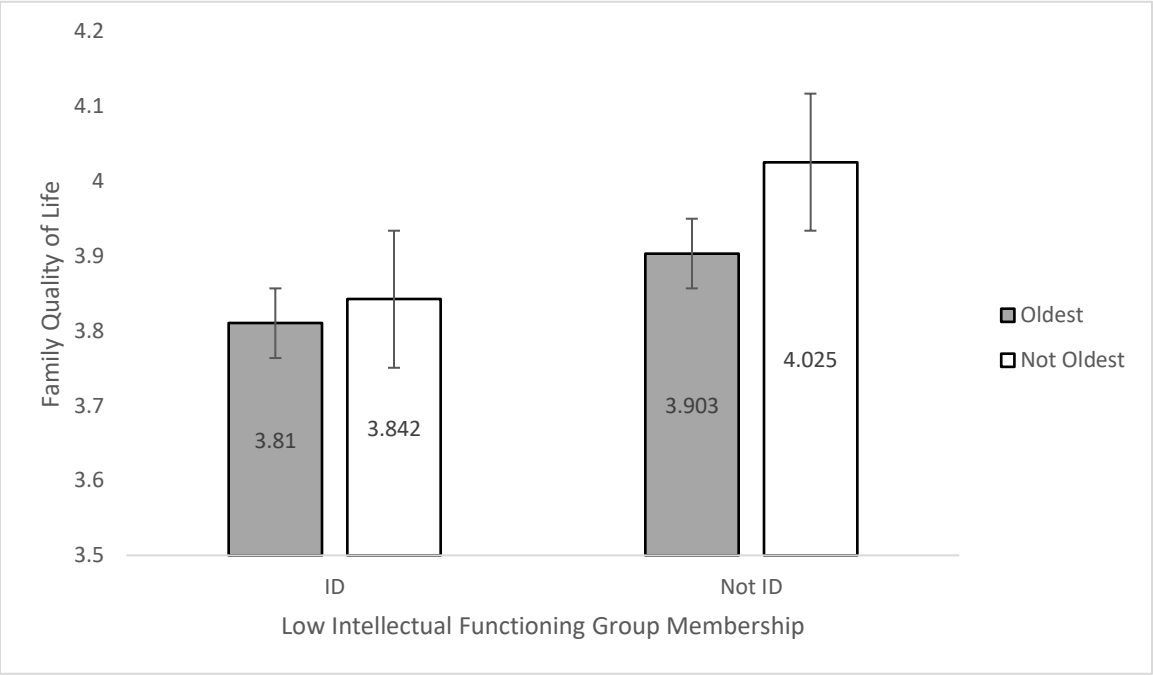
Estimated Marginal Means of Parenting Stress by Birth Order and ADHD Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 7

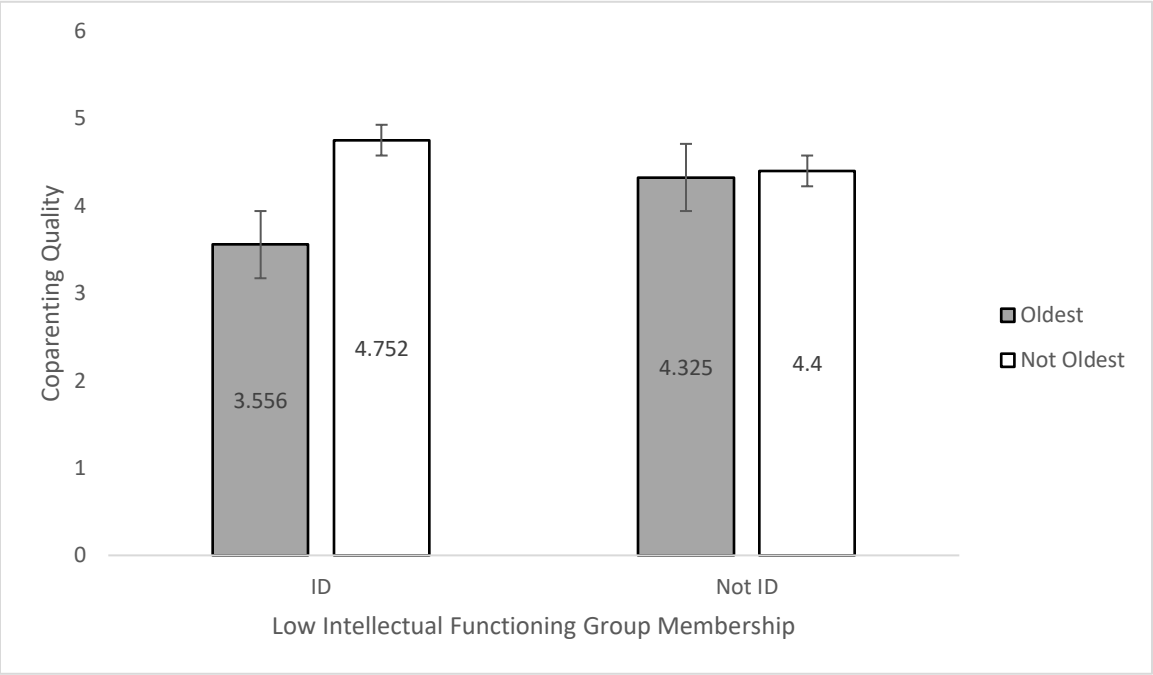
Estimated Marginal Means of Family Quality of Life by Birth Order and Low Intellectual Functioning Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 8

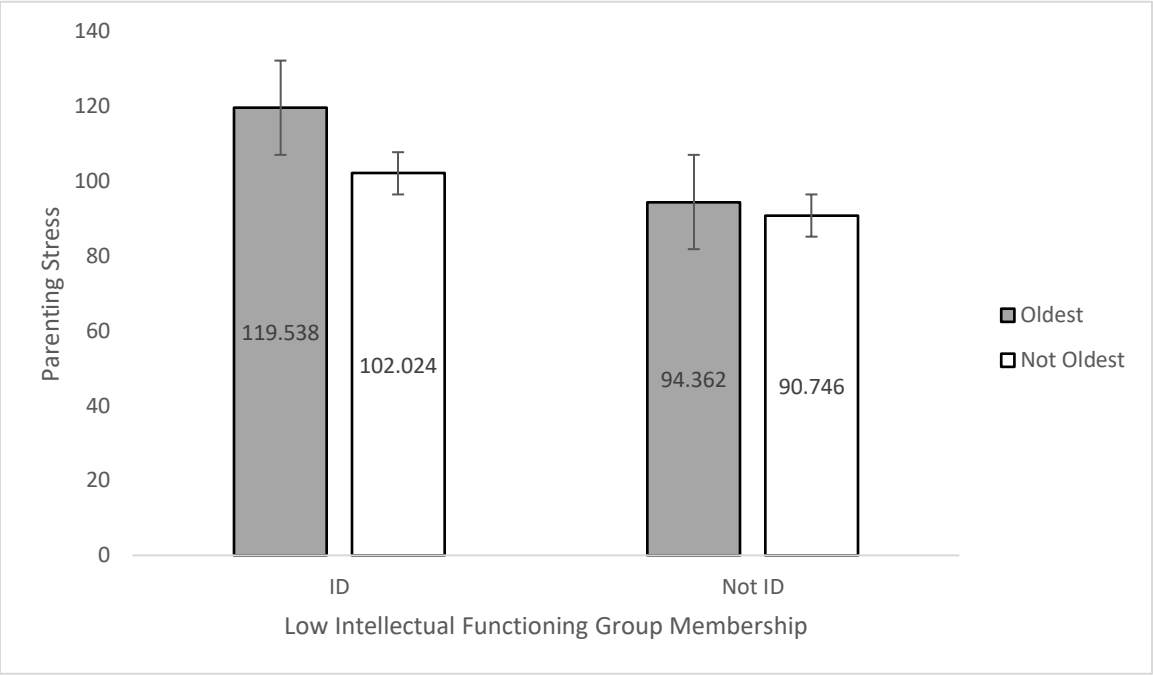
Estimated Marginal Means of Coparenting Quality by Birth Order and Low Intellectual Functioning Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 9

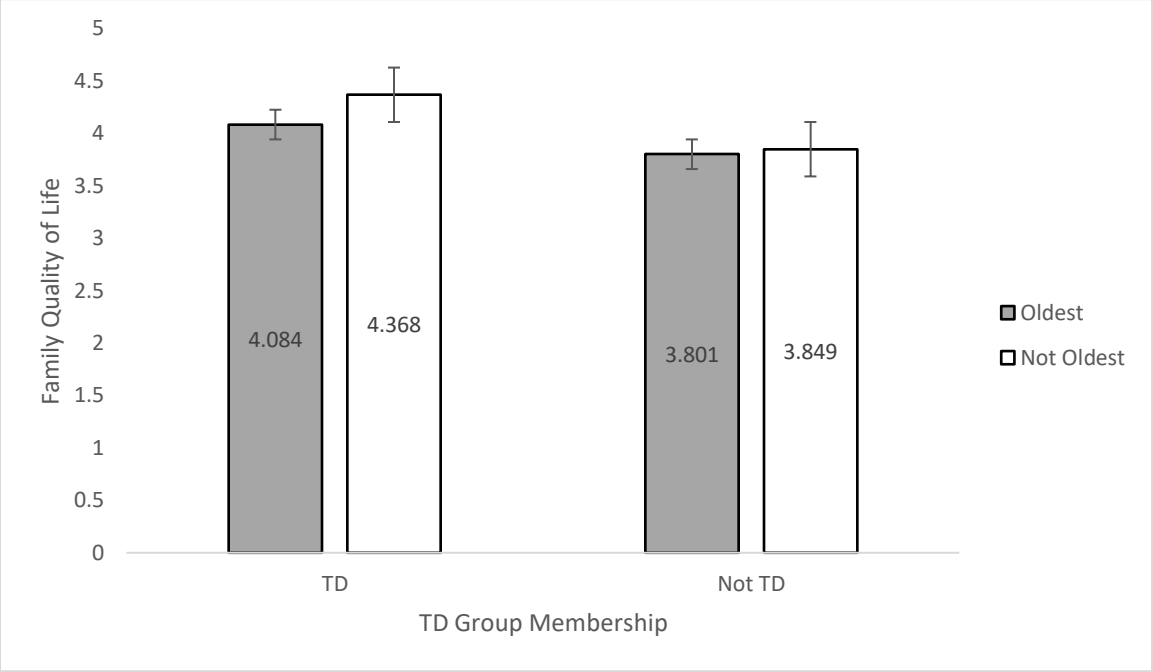
Estimated Marginal Means of Parenting Stress by Birth Order and Low Intellectual Functioning Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 10

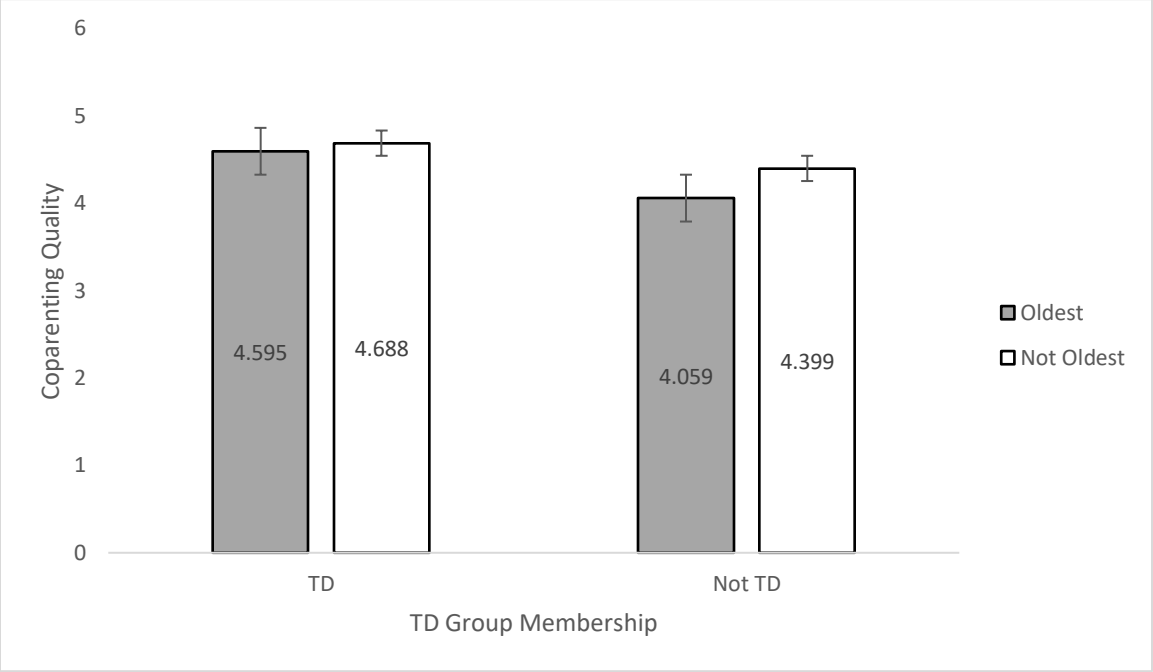
Estimated Marginal Means of Family Quality of Life by Birth Order and Having a TD Child



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 11

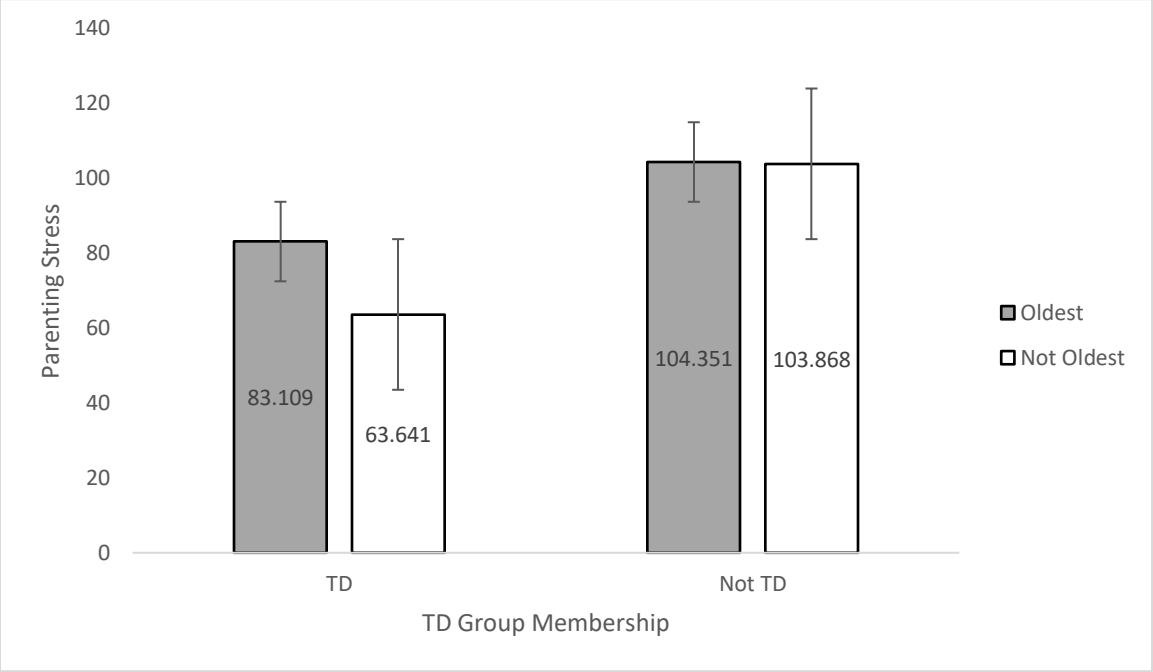
Estimated Marginal Means of Coparenting Quality by Birth Order and Having a TD Child



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 12

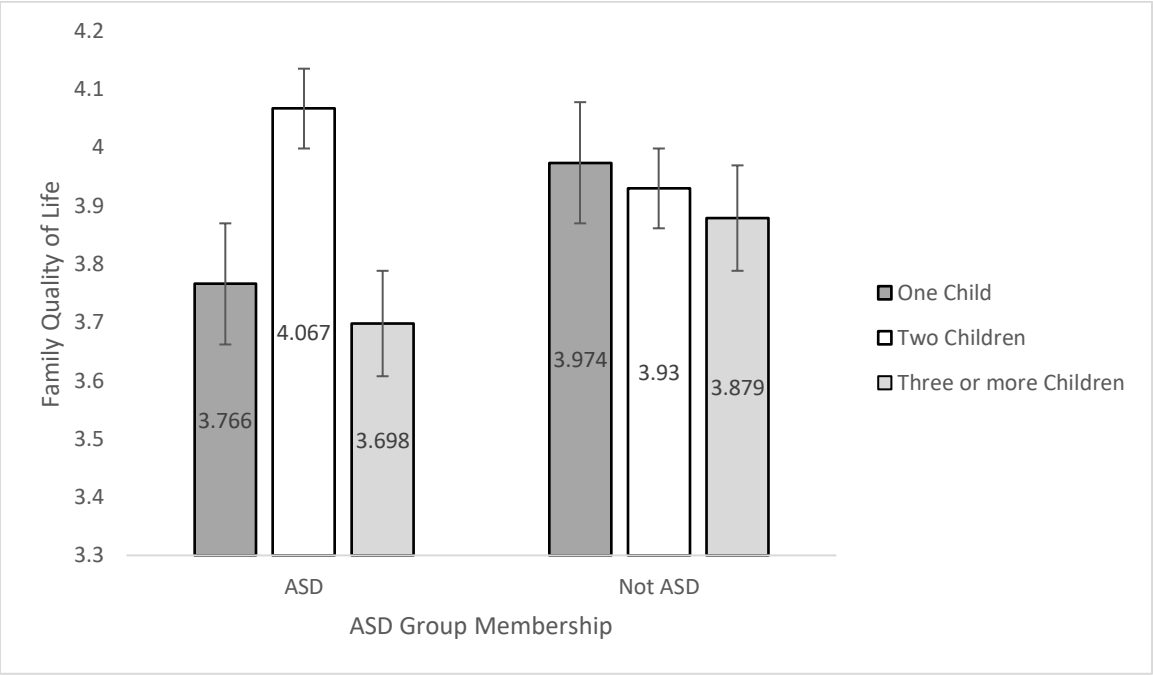
Estimated Marginal Means of Parenting Stress by Birth Order and Having a TD Child



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 13

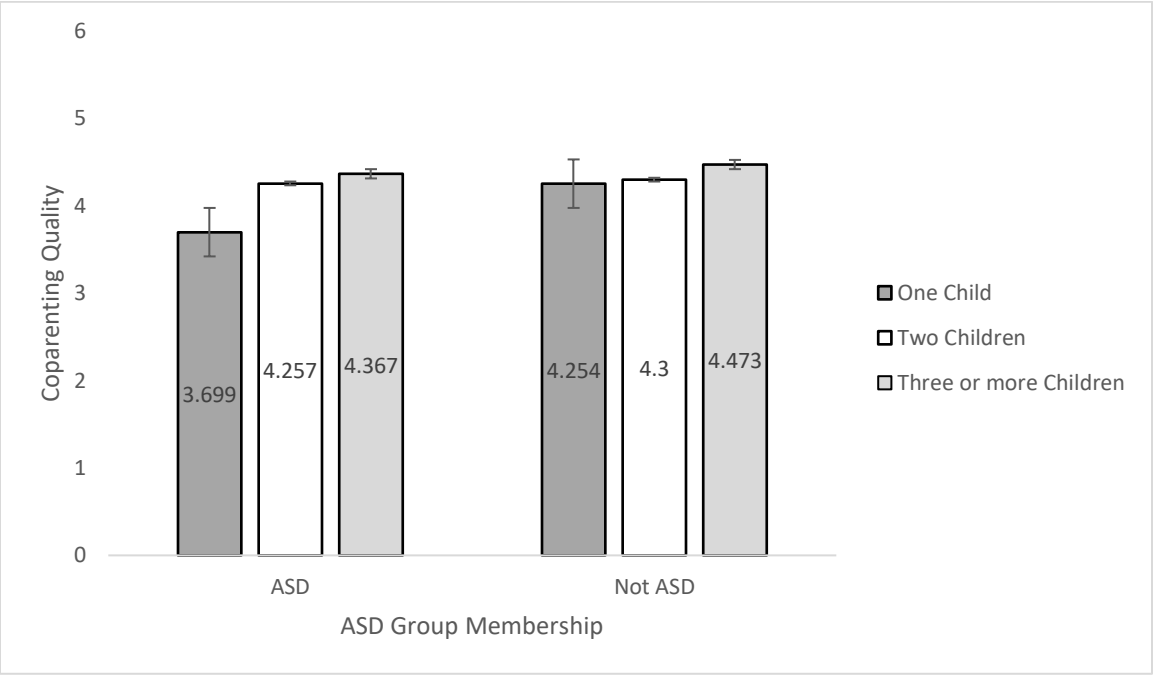
Estimated Marginal Means of Family Quality of Life by Number of Children and ASD Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 14

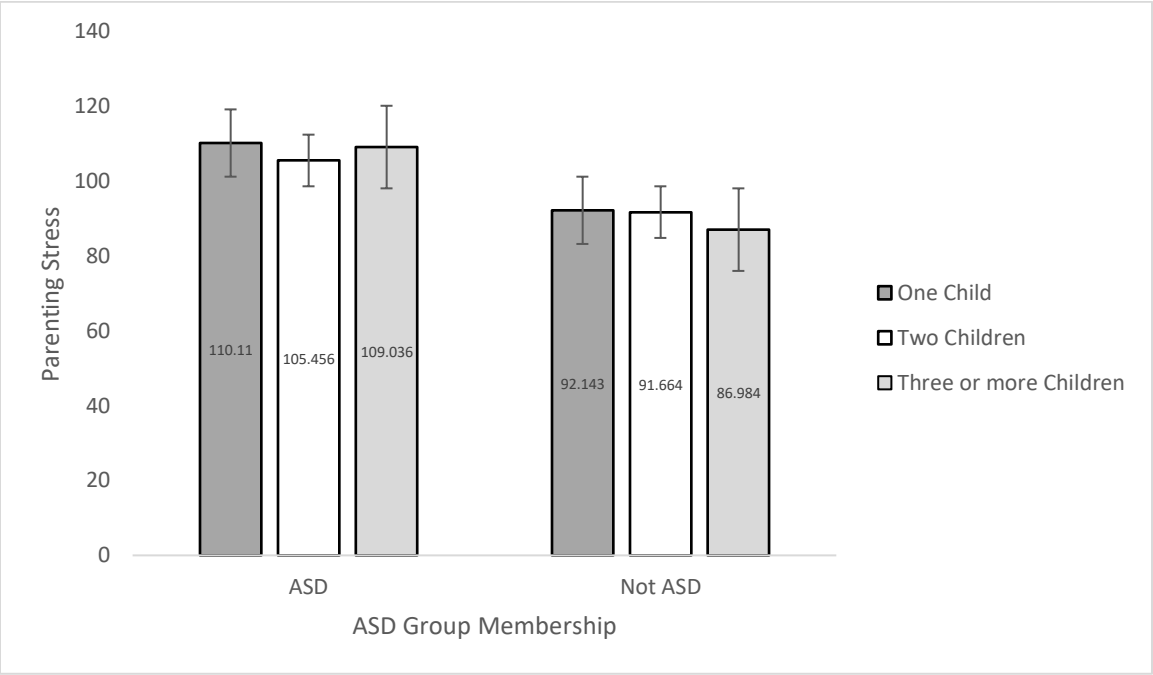
Estimated Marginal Means of Coparenting Quality by Number of Children and Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 15

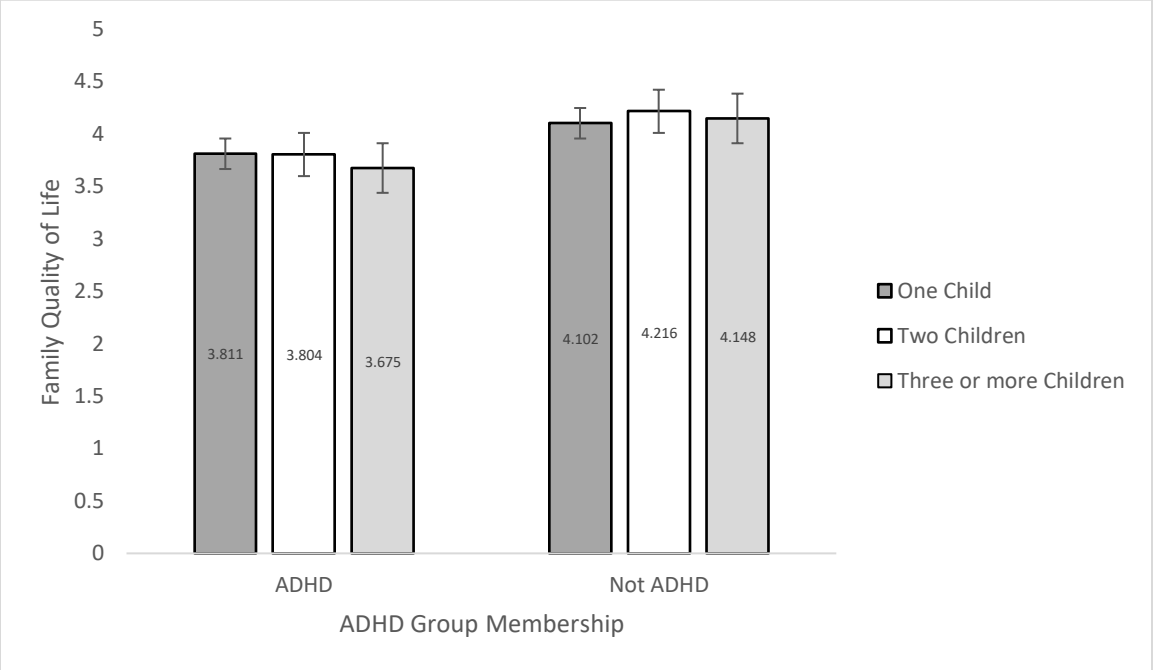
Estimated Marginal Means of Parenting Stress by Number of Children and ASD Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 16

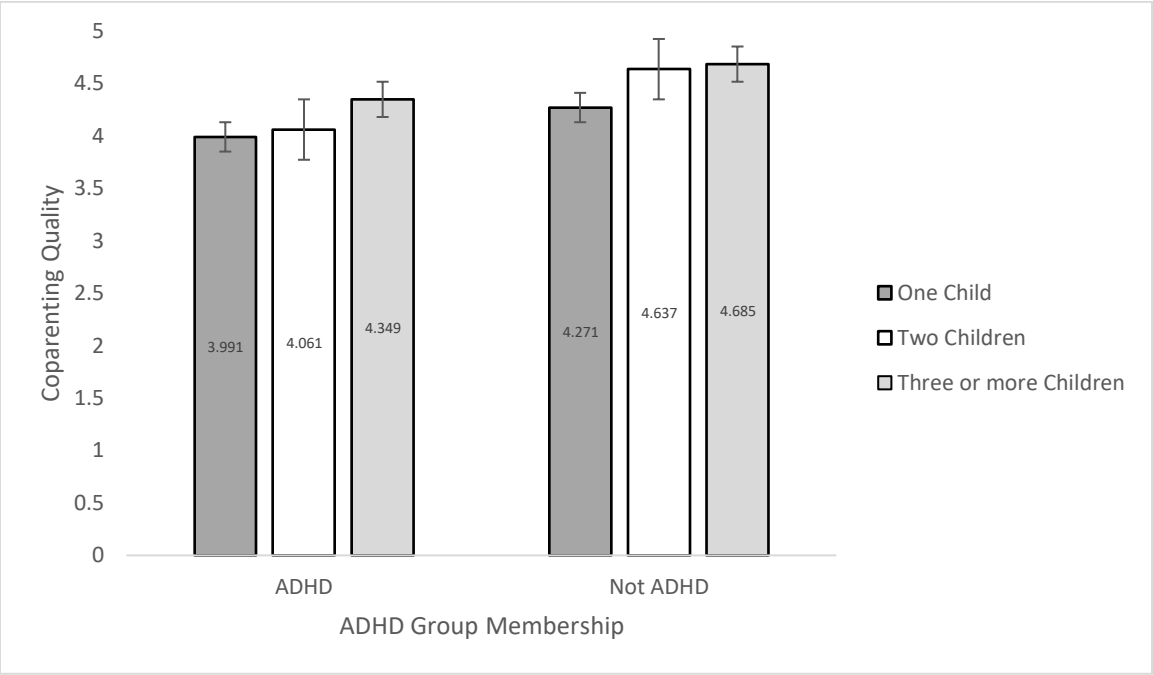
Estimated Marginal Means of Family Quality of Life by Number of Children and ADHD Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 17

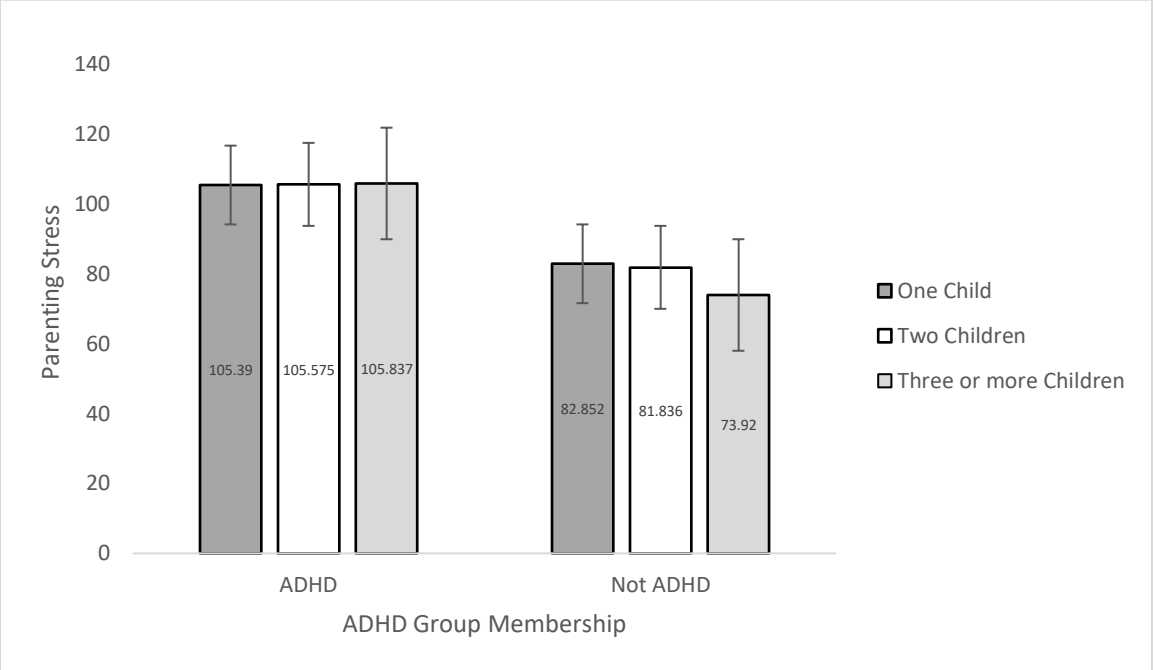
Estimated Marginal Means of Coparenting Quality by Number of Children and ADHD Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 18

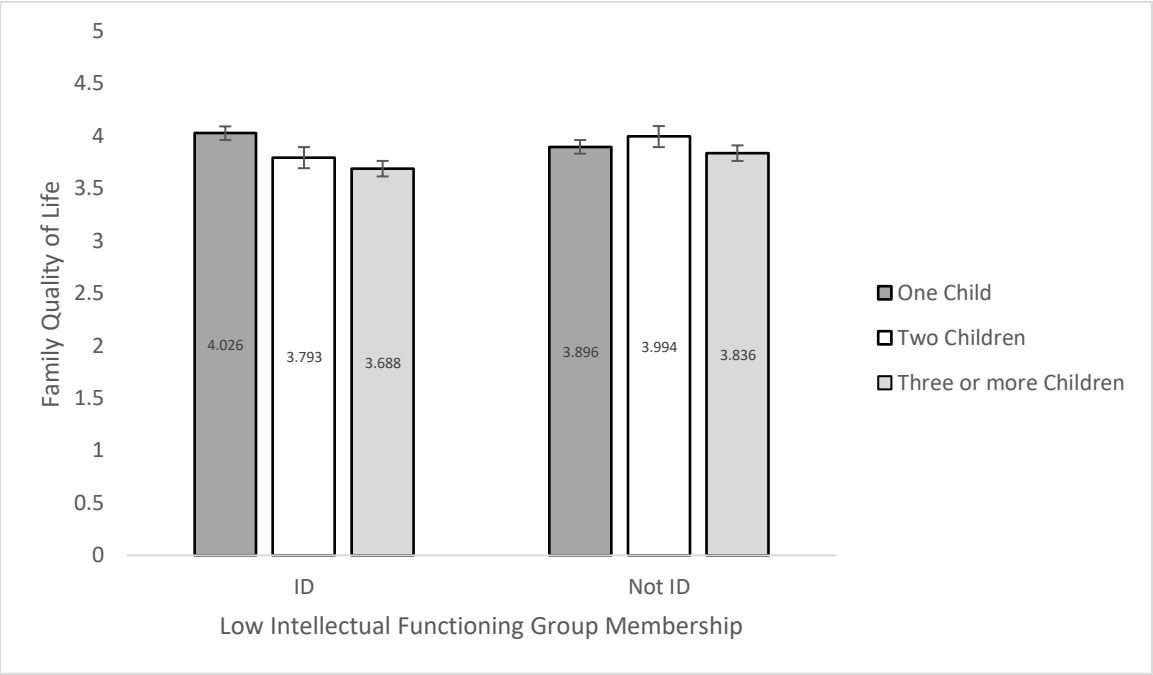
Estimated Marginal Means of Parenting Stress by Number of Children and ADHD Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 19

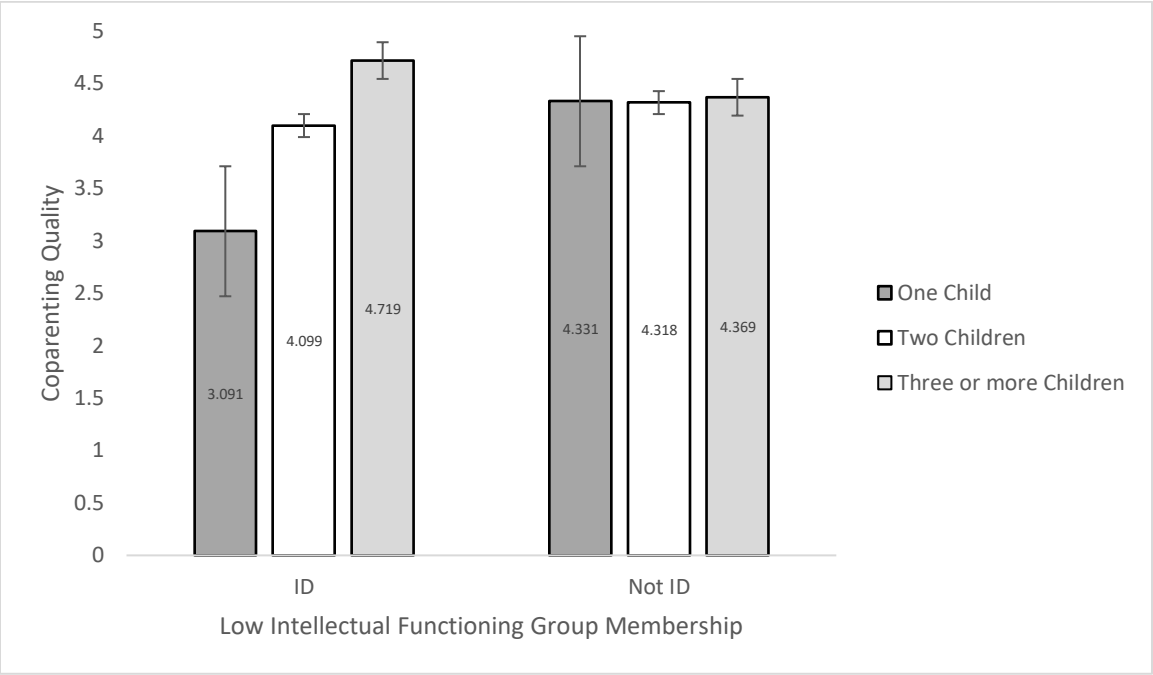
Estimated Marginal Means of Family Quality of Life by Number of Children and Low Intellectual Functioning Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 20

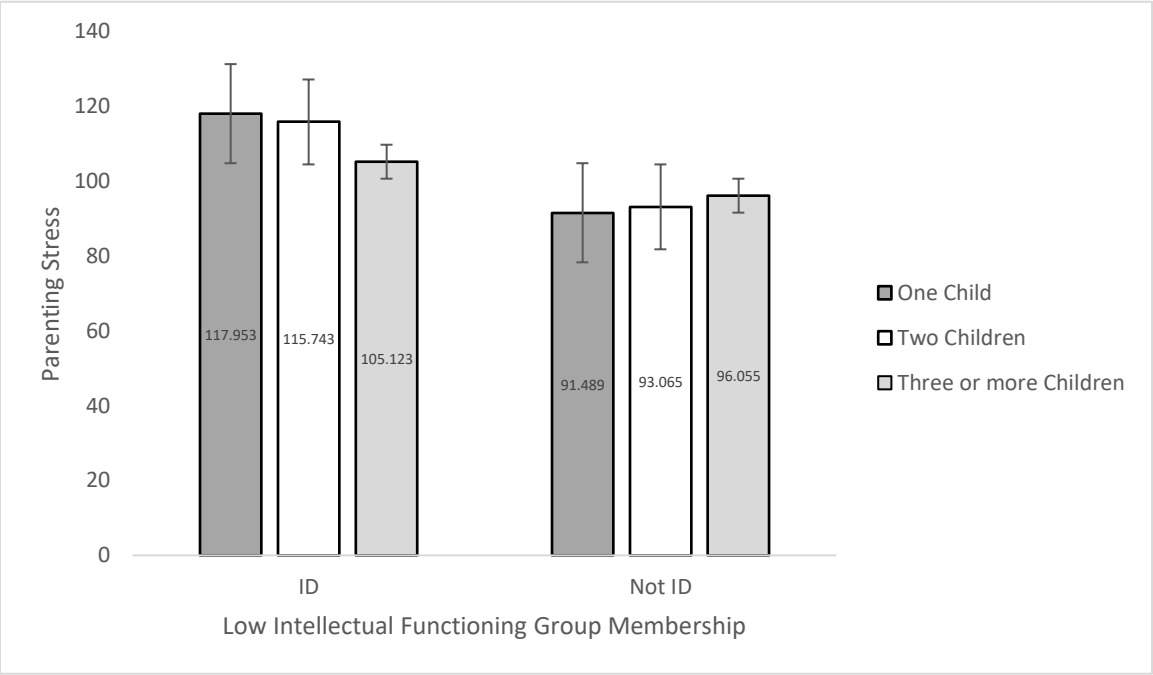
Estimated Marginal Means of Coparenting Quality by Number of Children Low Intellectual Functioning Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 21

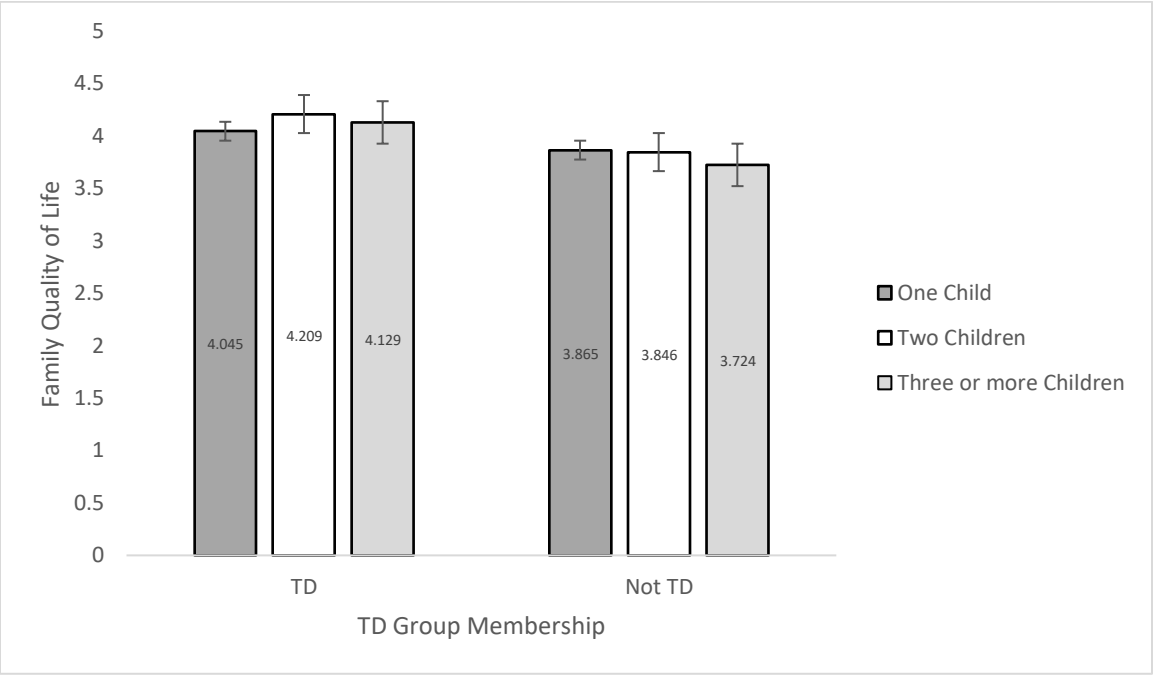
Estimated Marginal Means of Parenting Stress by Number of Children and Low Intellectual Functioning Group Membership



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 22

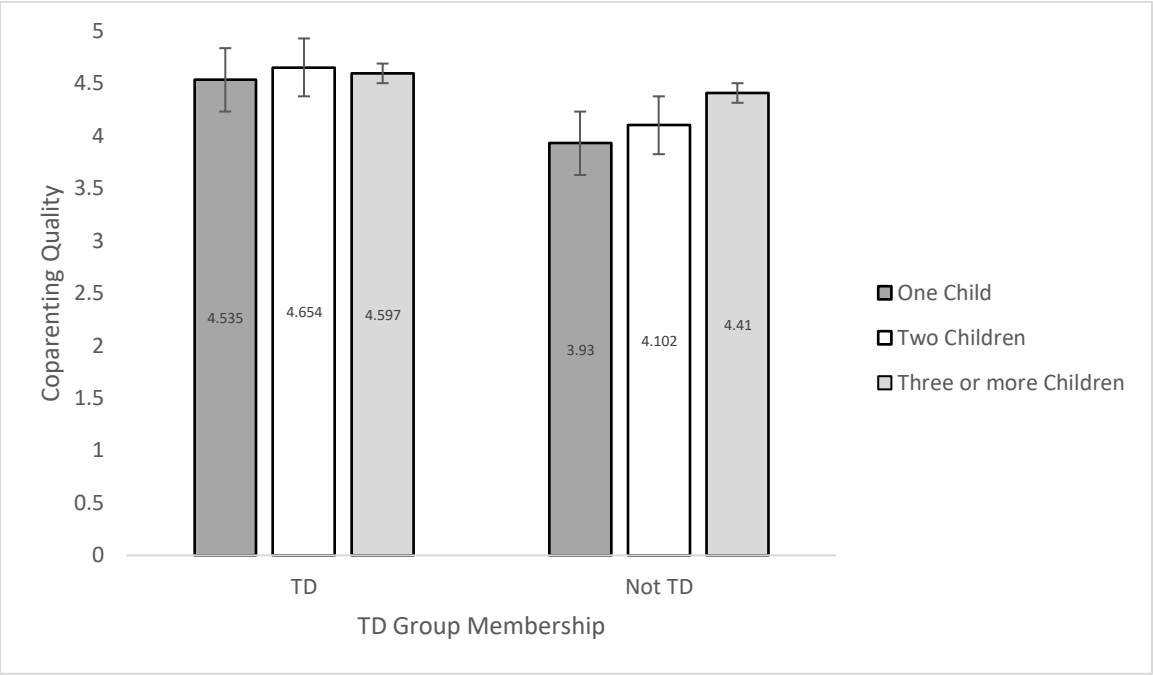
Estimated Marginal Means of Family Quality of Life by Number of Children and Having a TD Child



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 23

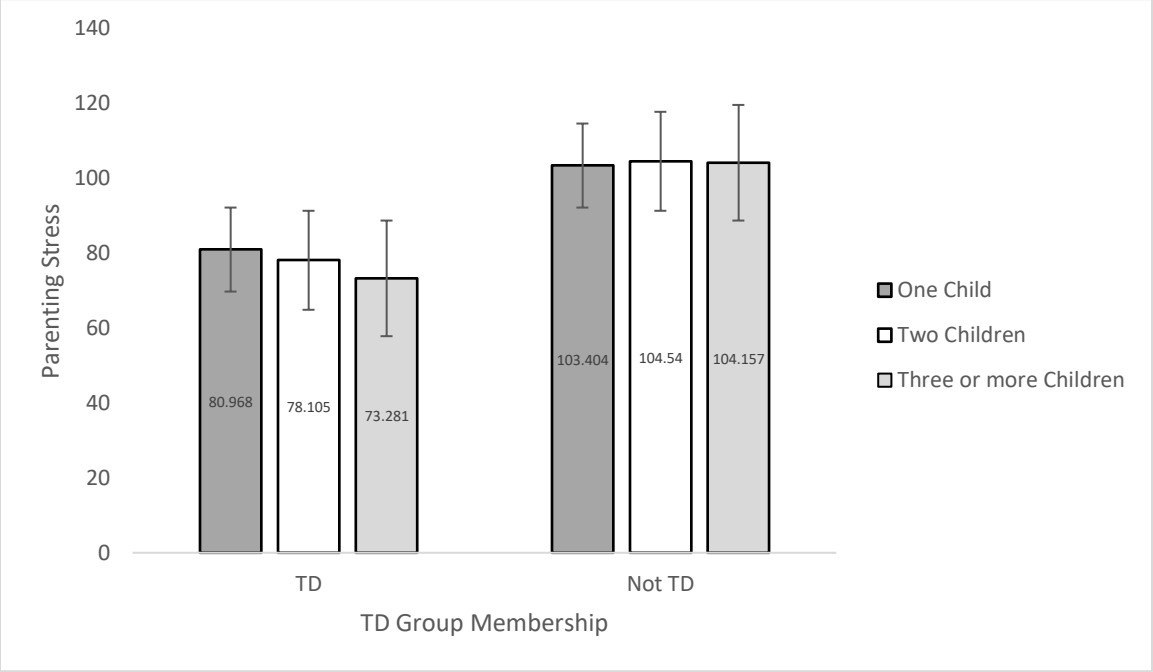
Estimated Marginal Means of Coparenting Quality by Number of Children and Having a TD Child



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 24

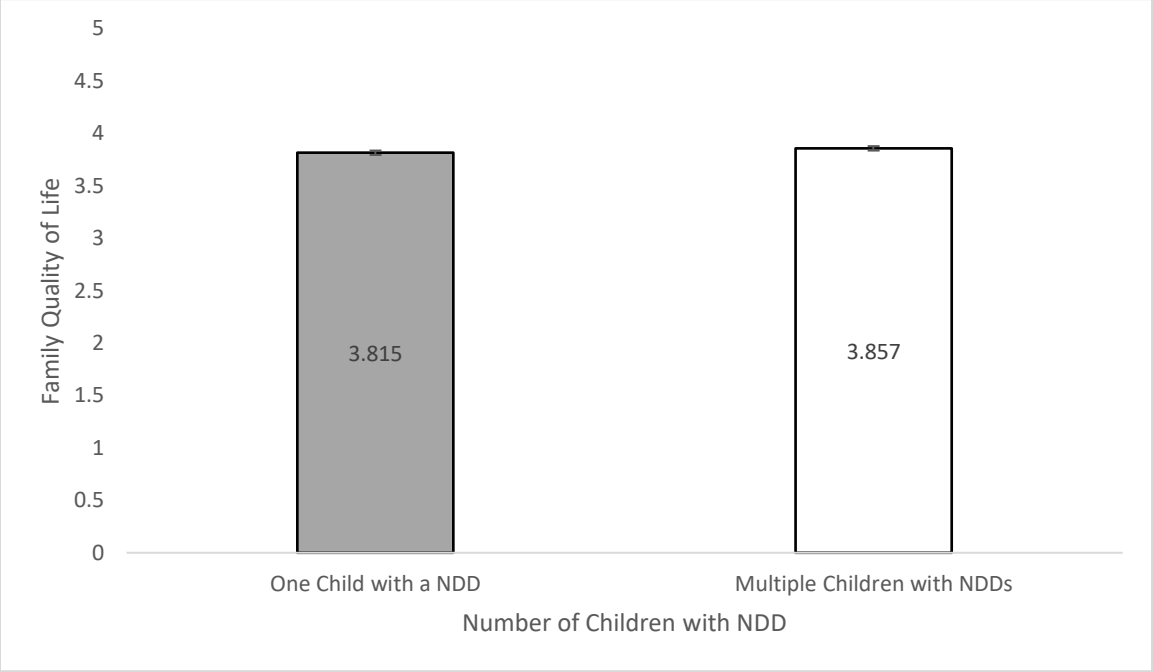
Estimated Marginal Means of Parenting Stress by Number of Children and Having a TD Child



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 25

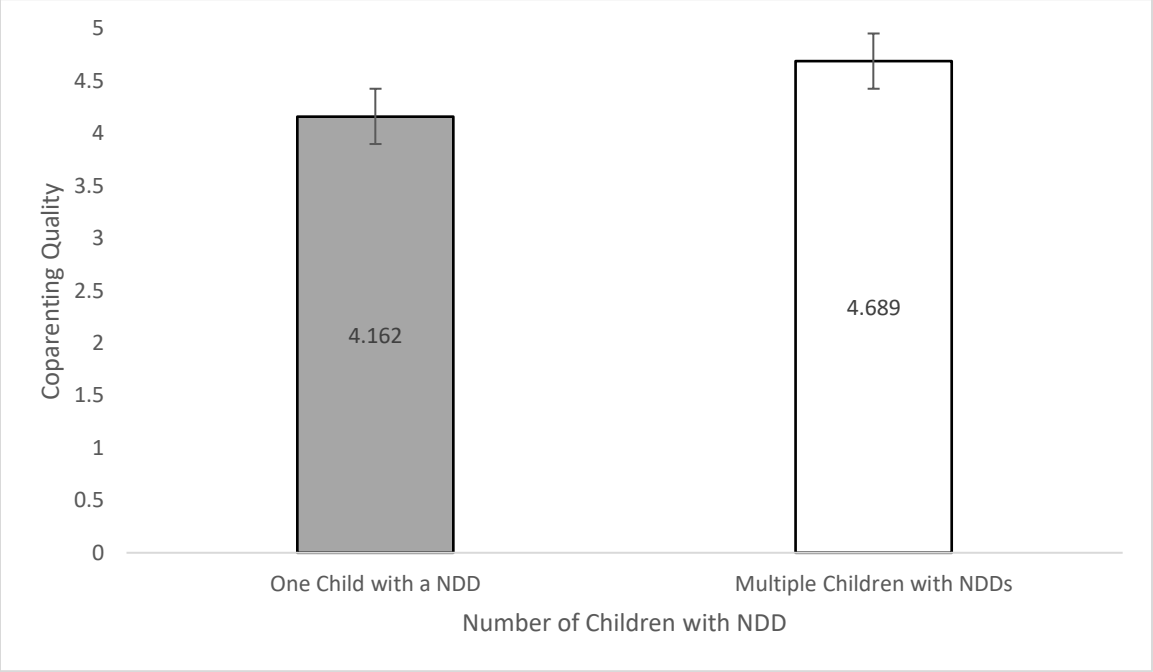
Estimated Marginal Means of Family Quality of Life by Number of Children with a NDD



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 26

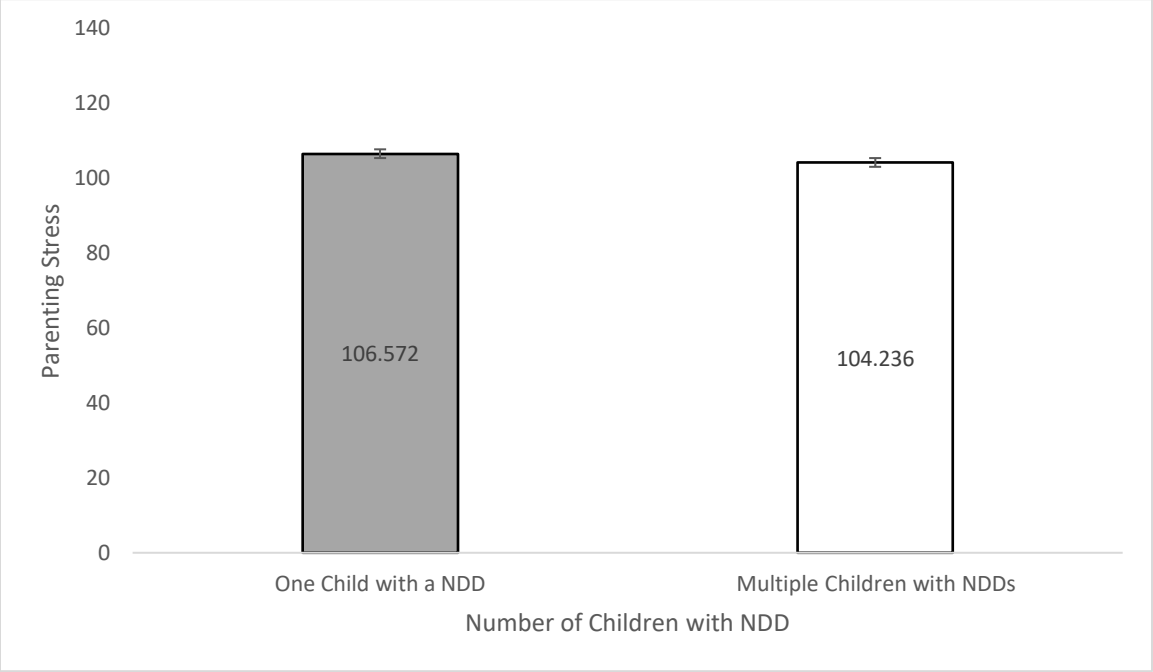
Estimated Marginal Means of Coparenting Quality by Number of Children with a NDD



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Figure 27

Estimated Marginal Means of Parenting Stress by Number of Children with a NDD



Note. Analyses only controlled for maternal ASD/ADHD diagnoses. Error bars show standard error.

Appendix A

A total of 8 additional projects are utilizing the FEND dataset, this includes two dissertations, three master's theses, and three honours theses. The first dissertation examined how child age is linked to family quality of life and parenting stress, as well as examined child age as a moderator. This study used a sample of families of TD children and children with ASD. The second dissertation examined the relationship between coparenting quality and family quality life in families of children with ASD, ADHD, co-occuring ASD and ADHD, as well as TD children. This study also examined child diagnosis as a moderator variable.

The first master's thesis examined partner status, social support and depressive symptoms as predictors of family quality life in mothers and fathers of children with ADHD. The second master's thesis examined depressive symptoms as a mediator of the relationship between social support, coparenting quality and parenting stress in fathers of TD children. The third master's thesis examined how child ADHD diagnosis is related to child internalizing/externalizing symptoms as well as parenting stress.

The first being my honours thesis that examined maternal depressive symptoms as a predictor of coparenting quality in families of children with ASD, ADHD, co-occuring ASD and ADHD, and TD children. The second honours thesis examined social support as a mediator of the relationship between ASD/ADHD symptomology and parenting stress. The third honours thesis examined child conduct problems and ADHD symptomology as a mediator of the relationship between paternal depressive symptoms and parenting stress.

Lastly, additional measures were included in FEND but were not included in the current study. These measures consist of the Center for Epidemiologic Studies Depression Scale (Radloff, 1977), the Strength and Difficulties Questionnaire (Goodman, 1977), and the Multidimensional Scale of Percieved Social Support (Zimet, et al., 1988).

Appendix B

Research Opportunity:

Researchers at the University of Manitoba are looking for

Caregivers of children with ASD and/or ADHD 2-18 years old

What is the Study About?

The purpose of this study is to learn about the strengths of families of children with autism spectrum disorder (ASD) and/or attention-deficit/hyperactivity disorder (ADHD), as well as their parenting and family needs. If you decide to participate, you will be asked to complete a survey on parenting, your family, your child's development and characteristics, and your own wellbeing.

Why Participate?

By taking part in this study, your contribution will help to improve the lives of families with a child with ASD and/or ADHD 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 or scan our QR code to open a new browser
- This will lead you to a website where you will be asked to enter your email
- An automatic email will be sent to you with the survey link
- The survey will take 30-45 minutes to complete

https://survey.pra.ca/S2/1/UM202223Reg/

SCAN ME

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

This research has been approved by the Research Ethics Board at the University of Manitoba, Fort Garry campus. If you have any concerns or complaints about this project, you may contact any of the above-named persons or the Human Ethics Officer at 204-474-7122 or HumanEthics@umanitoba.ca.
This document is available in alternative formats upon request.

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

University of Manitoba

fdpl.ca FAMILY AND DEVELOPMENTAL PSYCHOPATHOLOGY LAB

Research Opportunity:

Researchers at the University of Manitoba are looking for

Caregivers of children 2-18 years old

What is the Study About?

The purpose of this study is to learn about the strengths and parenting experiences of families. If you decide to participate, you will be asked to complete a survey on parenting, your family, your child's development and characteristics, and your own wellbeing.

Why Participate?

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

To Participate in this Study:

- Click on the link below or scan our QR code to open a new browser
- This will lead you to a website where you will be asked to enter your email
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This document is available in alternative formats upon request.

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

University of Manitoba

fdpl.ca FAMILY AND DEVELOPMENTAL PSYCHOPATHOLOGY LAB

Appendix C

Consent Form

Dr. Jen Theule, Associate Professor
University of Manitoba, Department of Psychology Email: Jen.Theule@umanitoba.ca

This consent form, a copy of which will be left with you 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.

Who you will be working with:

This study is being conducted by Dr. Jen Theule, along with graduate students Karis Cochrane, Dana Ronaghan, Alyssa Romaniuk, Lara Penner-Goeke, and Emily Hogan, and undergraduate students Taryn Gaulke, and Cari Slayen. If you have questions about the survey at any time, you may email Dr. Jen Theule at Jen.Theule@umanitoba.ca.

What we are trying to do:

The purpose of this study is to gain insight into the parenting experiences of parents of children from a variety of populations.

You can help if:

You are a parent of a child (or children) between the ages of 2 and 18 ***with or without*** an Autism Spectrum or Attention Deficit Hyperactivity Disorder diagnosis.

How you can help:

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.

Benefits of helping:
For helping with this study, you are **eligible to receive a summary of the results by entering your email**. Your email address will not be linked to your responses to the survey. Email addresses will be maintained by the research team and will be destroyed after the draw. Results will be sent out approximately in July of 2023.

Indirect benefits of helping:

By helping with this study, you may benefit indirectly from programs, policies, and services that may be informed by this research.

Risks of participating:

There are no known disadvantages or risks in taking part in the study. However, it is possible that some questions may bring up unpleasant feelings or uncomfortable emotions. In any case, you can refuse to answer any question, or end the survey.

Compensation:
To thank you for your time, you will have the opportunity to be entered in a **draw for one of ten $50 Amazon eGift Cards**. After completing the survey, a link will be available in a new web browser where you may provide your email address for each of these opportunities. The draw will be made in November of 2023. Email addresses will be maintained by the research team and will be destroyed after the draw.

What you need to know:

- Participation in this study is voluntary.
- You may complete the survey all at once or save your responses and come back to

  complete the survey at any time.

- The database containing anonymized study data will be stored for an indefinite

  period, as the study data may be useful for future analyses.

- You will be invited to share this survey with your parenting partner/coparent to

  complete the survey as well. If you choose to share the survey with your parenting partner/coparent, you will be asked to enter their email address. That email address will be used to link you and your parenting partner/coparent's responses.

- This study will not request your or your family members' names. Instead, your survey will be coded with a number to increase confidentiality.

- When presenting our findings, your responses will not be identifiable; in most cases, the results from all participants will be grouped. As an exception, we may report quotes from some open-ended questions. These quotes will be anonymized and untraceable to the participant.
- The survey is being made by Prairie Research Associates. Responses will be protected and safely kept within Prairie Research Associate's encrypted server which is password protected.
- Survey data will be stored for an indefinite period. This data will be stored indefinitely because we cannot anticipate all possible future analyses that might be theoretically or practically useful.
- The results of this research study may be presented through various outlets, such as conferences, master and doctoral presentations, and academic journals.
- There will be an option at the end of the survey asking if you would to be contacted for potential research opportunities in the future. 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. Email addresses will only be accessed by the research team when future studies are recruiting. These email addresses will be protected and separated from your responses on the survey. Once emails are sent out regarding future studies, they will be destroyed. This is optional and you do not have to provide your email address for future research opportunities if this is not of interest to you.
- 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.

- You will be asked at the end of your survey whether you would like your responses to be used in our study. You will still be able to enter the draw if you decide to withdraw your responses.
- Partial data refers to any responses provided and collected before leaving or completing the entire survey. Please note that in our experience, many people do not complete the survey in its entirety, and partial data is the majority of our responses. If you consent to participate, all responses you provide will be used, even if you exit the survey at any time. Once submitted, responses cannot be withdrawn as we will not be able to link your data to do so.

  Please indicate if you agree for partial data to be used:

  □Yes □No

  Some data and information from this study may be sent outside of the University of Manitoba to other researchers, organizations, or made publicly available. This is for further analysis, testing, as part of the research study, or a requirement by a granting agency or journal. Any information sent out of the University of Manitoba will not show your name or address, or any other identifiable personal information about you. However, despite efforts to keep your personal

information confidential, absolute confidentiality cannot be guaranteed. Your personal information may be disclosed if required by law.

Clicking "**I agree to participate in this research study**" indicates that you have understood to your satisfaction the information regarding participation in the research project and agree 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 the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. 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.

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

This research has been approved by the Research Ethics Board at the University of Manitoba, Fort Garry campus. If you have any concerns or complaints about this project, you may contact any of the above-named persons or the Human Ethics Officer at 204-474- 7122 or HumanEthics@umanitoba.ca. **Please screenshot the screen for a copy of this consent form to keep for your records and reference.**

Appendix D

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

i) If checked: Do you identify as a father? Yes/No

❍ Female

i) If checked: Do you identify as a mother? Yes/No

❍ Non-Binary

i) If checked: Do you identify as a father? Yes/No; Do you identify as a mother? Yes/No

❍ I do not identify with the genders listed above
i) If checked: Do you identify as a father? Yes/No; Do you identify as a mother? Yes/No
❍ I prefer not to answer

Q2 What is your age? _____ **** If under 18, survey ends.

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 is the highest level of education that you have received?
(Post-secondary education includes trade training, College, University Certificate, Diploma, and University degree)

- ❍ Less than high school
- ❍ High school
- ❍ Some post-secondary education
- ❍ Completed post-secondary education

Q6 What country do you currently live in?

- ❍ Canada
- ❍ United States
- ❍ Other (please specify) ___

Q7 (If Canadian) What ethnicity do you identify with?

- ❍ Asian
- ❍ Black
- ❍ LatinX
- ❍ First Nations
- ❍ Inuit
- ❍ Métis
- ❍ White
- ❍ Other (please specify) _____

Q7 (If United States) What ethnicity do you identify with?

- ❍ Asian
- ❍ Black
- ❍ LatinX
- ❍ American Indian or Alaska Native
- ❍ Native Hawaiian or other Pacific Islander

❍ White
❍ Other (please specify) _____

Q8 What state, province, or territory do you currently live in (please specify)? Please specify: _____

Q9 How did you hear about this survey?
❍ Social Media (e.g., Facebook, Twitter) (please specify) _____

❍ Webpage Posting (please specify) _____
❍ ASD Service Organization (please specify) _____
❍ ADHD 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:

Q10 Have you ever received a diagnosis of autism spectrum disorder (or Asperger's Disorder, Autistic Disorder, Pervasive Developmental Disorder Not Otherwise Specified)?

❍ Yes ❍ No

Q11 What autism spectrum diagnosis have you received? Please specify: _____

Q12 Who did you receive this diagnosis from?

❍ Family physician
❍ Paediatrician
❍ Psychiatrist

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

Q13 At what age were you diagnosed with ASD? Please specify: _____

Q14 Have you ever received a diagnosis of attention-deficit/hyperactivity disorder (or attention-deficit disorder)?

❍ Yes ❍ No

Q15 Who did you receive this diagnosis from? ❍ Family physician
❍ Paediatrician
❍ Psychiatrist

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

Q16 At what age were you diagnosed with ADHD/ADD? Please specify _____

Child Demographics

Q17 How many children do you have?

❍1

❍2

❍3

❍4

❍5

❍>5

Q18 Do you have a child between 2 and 18 years of age?

❍ Yes

❍ No

Q19 How old is your child between 2and 18 years of age? (if more than one child in this age range, please check multiple)

❍2

❍3

❍4

❍5

❍6

❍7

❍8

❍9

❍10

❍11

❍12

❍13

❍14

❍15

❍16

❍17

❍18

Q20 Do you have a child (aged 2-18) who has been diagnosed with autism spectrum disorder (or Asperger's Disorder, Autistic Disorder, Pervasive Developmental Disorder Not Otherwise Specified)?

❍ Yes

❍ No

Q21 How many of your children (age 2-18) have been diagnosed with autism spectrum disorder?

❍1

❍2

❍3

❍4

❍>4

Q22 Do you have a child (aged 2-18) who has been diagnosed with attention-deficit/hyperactivity disorder (ADHD or ADD)?

❍ Yes ❍ No

Q23 How many of your children (age 2-18) have been diagnosed with ADHD or ADD?

❍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 formatting and branching. The following guidelines will be used:

1. a) Child aged 2-18 (in families with no children with ASD or ADHD) **OR** *oldest* child age 2-18 (in families with no children with ASD or ADHD)
2. b) Child with ASD aged 2-18 (in families with one child with ASD) **OR** *oldest* child with ASD aged 2-18 (in families with more than one child with ASD)
3. c) Child with ADHD aged 2-18 (in families with one child with ADHD) **OR** *oldest* child with ADHD aged 2-18 (in families with more than one child with ADHD)
4. d) Child with ASD and ADHD aged 2-18 (in families with one child with ASD and ADHD) **OR** *oldest* child with ASD and ADHD aged 2-18 (in families with more than one child with ASD and ADHD)

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

Q24 How many years old is _____? _____

Q25 What month was _____ born in? _____

Q26 What is your relationship to _____?

❍ Biological parent
❍ Adoptive parent
❍ Foster parent

❍ Step-parent

❍ Other (please specify) _____

If foster parent or step-parent, how long has _____ lived with you? _____ months

Q27 What is your custodial arrangement for _____?

❍ Primary caregiver
❍ Shared custody
❍ Non-custodial caregiver

Q28 How many days a week does _____ live with you?

❍1

❍2

❍3

❍4

❍5

❍6

❍7

Q29 Does _____ attend school?
If yes, what grade is _____ in now?
o Pre-Kindergarten (including junior kindergarten, nursery)

o Kindergarten
o Grade 1
o Grade 2
o Grande 3
o Grade 4
o Grade 5
o Grade 6
o Grade 7
o Grade 8
o Grade 9
o Grade 10
o Grade 11
o Grade 12
o Other

Q30 Is there another person in your family who you share the responsibilities of parenting _____ with (i.e., a coparent)?

❍ Yes ❍ No

Q31 What is the relationship of your parenting partner/coparent to _____?

❍ Biological mother
❍ Biological father
❍ Adoptive mother

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

Q32 How much of the time does your parenting partner/coparent live with you and _____?
❍ Less than 50% of the time
❍ 50% of the time
❍ Between 50% and 100% of the time

❍ 100% of the time

Q33 Who diagnosed _____ with autism spectrum disorder?

❍ Family physician
❍ Paediatrician
❍ Psychiatrist

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

Q34 How old was _____ when he/she was diagnosed with autism spectrum disorder? Please specify_____

Q35 Has _____ received any interventions for their ASD symptoms?

❍ Yes

❍ No

Q36 Please describe the type of intervention _____ has been receiving?

Q37 How long has _____ received this intervention for? _____ years _____ months

Q38 Who diagnosed _____ with attention-deficit/hyperactivity disorder (ADHD or ADD)?

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

Q39 How old was _____ when he/she was diagnosed with attention-deficit/hyperactivity disorder (ADHD or ADD)?

Please specify_____

Q40 Has _____ received any interventions for their ADHD symptoms? If yes, select which:

- ❍ Medications
- ❍ Psychosocial interventions
- ❍ Both

Q41 Please describe the type of psychosocial intervention _____ has been receiving? Q42 How long has _____ received this intervention for? _____ years _____ months

Q43 Has _____ been **prescribed** any medication for their ADHD symptoms? Please select which medication _____ has been **prescribed:** (Brand name/Drug name)

- ❍ Adderall/ Dextroamphetamine and amphetamine
- ❍ Biphentin/Methylphenidate
- ❍ Concerta/Methylphenidate
- ❍ Dexedrine/Dextroamphetamine
- ❍ Focalin/Dexmethylphenidate
- ❍ Intuniv/Guanfacine
- ❍ Ritalin/ Methylphenidate
- ❍ Strattera/Atomoxetine
- ❍ Vyvanse/Lisdexamfetamine dimesylate

❍ Zenzedi/ Dextroamphetamine

Q44 Which medication has _____ been **taking** for their ADHD symptoms? (Brand name/Drug name)

❍ Adderall/ Dextroamphetamine and amphetamine

❍ Biphentin/Methylphenidate
❍ Concerta/Methylphenidate
❍ Dexedrine/Dextroamphetamine

❍ Focalin/Dexmethylphenidate

❍ Intuniv/Guanfacine

❍ Ritalin/ Methylphenidate
❍ Strattera/Atomoxetine
❍ Vyvanse/Lisdexamfetamine dimesylate

❍ Zenzedi/ Dextroamphetamine

Q45 How long has _____ taken this medication for? _____ years _____ months

Q46 Has _____ been diagnosed with an intellectual disability (and/or ID, developmental delay, global developmental delay, mental retardation, cognitive disability)?

❍ Yes ❍ No

Q47 Who diagnosed _____ with an intellectual disability?

❍ Family physician
❍ Paediatrician
❍ Psychiatrist

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

Q48 Has _____ been diagnosed with any of the following mental health or developmental conditions?

❍ Prenatal Alcohol Exposure/Fetal Alcohol Spectrum Disorder (FASD)/Fetal Alcohol Syndrome (FAS)

❍ Generalized Anxiety Disorder
❍ Panic disorder

- ❍ Social Anxiety Disorder
- ❍ Post-traumatic stress disorder
- ❍ Obsessive Compulsive Disorder (OCD)

- ❍ 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: _____

Q49. How has the coronavirus pandemic and associated public health changes to services in your community impacted you and your family?

- ○ Sliding scale from “Very negative” to “Very positive”

Qualitative Questions:

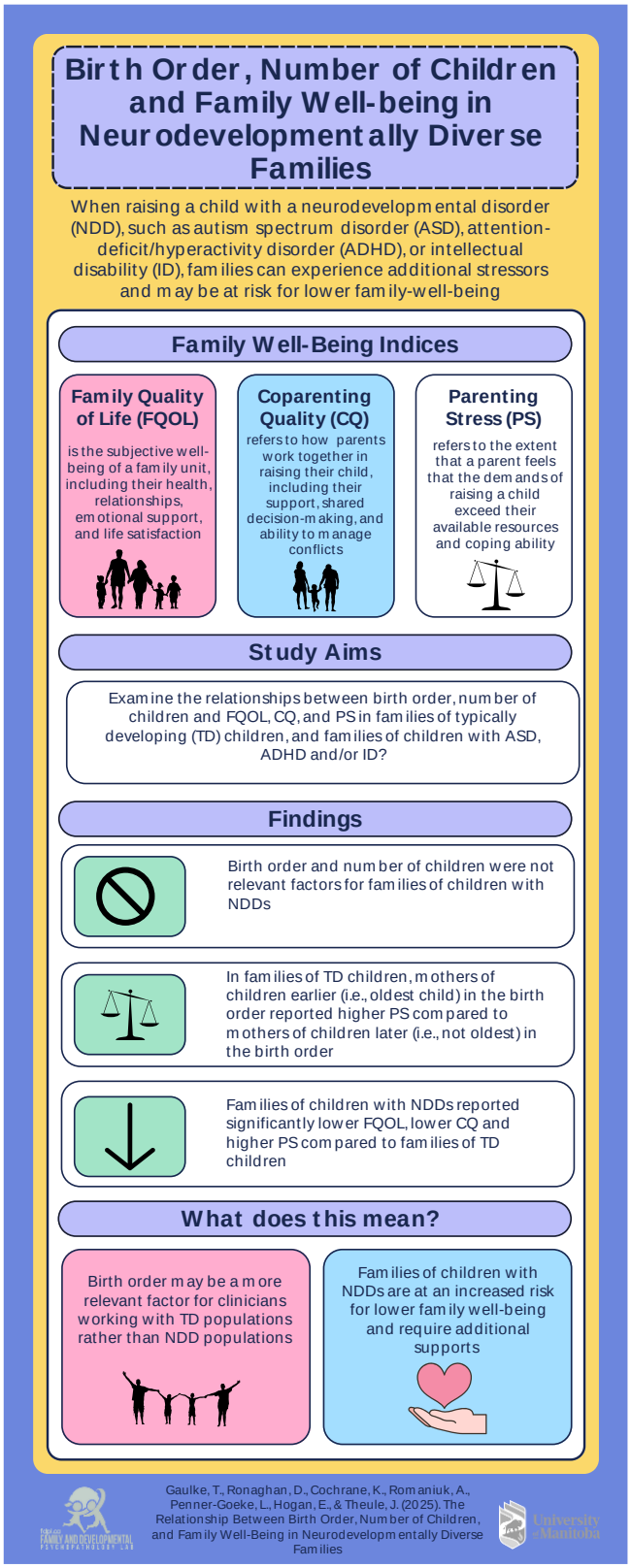
Q49. If you wish, please feel free to use the space below to report on any of your personal experiences with parenting.

Q50. Is there anything else you would like to add?

Appendix E

The first outlier was identified as a low score for FQOL (BC FQOL Total = 2.20), a low score for CQ (CRS Total = .06), and a high score for PS (PSI-4-SF Total = 164.00). The second outlier was identified as a high score for CQ (CRS Total = 8.83) and PS (PSI-4-SF Total 264.00), as well as had a BC FQOL Total score of 3.16. The third outlier was identified as a high score for PS (PSI-SF-4 Total = 196.00) and had a BC FQOL Total score of 4.36 and CRS Total score of 4.36. The fourth outlier was identified as a low score for FQOL (BC FQOL Total = 1.88), and had a CRS Total score of 1.03, and a PSI-SF-4 Total score of 140.00.

Appendix F


Birth Order, Number of Children and Family Well-being in Neurodevelopmentally Diverse Families
When raising a child with a neurodevelopmental disorder (NDD), such as autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD), or intellectual disability (ID), families can experience additional stressors and may be at risk for lower family-well-being
Family Well-Being Indices
Family Quality of Life (FQOL)
is the subjective well-being of a family unit, including their health, relationships, emotional support, and life satisfaction
Coparenting Quality (CQ)
refers to how parents work together in raising their child, including their support, shared decision-making, and ability to manage conflicts
Parenting Stress (PS)
refers to the extent that a parent feels that the demands of raising a child exceed their available resources and coping ability
Study Aims
Examine the relationships between birth order, number of children and FQOL, CQ, and PS in families of typically developing (TD) children, and families of children with ASD, ADHD and/or ID?
Findings
Birth order and number of children were not relevant factors for families of children with NDDs
In families of TD children, mothers of children earlier (i.e., oldest child) in the birth order reported higher PS compared to mothers of children later (i.e., not oldest) in the birth order
Families of children with NDDs reported significantly lower FQOL, lower CQ and higher PS compared to families of TD children
What does this mean?
Birth order may be a more relevant factor for clinicians working with TD populations rather than NDD populations
Families of children with NDDs are at an increased risk for lower family well-being and require additional supports
Gaulke, T., Ronaghan, D., Cochrane, K., Romaniuk, A., Penner-Goeke, L., Hogan, E., & Theule, J. (2025). The Relationship Between Birth Order, Number of Children, and Family Well-Being in Neurodevelopmentally Diverse Families
University of Manitoba