

THESIS

THE EFFECTS OF RISK AND PROTECTIVE FACTORS ON MALTREATMENT FOR
INDIVIDUALS WITH INTELLECTUAL DISABILITY

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ABSTRACT

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Research consistently demonstrates that children with intellectual disability (ID) are at a higher risk for child maltreatment than typically developing children. While the relationship between child maltreatment and disability is well-established, no longitudinal studies have assessed families of children with ID for early risk and protective factors associated with later maltreatment. This study drew on data from the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN) to examine children with ID in five samples across the U.S. who were at risk for abuse and neglect at an early age. The relationship between early risk and protective factors and maltreatment was explored through a series of regression analyses for children with and without ID. Results replicated the finding that children with ID experienced higher counts of child maltreatment than children without ID. Child behavior problems predicted later maltreatment counts for children with ID and without ID, and parenting stress predicted maltreatment only for children without ID. The findings indicate that at least some of the processes involved in child maltreatment are the same for children with and without ID, including child behavior problems. Future research should be devoted to better understanding why children with ID are more likely to experience maltreatment and higher counts of maltreatment allegations compared to children without ID.

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INTRODUCTION

The maltreatment of children is a serious concern in the United States (Children’s Bureau, 2019). The U.S. Centers for Disease Control and Prevention (CDC) defines child maltreatment as “any act or series of acts of commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child” (Leeb, 2008). The most common forms of child maltreatment are physical abuse, sexual abuse, psychological or emotional abuse, and neglect (Fortson et al., 2016). Child maltreatment is prevalent, with over 3.5 million children in the US receiving an investigation for child abuse or neglect every year (Children’s Bureau, 2019). Results from the nationally representative National Survey of Children’s Exposure to Violence estimate that 15.2% of children 0-17 years old experienced maltreatment in the preceding year, and 24.9% had experienced maltreatment in their lifetime (Finkelhor et al., 2015).

Intellectual disability (ID) is characterized by challenges in intellectual and adaptive functioning that emerge during the developmental period (i.e., before the age of 18) (Schalock et al., 2010). ID has a range of etiologies and presentations, and the development and course of ID can vary as the result of environmental, medical, or genetic conditions (American Psychiatric Association, 2013). Individuals with ID are at an increased risk for abuse and neglect of all kinds, with the lifetime prevalence for maltreatment estimated to be around 11.5 to 28% (Horner-Johnson & Drum, 2006). Maltreatment is estimated to be anywhere from 2 to 10 times more likely in people with ID than in people without disabilities (Horner-Johnson & Drum, 2006). Moreover, much of the research on maltreatment in ID is likely underestimating the prevalence rates for this population due to method limitations; for example, using CPS workers to determine

a classification of ID rather than using a physician or professional diagnosis (Horner-Johnson & Drum, 2006).

The relationship between maltreatment and ID is complex and likely bi-directional, with challenges in intellectual and adaptive functioning possibly resulting from some forms of maltreatment, and ID predisposing children to abuse or neglect (Stalker & McArthur, 2012; Sullivan & Knutson, 2000). For example, Sullivan and Knutson (Sullivan & Knutson, 2000) found that in the opinion of CPS workers, disability led to or contributed to abuse in 47% of cases, and abuse resulted in or contributed to a disability in 37% of cases. A review of literature by Kelly (Kelly, 1992) found evidence that abuse is connected with the emergence of ID, and others have echoed this claim (Firth et al., 2001). However, very little research has explored this issue in a manner that can demonstrate directionality, leaving it an important question in the association between disability and child maltreatment (Stalker & McArthur, 2012).

Some manifestations of ID share common risk factors with child abuse, leading some to propose that maltreatment may emerge in parallel with the disability (Spencer et al., 2005). Consider, for example, the prenatal period. According to the American Association on Intellectual and Developmental Disabilities (AAIDD), social risk factors for ID in the prenatal period include poverty and domestic violence, behavioral risk factors include parental drug use, alcohol use, smoking, and parental immaturity, and educational risk factors include parental cognitive disabilities and a lack of preparation for parenthood (Schalock et al., 2010). Many of these risk factors have also been identified in the etiology of child maltreatment, including financial problems, domestic violence, parental alcohol and drug abuse, and any caregiver disability (Children's Bureau, 2019).

While the relationship between disability and maltreatment is complex and not fully understood, clearly children with ID are highly susceptible to abuse and neglect. Exposure to maltreatment is related with several adverse developmental and mental health outcomes. A longitudinal study by Silverman et al. (Silverman et al., 1996) examining the effects of childhood and adolescent abuse on early adult functioning found that adolescents who experienced physical abuse were more likely at age 21 to meet diagnostic criteria for major depression, post-traumatic stress disorder, antisocial behavior, and drug abuse-dependence than non-abused comparisons. The same study found that physically abused females had a 6-fold elevated risk for suicide attempts compared to non-physically abused females. Both males and females experienced significantly more co-occurring conditions, more externalizing behaviors, and poorer functioning if they had been abused (Silverman et al., 1996). Child maltreatment has also been linked with poor academic performance, physical health problems, behavior problems, suicidal behavior, disrupted attachment, blunted physiological stress response systems, lower social functioning, and shortened life expectancy (Afifi & MacMillan, 2011; Mikton & Butchart, 2009; Negriff et al., 2020; Yoder et al., 2020).

In addition to the developmental costs suffered by victims of maltreatment, there is an economic cost to child maltreatment. The estimated annual US economic burden of child maltreatment ranges from \$428 billion to \$2 trillion (Peterson et al., 2018). Despite the harmful effects of maltreatment, efforts for the prevention of abuse and neglect are relatively under-resourced. In some states such as New York and Montana, the percentage of child welfare expenditures dedicated to prevention was as low as 1% in 2018, and the average across states that year was 15% (Rosinsky et al., 2021). When prevention efforts have occurred, they historically focused on secondary or tertiary prevention, or preventing the recurrence of child

maltreatment and foster care entry (Harden et al., 2020). Despite the relatively low funding dedicated to maltreatment prevention, policymakers, researchers, and service providers are bringing attention to the benefits of underutilized prevention strategies. The Family First Prevention Services Act of 2018 demonstrates the shift in prioritization toward prevention by allowing states and eligible tribes to seek reimbursement for preventive services for families with children at risk of entering foster care (Family First Prevention Services Act, 2018). Preventing maltreatment before it occurs would avoid the pervasive damage of abuse and neglect and ensure the healthy development of children and families, while likely reducing the economic burden produced by maltreatment every year.

Effective prevention requires the identification of empirically supported risk and protective factors that lead to adverse outcomes. To inform maltreatment prevention efforts, it is necessary to identify and target modifiable risk and protective factors that predict maltreatment among individuals with ID. The aim of this study is to identify malleable risk and protective factors that can be leveraged to promote resilience in families of children with ID. This study has 3 primary goals:

1. Determine the extent to which particular family factors increase the risk that children with ID will experience maltreatment.
2. Identify family protective factors that mitigate the effects of risk factors on maltreatment for children with ID.
3. Recommend future directions for maltreatment prevention and promoting family resilience for families of children with ID.

Each of these goals is intended to contribute to the maltreatment prevention field by investigating risk and protective factors associated with the abuse and neglect of children with ID and using those findings to inform practices to promote family resilience.

LITERATURE REVIEW

Theoretical Framework

Hill's ABC-X model of family stress and coping is a conceptual framework for viewing families under stress, and how some families handle stress better than others (Hill, 1958). The ABC-X formula is made up of A) the stressor or crisis-provoking event, B) the family's internal resources for dealing with the stressor, C) the family's definition or perception of the event, and X) whether or not the event becomes a crisis for the family (Hill, 1958). McCubbin and Patterson (McCubbin & Patterson, 1983) expanded the ABC-X model into the double ABC-X model of adjustment, where the factor "aA" represents the pile-up of stressors and demands in the aftermath of an inciting event. The "bB" variable represents the family's existing resources and new resources that the family develops in adaptation to the crisis or pile-up of stressors. "cC" in the double ABC-X model is expanded to include the family's perceived meaning of the total situation, including any additional stressors, old and new resources, and what is required to manage the hardship. The outcome variable, or "xX," in the double ABC-X model shifts from a simple reduction of crisis to a measure of family adaptation, or how well the individuals and family system adapt to the crisis.

The ABC-X and double ABC-X model of family stress and coping are situated in a family systems perspective. The family system is made up of dynamic subsystems and relationships that each influence the others moment-to-moment and over time (Granic & Patterson, 2006; Lindblom et al., 2017). Through the negative feedback process, a dyad will continue to reinforce patterns of behavior called attractors until they stabilize, making it easy for a parent and child to engage in those behaviors and increasingly difficult to break out of them (Granic & Patterson, 2006). Mutually hostile or aversive parent-child interactions can develop

through the negative feedback process over time and become powerful attractors (Granic & Patterson, 2006; Lunkenheimer et al., 2017). Through the same process of negative feedback, positive interactions can be reinforced as attractors. As different patterns of interaction become available in the state space of the parent-child subsystem, the strongest attractors (i.e., those that have repeated the most over time) will be the patterns that the dyad finds it easiest to revisit.

The ABC-X model offers insight into parent-child interactions, and how they can escalate to the point of harsh or abusive parenting behaviors (Granic & Patterson, 2006; Lunkenheimer et al., 2017). The model also provides an explanation for how some families cope and adapt to stressors, demonstrating family resilience (Rosino, 2016). The ABC-X model provides a framework for identifying resources available to parents of children with ID that may act as a buffer against increased caregiving demands and resulting stress. White and Hastings (White & Hastings, 2004) used this perspective to identify forms of social support that buffered the effects of child adaptive and behavioral problems on parental well-being and found that informal sources of parental support were associated with parental well-being after controlling for child characteristics. This research emphasizes the strengths of families and family members and how those strengths can contribute to positive outcomes.

Risk and Protective Factors

A vast body of research has identified risk and protective factors that precede the onset of health, behavior, and developmental problems (e.g., substance use, obesity, risky behaviors, school dropout, conduct problems). Risk factors increase the likelihood of adverse outcomes, often co-occur, and can operate within different layers of ecological context (e.g., individual, family, peers, community, or macrolevel systems) (Bronfenbrenner, 1977; Sameroff, 2010). Protective factors are situated within the same contexts and buffer the effects of risk to lessen the

likelihood of poor outcomes. The presence of protective factors may help explain why some individuals demonstrate resilience in the face of many apparent challenges (Coie et al., 1993; Gerstein et al., 2009). Preventive interventions can focus on reducing risk factors directly, increasing protective factors to buffer the effects of risk factors, or disrupting the pathways between risk factors and adverse outcomes (Coie et al., 1993). Therefore, identifying early risk and protective factors for the maltreatment of children with ID can inform the development of prevention efforts by elucidating potential targets for intervention.

According to Mazzucchelli et al. in the *Handbook of Intellectual Disabilities*, “Of all the potentially modifiable environmental risk and protective factors that can meaningfully influence children’s development, none is more important than the quality of parenting children receive” (Mazzucchelli et al., 2019). Intervening in family mechanisms linking the presence of ID and family disruption is critical for reducing the impacts of child ID on family well-being and child outcomes (Crnic et al., 2017). Therefore, this thesis will focus on family-based factors because of the high potential for prevention and intervention impact, especially in early childhood (Guralnick, 2017). While other contextual factors are important and necessary foci for future research, they are outside of the scope of this project.

Intellectual Disability

ID is characterized by challenges in intellectual and adaptive functioning that emerge during the developmental period (Schalock et al., 2010). Intellectual functioning refers to general mental capacity including the ability to reason, problem-solve, plan, think abstractly, make judgments, and learn in academic and real-life settings, and is commonly assessed with standardized measures of IQ (American Psychiatric Association, 2013; Tassé et al., 2016). Adaptive behavior is expressed through conceptual, social, and practical skills that are learned

and performed in daily life (Schalock et al., 2010). A diagnosis of ID is sometimes (but not always) made alongside other diagnoses including neurocognitive disorders, communication disorders, specific learning disorders, and autism spectrum disorder (American Psychiatric Association, 2013). The most common co-occurring conditions are attention-deficit/hyperactivity disorder, depressive and bipolar disorders, anxiety disorders, autism spectrum disorder, stereotypic movement disorder, impulse-control disorders, and major neurocognitive disorder (American Psychiatric Association, 2013). This complexity and comorbidity can impact child functioning and be a significant challenge to parents of children with ID (Carulla et al., 2011).

Risk Factors

Parenting Stress. Parenting stress is a caregiver's experience of everyday stress. Parenting stress is a prominent risk factor for child maltreatment and has been connected with poor parenting behaviors, parental dysregulation, and child behavior problems (Anthony et al., 2005; Neece et al., 2012; Rodriguez & Murphy, 1997; Stith et al., 2009). A study found that most mothers who neglect their children experienced an extreme level of stress related to their parental role (scoring over the 90th percentile rank) when compared to non-neglecting mothers from similar socioeconomic environments (Éthier et al., 1995). Other studies have demonstrated a positive association between stress and maltreatment or abuse potential (Ammerman & Patz, 1996; Lawson & Hays, 1989; Rodriguez & Murphy, 1997). Parents who are highly stressed typically demonstrate less nurturance, warmth, and responsiveness with their child and use more intrusive, controlling, and assertive parenting techniques (Sanner & Neece, 2018). In turn children experience poor behavioral and social outcomes (Anthony et al., 2005; Pianta & Egeland, 1990). A mutually escalating pattern of interaction can occur in which parenting stress

leads to heightened behavior problems in children and child behavior problems elevate parenting stress (Calkins, 2002; Neece et al., 2012).

Raising a child can be a challenging and taxing undertaking for any parent, and parents with children with ID often face additional unique demands. Parents of children with ID consistently report higher levels of parenting stress than parents of typically developing children (Baker et al., 1997; Blacher et al., 2005; Herring et al., 2006). The stress experienced by these parents tends to occur in frequent ongoing experiences referred to as daily hassles or stressors, often related to the specialized care and support needs of the children (Glidden et al., 2006; Mazzucchelli et al., 2019). Furthermore, children with ID are three to four times more likely to develop emotional and behavioral problems compared to their typically developing peers, sometimes including severe presentations like aggression and self-injury (Baker et al., 2003; Lang et al., 2013). Child behavior problems have demonstrated a significant bidirectional relationship with parenting stress (Neece et al., 2012). It follows that in families of children with ID, parenting stress is an important risk factor to consider in the discussion of maltreatment. It should be noted that recent work focuses on the resilience and adaptation shown by some families of children with disabilities, demonstrating that not all parents of children with ID will experience higher levels of stress over time (Gerstein et al., 2009).

Parental Depression. In his seminal work on the determinants of parenting and child maltreatment, Belsky (Belsky, 1984) concluded that the psychological well-being of the parent is the most important predictor for parenting in contexts of stress. Maternal depression has been associated with disruptive, hostile, and rejecting home environments that strain the parent-child relationship (Orvaschel et al., 1980). Psychiatric disorders and depression in particular are potential risk factors for child abuse (Burke, 2003). A study of 100 clinically depressed mothers

found that 41% of depressed mothers reported thoughts of harming their children compared to 7% in a control sample of non-depressed mothers (Jennings et al., 1999). A meta-analysis of 155 studies examining different risk factors associated with child maltreatment found that out of 14 studies that looked at parental depression, 10 found significant effects (Stith et al., 2009). Depression had one of the largest effect sizes of all parent characteristics in the meta-analysis for risk of child physical abuse (Stith et al., 2009). The authors of that analysis concluded that the mental health needs of parents are an important area of risk that should be addressed in the assessment and treatment of child maltreatment (Stith et al., 2009).

Some parents raising a child with ID may experience higher levels of depressive symptoms because of family stress associated with child management problems or higher caretaking burden (Walker et al., 1992). In a study of families of adolescents with ID, 26% of parents were in the clinical or borderline range for depression symptoms (White & Hastings, 2004). In that study, measures of child functioning were not associated with parent depression scores, but the perceived helpfulness of supports did have a buffering effect that was associated with lower stress, anxiety, and depression (White & Hastings, 2004). Another study looked at personality and coping styles in parents of children with developmental disabilities and found that personality accounted for a large amount of variance in depression, and some coping strategies were associated with higher depression while others were associated with lower depression (Glidden et al., 2006). This evidence suggests that there is heterogeneity in the mental well-being of parents with children with ID, but that depressive symptoms could be exacerbated for some parents of children with ID depending on their caregiving stress, levels of support, and internal resources.

Parental Substance Abuse. Substance abuse is a major public health concern that impacts the user and their family (Calhoun et al., 2015). Substance abuse can be defined in different ways, but for this study involves alcoholism or problematic drinking, cannabis use disorder, and/or the use of illicit substances. It is estimated that 50-80% of children removed from their homes because of caregiver neglect have at least one parent with substance abuse problems (Calhoun et al., 2015). An analysis of caregiver risk factors found that 29.4% of child maltreatment victims had caregiver drug abuse as a risk factor and 15.9% of victims had caregiver alcohol abuse as a risk factor (Children's Bureau, 2019). Parental substance abuse has been linked with harsh and problematic parenting practices including corporal punishment and use of threats against the child (Calhoun et al., 2015). Issues with substance misuse can lead to problems such as mental illness, chronic unemployment, or drug-related incarceration that can impair the parent's ability to provide adequate care to children (Calhoun et al., 2015). Drug and alcohol abuse also impair parental judgment and increase the risk of neglectful behaviors like overlooking children's basic needs and not providing adequate supervision (Calhoun et al., 2015; Latendresse et al., 2008).

The risk for maltreatment may increase when a parent with substance use concerns has a child with ID. Prenatal drug and alcohol abuse is a risk factor for the emergence of ID (Schalock et al., 2010). In-utero drug and alcohol exposure can result in fetal alcohol syndrome, premature birth, low birth weight, and oxygen deprivation, which can contribute to functional deficits resulting in an ID diagnosis (Schalock et al., 2010; Vig & Kaminer, 2002). Raising a child with a disability could also present additional challenges for parents who have substance abuse concerns, compounding the likelihood of maltreatment (Slayter & Springer, 2011). All of this

makes parental substance abuse an important early risk factor to examine for the maltreatment of children with ID.

Child Behavior Problems. Just as parent factors can influence child social, emotional, and behavioral development, child factors can have an impact on parents and families in positive and negative ways. Child behavior problems include internalizing behaviors (e.g., social withdrawal, anxiety, depression) and externalizing behaviors (e.g., physical or verbal aggression, challenging behaviors, delinquency). One meta-analysis of 155 papers exploring risk factors in child maltreatment found that child externalizing and internalizing behaviors were two of only three child factors significantly associated with abuse or neglect, along with child social competence (however, the direction of causality is ambiguous) (Stith et al., 2009).

There is evidence that as young as age 3 children with ID display higher rates of behavior problems than their peers without ID (Baker et al., 2002, 2003; Totsika et al., 2020). These early behavior problems make children with ID more likely to have diagnosable levels of hyperactivity/attention deficit hyperactivity disorder and conduct disorder (Totsika et al., 2020). A large body of research has demonstrated that behavior problems in children with ID are associated with higher parental stress and distress (Baker et al., 2005; Blacher et al., 2005; Sanner & Neece, 2018; Totsika et al., 2020). In fact, high parental stress is more a result of child problem behaviors than intellectual ability or disability severity (Neece et al., 2012; Sanner & Neece, 2018). One study found that in families with a child with ID, child externalizing problems accounted for 38% of the variance in maternal stress levels (Margalit et al., 1989). The strong association between parenting stress and child behavior problems makes behavior problems a risk factor for maltreatment particularly in families of children with ID.

Disability Severity. It has been hypothesized that severity of disability is positively associated with risk of maltreatment. To the contrary, mild developmental problems have been consistently linked with a higher risk of abuse than severe disabilities (Balogh et al., 2001; Benedict et al., 1990; Levy & Packman, 2004; Verdugo et al., 1995; Zirpoli et al., 1987). Some have posited that parents may have a harder time coping with the uncertainty of outcomes in children with less severe impairments (Benedict et al., 1990). It has also been suggested that children at lower levels of functional challenge may be less likely to receive a diagnosis and therefore have less services available to them (Benedict et al., 1990). On the other hand, a population-based study in the UK found that children with moderate to severe intellectual impairment were more likely to be investigated for child abuse and neglect compared to other types of disability (Spencer et al., 2005). This suggests that the association between functional severity and maltreatment may not be linear but may be affecting those children at the more extreme ends of functional abilities (those with mild presentations and those with severe). Little to no direct association has been found between a child's severity of ID and parenting stress, a conjectured path between ID and maltreatment (Beckman, 1983; Hassall et al., 2005; Walker et al., 1992). Instead, the parenting stress experienced by parents of children with ID is explained by other factors such as maladaptive and challenging behaviors (Baker et al., 2003; McIntyre et al., 2002). For these reasons, severity of cognitive and adaptive behaviors is being included in this study as an exploratory factor to evaluate the relationship between disability severity and maltreatment and add to the current body of literature.

Protective Factors

Parenting Attitudes. Adaptive attitudes toward parenting and child-rearing could be an important protective factor against child maltreatment. Parent attitudes are conceptualized as

models of desirable parenting behavior and have been shown to contribute to parenting behaviors (Holden & Buck, 2002). Parental values and beliefs about childrearing have been associated with parenting outcomes such as maternal warmth and sensitivity and positive behaviors like reading to the child (Luster et al., 1989). Favorable attitudes toward parenting include appropriate expectations for the child's behavior, endorsement of positive and appropriate discipline, and empathy (Bavolek et al., 1979; Mennen & Trickett, 2011). A great deal of attention has been given to the role of inappropriate parental attitudes in the child maltreatment literature.

Maladaptive attitudes are related to insensitive parenting and a higher likelihood of abuse and neglect (Ammerman & Patz, 1996; Cicchetti et al., 2006). Recent intervention studies have focused on improving parents' attitudes in order to reduce the likelihood of child maltreatment (Alvarez et al., 2020; McKelvey et al., 2012). These studies suggest that parenting attitudes are linked with maltreating behaviors and may serve as a protective factor to lessen the risk of child maltreatment.

Positive parenting attitudes could play a role in mitigating the impacts of risk factors on child maltreatment in families of children with ID. Empathy, a component of positive parenting attitudes, may help parents of children with ID to understand their child's perspective and be more aware of challenges their child endures (Burton et al., 2018). Empathy also involves an emotional aspect of compassion, tenderness, and sympathy (Psychogiou et al., 2008). These positive perceptions and emotions allow parents to be more sensitive and responsive to their child's needs (Psychogiou et al., 2008). Favorable attitudes toward the use of corporal punishment have been shown to interact with parenting stress to increase child abuse potential. However, among parents with low belief in corporal punishment, parenting stress is not associated with child abuse potential, demonstrating the protective influence that positive views

on discipline may have on reducing the impacts of stress on child maltreatment. More adaptive parenting attitudes can therefore have a positive impact on parenting behaviors toward children with ID and be protective against maltreatment behaviors.

Family Functioning. Family functioning is the well-being of the family or household in domains such as the health of relationships in the family, conflict resolution, cohesion, leadership, and expressiveness (Beavers & Hampson, 1990). Researchers have recognized family functioning as a key aspect to family resilience, or the ability for a family to grow through adversity (Newland, 2014). Positive family functioning is connected with better parent-child interactions and child outcomes (Newland, 2014). Research has shown that high levels of family functioning appear to be related to higher quality parenting and lower levels of neglectfulness (Gaudin et al., 1996). Children who experience neglect, on the other hand, are in homes that are less organized, more chaotic, and less verbally expressive than comparison families (Gaudin et al., 1996). Higher family functioning has also been associated with parents' use of adaptive coping strategies like positive reframing and drawing on emotional and instrumental support (Counts et al., 2010). Family functioning is a malleable attribute that can be targeted with intervention. For example, a meta-analysis of 40 programs targeting families with young children at risk for abuse and neglect found significant effects for improvements in family functioning and significant reductions in abusive and neglectful acts (Geeraert et al., 2004).

Having a child with a disability is an experience that often affects family functioning (Cuzzocrea et al., 2011; Murphy, 2011). High family functioning can be a sign of resilience in families with a child with ID because it demonstrates the capacity to adapt and find balance amid a stressful event. In a study comparing parents with and without a child with disability, both groups showed similar levels of family cohesion and adaptability (Cuzzocrea et al., 2011).

However, among parents of a child with disability, parents from high functioning families showed more positive parenting behaviors such as better monitoring of their child's needs and higher levels of initiating and actively interacting with the child (Cuzzocrea et al., 2011). The study suggests that family functioning might influence the association between parental stress and parenting style (Cuzzocrea et al., 2011). Very little research has been done on family functioning as a protective factor in families of a child with ID, yet this could be an indicator of resilience and an important factor in moderating the effects of parenting stress on maltreatment.

Partner Relationship Quality. The relationship quality between a caregiver and his or her romantic partner may provide an important form of support within the family system. Links between marital quality and parenting quality have been found across different child developmental periods including infancy, preschool years, elementary school years, and the adolescent period (Belsky, 1984). The relationship quality between intimate partners has also demonstrated a protective effect against child maltreatment. For example, a longitudinal study on the intergenerational transmission of maltreatment found that in families that broke the cycle of abuse (the mother experienced maltreatment but the child did not), the intimate partners had a supportive and trusting relationship (Jaffee et al., 2013). Similarly, an investigation of 3-generation longitudinal data found that romantic partner warmth and positive communication were associated with less harsh parenting, and when those positive partner behaviors were high there was no evidence of transmission of harsh parenting from the previous generation (Conger et al., 2013). Therefore, a stable and nurturing relationship between a caregiver and their romantic partner is an important factor in preventing maltreatment, especially in high risk families such as those with parents who were victims of maltreatment (Conger et al., 2013; Jaffee et al., 2013; Schofield et al., 2013).

Partner relationship quality appears important in the adaptation of families of children with ID. A longitudinal study on the development of children with disabilities and their families found that marital satisfaction predicted lower parenting stress and fewer depressive symptoms controlling for SES, child characteristics, and social support (Kersh et al., 2006). In the same study, marital quality predicted higher parenting efficacy in mothers (Kersh et al., 2006). Other studies of parents with children with developmental disabilities have shown that marital adjustment is associated with the lower levels of parenting stress and well-being in mothers and fathers (Gerstein et al., 2009). The relationship between adult partners shows promise as a protective factor against parenting stress for parents of children with ID, and it is important to investigate whether the protective effects against child maltreatment found in the general population are salient for families of children with ID.

Dependent Variable

Maltreatment. Child maltreatment includes four distinct categories: physical abuse, sexual abuse, psychological abuse, and neglect (Children's Bureau, 2019; Fortson et al., 2016). Different measures can be used to assess maltreatment as an outcome, including subtype, severity, frequency, and chronicity (Manly et al., 1994). A study of the dimensions of maltreatment found that the frequency of maltreatment reports was significantly related to all four measures of the child's global functioning, including lower social competence, lower cooperation, and higher levels of behavior problems (Manly et al., 1994). This study also found an interaction effect between severity and frequency where frequency mattered more for child outcomes at lower levels of maltreatment severity (Manly et al., 1994). Chronicity and subtype differences also demonstrated some connections to child outcomes like peer ratings of aggression and behavior problems (Manly et al., 1994). Due to the limited scope of this study, I will be

using a measure of the frequency of reports of maltreatment as the outcome measure in the assessment of risk and protective factors for children with ID.

Measures of maltreatment frequency can use allegations of maltreatment or only substantiated investigations. Kugler et al. (Kugler et al., 2019) used propensity scoring to investigate whether an unsubstantiated report of maltreatment was related to different health outcomes than a substantiated investigation or no investigation. They found similar health impacts among substantiated and non-substantiated victims for teen pregnancy, HIV-risk behaviors, and drug use (Kugler et al., 2019). They also found that females with an unsubstantiated allegation of maltreatment reported the highest scores of depressive symptoms (Kugler et al., 2019). Another population-based study of childhood mortality following a nonfatal allegation of maltreatment found that adjusting for other risk factors, children with a prior allegation of maltreatment died from intentional injuries at a rate 5.9 times greater than children who had never been reported for maltreatment (Putnam-Hornstein, 2011). This is consistent with prior findings that allegations of maltreatment are more common among cases of children dying from injuries than among children dying of natural causes (Schnitzer & Ewigman, 2005, 2008). Other researchers have demonstrated the difficulty of judging and substantiating maltreatment reports and assert that substantiation is a flawed measure of child maltreatment (Cross & Casanueva, 2009). Allegations therefore seem to be a more meaningful measure of abuse and neglect that demonstrate similar impacts to substantiated cases in terms of child outcomes.

CURRENT STUDY

The study purpose was to identify the relative strength of malleable family-based risk factors for child maltreatment in families of children with ID, and the buffering effects of family-based protective factors in mitigating the impacts of risk. While there is support in the literature for higher rates of maltreatment among children with disabilities, little is known about the directionality in the connections between disability and maltreatment. This is because no studies to date have examined prospective longitudinal data to consider rates of abuse and neglect among children with disabilities (Fisher et al., 2008). This study will be a significant contribution to the literature by analyzing early risk factors that may be associated with later maltreatment in a sample of children with ID. In addition, the relative strengths of risk factors in maltreatment outcomes have rarely been considered in research on maltreatment among children with disabilities (Fisher et al., 2008). The design of this study will allow for the relative impacts of early factors to be elucidated by revealing the proportion of explained variance on maltreatment for each risk factor, and furthermore the effects of protective factors in reducing maltreatment. Finally, many studies of risk factors among families with children with ID have used convenience samples made up largely of white, well-educated, and middle class or higher socioeconomic status (SES) parents and families (Fisher et al., 2008; Hodapp & Dykens, 2001). This study will use a racially diverse national sample that has a high representation of children from low-income families, parents with low education levels, and varying family structures.

The current study aims to contribute to literature on child maltreatment by providing a longitudinal analysis of factors that predict maltreatment outcomes using a sample of moderate-risk and high-risk individuals classified with significant deficits in intellectual and adaptive functioning. The study was guided by the following hypotheses:

Hypothesis 1. Children with ID will experience higher levels of all types of child maltreatment than children without ID.

Hypothesis 2. High parenting stress, parental depressive symptoms, caregiver substance use, and child behavior problems will predict later maltreatment frequency for children with ID.

Hypothesis 3. Positive parenting attitudes, family functioning, and higher partner relationship quality will be protective factors that mitigate the impact of risk factors on later maltreatment frequency for children with ID.

Hypothesis 4. Significance of challenges in cognitive and adaptive functioning will predict maltreatment in children with ID. This is an exploratory hypothesis.

METHOD

Participants

Data collected from 1991 to 2012 for the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN) were used for the present study. LONGSCAN is a national, longitudinal, multi-site study of children at risk for, or with a history of, maltreatment and their families (Runyan et al., 2014). Participants were recruited at age 4 or younger and followed through age 18. Data were collected from 1,354 children from five diverse regions in the Midwest, Southwest, Northwest, South, and East. The East, Midwest, and Northwest samples were drawn from urban areas, the Southwest sample was drawn from a suburban area, and the South sample was recruited statewide and included participants from urban, suburban, and rural communities. Eligibility criteria differed by site to represent varying levels of risk for exposure to maltreatment based on one or more of the following factors: low income, failure to thrive (inadequate physical growth in first two years of life), parental substance use, prior involvement with Child Protective Services (CPS), suspected maltreatment reports, and state public health records. Some sites included comparison groups. The full sample was examined for group differences in the frequency of maltreatment allegations and type of maltreatment experienced for children who met criteria for ID and those who did not. Additional analyses were conducted to examine the risk and protective factors associated with later maltreatment in a subsample of the original participants who met classification criteria for ID (n=200).

Table 1

Participant Demographics (Participants without ID)

Family Characteristics	Baseline (919)	EA	MW	NW	SO	SW
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Child Gender						
Male	437	99	67	91	83	97
Female	482	76	89	90	100	127
Child Race/ethnicity						
White	266	9	25	91	71	70
Black	471	160	81	37	110	83
Hispanic	41	1	22	5	0	33
Mixed	106	3	24	43	2	34
Other*	15	2	4	5	0	4
Caregiver Income						
\$14,999 or less	482	114	103	97	101	67
\$15,000-\$24,999	201	32	33	39	43	54
\$25,000-\$39,999	93	9	12	25	15	32
\$40,000-\$49,999	31	3	4	6	3	15
\$50,000 or more	52	3	4	10	4	31

Note: * Includes Native American, Asian, and Pacific Islander.

Table 2

Participant Demographics (Participants with ID)

Family Characteristics	Baseline (200)	EA	MW	NW	SO	SW
Child Gender						
Male	109	18	21	23	10	37
Female	91	16	15	18	12	30
Child Race/ethnicity						
White	45	1	4	21	5	14
Black	111	33	23	10	16	29
Hispanic	18	0	6	2	0	10
Mixed	25	0	3	7	1	14
Other*	1	0	0	1	0	0
Caregiver Income						
\$14,999 or less	110	29	25	26	11	19
\$15,000-\$24,999	28	1	8	6	5	8
\$25,000-\$39,999	26	1	2	4	4	15
\$40,000-\$49,999	8	0	1	0	0	7
\$50,000 or more	11	0	0	2	0	9

Note: * Includes Native American, Asian, and Pacific Islander.

Procedure

Children and caregivers were interviewed every two years from age 4 to age 18. CPS maltreatment data were obtained from local county offices and coded for the LONGSCAN dataset. LONGSCAN protocol content and administration procedures were kept as uniform as possible across sites through the standardized training of coordinators and interviewers, thorough documentation of data procedures, and inter-rater reliability checks of data coding (Runyan & Kotch, 2014). The present study uses data collected from ages 4 for the identification of ID, data from ages 4, 6, and 8 for the presence of early risk and protective factors, and a measure of cumulative allegations of maltreatment from age 6 to age 18 for the outcome measure. Full details concerning the LONGSCAN study procedures and protocols are available (Runyan et al., 2014).

Measures

Demographic Control Variables. Demographic indicators include child sex (0=male, 1=female), child race/ethnicity (White, Black, Hispanic, Mixed Race, or Other), and caregiver income per year (<\$14,999, \$15,000-\$24,999, \$25,000-\$39,999, \$40,000-\$49,999, \$50,000 or more). Child race/ethnicity and caregiver income will be dummy coded using Black and <\$14,999 as reference groups.

Battelle Developmental Inventory Screening Test. Cognitive functioning and adaptive behavior were measured at age four using the Battelle Developmental Inventory Screening Test (Newborg et al., 1988). The BDST is comprised of 96 items and was normed in a stratified random sample that matched population distributions for geographical region, race, and sex based on U.S. Census data. The BDST reportedly demonstrates high test-retest reliability with coefficients ranging from .84 to .99, and high validity with scores correlating above .9 with performance on the full Battelle Developmental Inventory. The AAIDD defines the cutoff criteria

for ID as two (or more) standard deviations below the population mean in intellectual functioning and adaptive behavior (Schalock et al., 2010). Pursuant to this definition, a cutoff of 2.0 on the BDST (signifying 2 SDs below a normed mean) on both the cognitive and adaptive domains was used to classify a subsample of participants demonstrating criteria for ID in this study. While it is not clear whether these children would receive a clinical diagnosis of ID, moderate ID can sometimes be diagnosed in preschool years and severe or profound ID is often connected to an organic cause such as a genetic order and can be identified before or shortly after birth (Witwer et al., 2014). Children who are diagnosed with mild ID often show signs of developmental delays in infancy and early childhood, but symptoms are not as easily recognized (Cervantes et al., 2019). A diagnosis of developmental delay is sometimes used when young children present significant deficits across developmental domains but it is not yet clear if they would meet criteria for ID (Baker et al., 2005).

Everyday Stressors Index. Parenting stress was measured at the age six interview using the Everyday Stressors Index (ESI), a 20-item scale that measures the level of everyday stress caregivers experience (Hall, 1983). Scores range from 0-60, with higher scores representing greater daily stress across different problem areas. Cronbach's alpha for the full LONGSCAN sample was .85, and construct validity was demonstrated with a significant correlation with a measure of depression, which tends to be correlated with stress (Runyan et al., 2014).

Caregiver Substance Use. The primary maternal caregiver's substance use was measured when children in the study were eight years old using a scale developed for the LONGSCAN study to assess the use of commonly used drugs including alcohol, tobacco, cannabis, cocaine, hallucinogens, heroin, stimulants, and tranquilizers (Runyan et al., 2014). Frequency of use is measured on a scale from 1-4, with 1 indicating use 1-2 times per month, 2

indicating use 3-5 times per month, 3 indicating more than 5 times per month, and 4 being daily. A summative index will be created by combining responses of current use frequency across all substances. Scores range from 0-44, with higher scores indicating more substance use.

Child Behavior Checklist/4-18. Child behavior problems were measured at age six using the Child Behavior Checklist/4-18 (CBCL/4-18; (Achenbach, 1991). The CBCL is a parent-report measure that assesses externalizing and internalizing child problems. The measure has demonstrated high test-retest reliability over a 7-day period with a correlation coefficient of .93 for the Total Problems scale (Achenbach, 1991). Inter-parent agreement was also high at .76 for Total Problems (Achenbach, 1991). Internal consistency coefficients for the CBCL/4-18 scales range from .76 to .92 (Achenbach, 1991). The Total Problems score is computed by summing the items, then converting the raw score to an age-standardized T-score.

Center for Epidemiologic Studies Depression Scale. The Center for Epidemiologic Studies Depression Scale (Radloff, 1977) includes 20 items to measure self-reported symptoms associated with depression. This scale was administered at the age six visit. Total scores can range from 0 to 60, with higher scores indicating more depressive symptoms. The CES-D has high concurrent and construct validity, high internal consistency, and is reliable for assessing depressive symptoms across racial, gender, and age categories (Radloff, 1977; Runyan et al., 2014). Cronbach's alpha for the full LONGSCAN sample was .90.

Adult-Adolescent Parenting Inventory. Parenting sensitivity was assessed at age four using the Adult-Adolescent Parenting Inventory (AAPI; (Bavolek et al., 1979). Thirty-two items on the original AAPI evaluate appropriate caregiver expectations, appropriate empathy, rejection of physical punishment, and appropriate family roles. Answers range from 1-5 on a Likert scale and higher scores indicate appropriate attitudes toward parenting. The appropriate expectations

subscale was expanded with six additional items in LONGSCAN to improve the subscale's validity and reliability. Construct validity for the AAPI was determined using inter-item correlations, item-construct correlations, and factor analyses (Bavolek, 1984). Cronbach's alpha coefficients in the LONGSCAN sample are as follows for each subscale: Appropriate Expectations (expanded) = .83, Appropriate Empathy = .83, Rejection of Physical Punishment = .83, Appropriate Family Roles = .90. A total score summing all items will be used as a measure of positive parenting attitudes. The total score has demonstrated validity through significant positive correlations with related constructs measuring positive parenting and significant negative correlations with measures of harsh parenting (Conners et al., 2006). Cronbach's alpha for the total score was .94.

Self-Report Family Inventory. This thirty-six-item measure was adapted from the Beavers Model of Family Functioning (Beavers et al., 1985). The Self-Report Family Inventory (SFI) assesses the caregiver's perception of family functioning and was given at the age six wave of data collection. The original SFI includes five subscales of family function to assess overall family health, conflict resolution, cohesion, emotional expressiveness, and leadership. Cronbach's alpha coefficients in the LONGSCAN sample are as follows for each subscale: Family Health/Competence = .88, Conflict = .69, Cohesion = .61, Expressiveness = .70, Leadership = .15. Due to the low reliability of the Leadership subscale in this sample and low psychometrics reported in other studies (e.g., NICHD Study of Early Child Care and Youth Development), the Leadership scale will not be included in this study. A total score summing the 31 items from the remaining four scales will be used as a measure of adaptive family functioning. The Total Score alpha is .92. Lower scores on the SFI represent more competent family functioning.

Autonomy & Relatedness Inventory. The Autonomy and Relatedness Inventory (ARI) is a 24-item shortened version of the Marital Autonomy and Relatedness Inventory (MARI; unpublished). The ARI was administered to the maternal caregiver at age four in the LONGSCAN study and measured the quality of the caregiver's relationship with her spouse, partner, or a "significant other." Six scales of four items each are included in the ARI to measure positive and negative dimensions of the relationship. For the current study, the positive dimensions of relatedness, acceptance, and autonomy will be used as a protective predictor. The Cronbach's alphas for each of the scales in this sample were: Relatedness = .79, Acceptance = .81, and Autonomy = .75. A sum of the 12 items in these subscales will be used as a measure of parent relationship quality, with higher scores representing a greater degree of relationship quality.

Wechsler Preschool and Primary Scale of Intelligence-Revised. The Short Form Vocabulary and Block Design subtests of the Wechsler Preschool and Primary Scale of Intelligence-Revised (Wechsler, 1989) is a standardized assessment that indicates cognitive ability in children ages 3-7 years old. The Vocabulary and Block Design Short Form is highly correlated with the WPPSI-R Full Scale IQ measure ($r = .83$) and is a good measure of general intellectual functioning (Runyan et al., 2014; Sattler, 1992). The Vocabulary subtest requires children to name objects shown in pictures or to define words orally presented to them. The Block Design subtest asks children to reproduce designs using blocks. Raw scores are converted to standardized scores based on the examinee's age. The sum of the two scaled scores has a population mean of 20. Higher scores reflect higher cognitive ability.

Vineland Screener. The Vineland Screener (Sparrow et al., 1993) is derived from the Vineland Adaptive Behavioral Scales (Sparrow et al., 1984), a measure of adaptive functioning

normed on a national representative sample. The VSC contains three measures of adaptive functioning: Communication, Daily Living Skills, and Socialization, each of which are highly correlated with their counterparts on the VABS with r values ranging from .92 to .95 (Sparrow et al., 1993). The Daily Living Skills and Socialization domains were administered for LONGSCAN at the age 6 visit. The VSC was interview-administered to the primary maternal caregiver, who answered questions about the child's behavior and relationships. An example question is, "How does s/he usually behave if s/he can't do something s/he really wants to do, like watch a TV show or have a special treat?" Raw scores are converted into standard scores according to the respondent's age with higher scores indicating greater ability in performing tasks.

CPS Maltreatment Data. The dependent variable, maltreatment allegations, will be derived from child protective services (CPS) local agency data. CPS maltreatment data were obtained from local county offices and coded for the LONGSCAN dataset. The maltreatment data includes items for the number of records, allegations, and substantiations for each maltreatment type (physical abuse, sexual abuse, neglect, educational maltreatment, emotional maltreatment, moral/legal maltreatment) for each time point of data collection. Allegations of maltreatment will be used as the outcome variable based on findings that children with an investigation of maltreatment experience similar long-term health outcomes regardless of substantiation status (Kugler et al., 2019). A sum count of allegations across all types of maltreatment from age 6 to age 18 will be computed. The resulting variable will be a ratio measurement for the number of maltreatment allegations received regarding the individual from age 6 to age 18.

ANALYSES

Only children with data to determine intellectual status were retained in the sample, resulting in a total sample size of 1,119 and a sub-sample of children with ID of 200. See raw counts of maltreatment types by ID status in Table 3. Negative binomial regression tests were used to compare the differences between children with ID and children without ID for frequency of each type of maltreatment (physical abuse, psychological/emotional abuse, sexual abuse, and neglect). Negative binomial regression is a generalized model that can be used for over-dispersed count data, as is the case is for the maltreatment count outcome data in this study. The zero-inflated count distribution is demonstrated in Figure 1 for maltreatment allegations, with similar distributions occurring for the specific types of abuse and neglect allegations. A D'Agostino test for skewness found that the skew of maltreatment allegations in the full sample was 2.75, $p < .05$ and the Bonnett-Seier test for Geary kurtosis was $\tau = 3.68$, $p < .05$.

Table 3

Raw counts of each maltreatment type from age 6 to age 18 by ID status

Maltreatment Type	Intellectual Disability	No Intellectual Disability	Total
	<i>n</i>	<i>n</i>	<i>n</i>
Physical Abuse	166	522	688
Emotional Maltreatment	108	400	508
Sexual Abuse	47	137	184
Neglect	293	880	1,173
All Types of Maltreatment	755	2,467	3,222

A set of hierarchical negative binomial regression analyses tested the effects of risk and protective factors on the dependent variable, frequency of maltreatment allegations, in the subsamples with and without ID. Separate models were run for the children with and without ID to identify significant predictors for each group. A third negative binomial regression model was

run with ID as a predictor and only the significant predictors included, as well as interaction terms to identify any moderating role of ID.

For the hierarchical regression models, all demographic indicators were dummy coded into dichotomous variables. Risk and protective factors were entered into analyses as blocks. Covariates were entered in the first block, risk factors (independent variables) were included in the second block, and protective factors (independent variables) were included in the third block. This method of regression evaluates the relative effects of each group of variables on the outcome and how each new block changes the effect of existing variables in the model (Yoder et al., 2020). By entering the protective factors after the risk factors, the results indicate if the protective factors reduce or eliminate the effects of the risk factors. For the third regression model, all predictors and interaction terms were entered in one block, to identify any interaction effect of ID with important risk and protective factors.

It was anticipated that high parenting stress, caregiver substance use, child behavior problems, and negative parental attributions will significantly predict a greater number of maltreatment allegations. Adding parenting attitudes, family functioning, and partner relationship quality into the regression model was expected to reduce or eliminate the effects of some or all of the risk factors on maltreatment allegations. Covariates were not expected to be statistically significant. ID was not expected to interact with risk and protective factors; however, this was somewhat exploratory to investigate whether risk and protective factors operate differently among these two groups.

A fourth regression model was used to test the exploratory hypothesis that severity of cognitive and adaptive functioning influences later maltreatment allegation frequency. Maltreatment allegation frequency from ages 6-18 were regressed on cognitive and adaptive

functioning at age 6. Cognitive and adaptive functioning were entered as linear and curvilinear factors to explore their relationship with maltreatment.

RESULTS

Multiple Imputation

All analyses were conducted using *R*. Multiple imputation was used to address potential bias introduced by missing data. Multiple imputation is generally robust for large samples ($n > 400$), producing unbiased results with good coverage rates (more than 90% of the time the true parameter is covered in the confidence interval) for up to 75% missingness (Demirtas et al., 2008). Of the 1,119 participants retained for analysis, 358 (31.99%) had no missing data, 384 (34.32%) had one missing predictor variable, and 377 (33.69%) had missingness on two or more predictor variables. See Figure 2 for a visualization of missing data in this dataset. The *R* package “Multivariate Imputation by Chained Equations” (Van Buuren & Groothuis-Oudshoorn, 2011) was used to perform the data imputation. 20 imputed data sets were created using 20 iterations for each imputation. A random seed number of 1899 was used for reproducibility of results. Three multiple imputations were performed: one with the full sample to perform group comparisons by ID on maltreatment allegation frequency, one with the subsample without ID to assess risk and protective factors for maltreatment, and one with the subsample with ID to assess risk and protective factors for maltreatment.

Visualization of missing data (covariates, risk factors, and protective factors)

Negative Binomial Regressions for Group Comparisons

A series of negative binomial regression analyses were performed to assess group differences between children with and without ID on the frequency of each maltreatment type.

Physical Abuse

Children with ID experienced a higher count of physical abuse than children without ID, but the difference was not statistically significant, $b = .38$, $\exp(b) = 1.46$, $SE = .19$, $z = 1.95$, $df = 1114.893$, $p = .051$.

Emotional Maltreatment

Children with ID experienced a higher count of emotional maltreatment than children without ID, but the difference was not statistically significant, $b = .22$, $\exp(b) = 1.24$, $SE = .20$, $z = 1.05$, $df = 1114.893$, $p = .292$.

Sexual Abuse

Children with ID experienced a higher count of sexual abuse than children without ID, but the difference did not meet statistical significance, $b = .46$, $\exp(b) = 1.58$, $SE = .23$, $z = 1.94$, $df = 1114.893$, $p = .052$.

Neglect

Children with ID experienced a statistically significantly higher count of neglect than children without ID, $b = .43$, $\exp(b) = 1.53$, $SE = .20$, $z = 2.17$, $df = 1114.893$, $p = .030$.

All Maltreatment

Across all types of maltreatment, children with ID experienced statistically significantly higher counts than children without ID, $b = .34$, $\exp(b) = 1.41$, $SE = .17$, $z = 1.98$, $df = 1114.893$, $p = .047$.

Hierarchical Negative Binomial Regressions for Risk and Protective Factors

We performed separate hierarchical negative binomial regressions to examine covariates (Block 1: child sex, caregiver income, child race) and risk factors (Block 2: parenting stress, parent substance use, child behavior problems, parent depressive symptoms) as predictive of maltreatment allegation count in a subsample of 200 children with ID and a subsample of 919

children without ID. Predicted variability increased by approximately 12%, and 5% with the addition of Block 1 and Block 2 predictors, respectively in the subsample with ID (Block 1 R^2 Nagelkerke = 0.12, Block 2 R^2 Nagelkerke = 0.17). In the subsample of children without ID, covariates accounted for approximately 4% of variability, and risk factors increased predicted variability by around 4% (Block 1 R^2 Nagelkerke = 0.04, Block 2 R^2 Nagelkerke = 0.08).

Table 4 shows the results from the regression model including only children with ID. Block 2 of the regression model among children with ID revealed that each income group greater than <\$15k was less likely to experience maltreatment than those in the <\$15k group; however, only the \$25-\$40k group was statistically significantly different. Children in the \$25-\$40k income group were 62.1% less likely to experience maltreatment than those in the <\$15k income group (in Block 2 with covariates and risk factors), holding other factors in the model constant: Est = -.97, SE = .43, exp(B) = .38, $p = .03$. Children with race reported as Hispanic were 79.4% less likely to have an allegation of maltreatment than children with race reported as White (in model with risk factors), holding the other factors in the model constant: Est = -1.58, SE = .60, exp(B) = .21, $p = .01$. For each 1-unit increase in child behavior problems, the likelihood of a maltreatment allegation increased by around 3%, holding the other variables in the model constant: Est = .03, SE = .01, exp(B) = 1.03, $p = .04$.

Block 3 of the first regression model revealed that among children with ID, no protective factors were statistically significantly associated with maltreatment allegations. However, parent-partner relationship quality was approaching significance, Est = -.03, SE = .02, exp(B) = .97, $p = .08$. The inclusion of protective factors in the model reduced the effects of income (Est = -.84, $p = .06$) on allegations of maltreatment and reduced the effects of child behavior problems (Est = .03, $p = .06$) on allegations of maltreatment for children with ID.

Table 4*Predictors of Maltreatment Allegations in Children with ID*

Characteristics	Block 1: Covariates est(SE)	Block 2: Risk factors with covariates	Block 3: Risk and protective factors with covariates
Intercept	1.70(.35)***	-0.12(.97)	1.70(2.04)
Child sex: Female	0.11(.28)	0.05(.29)	-0.09(.30)
Caregiver income: \$15,000-\$25,000	-0.23(.42)	-0.39(.44)	-0.42(.45)
Caregiver income: \$25,000-\$40,000	-0.74(.43)‡	-0.97(.43)*	-0.84(.44)‡
Caregiver income: \$40,000-\$50,000	-0.58(.66)	-0.84(.70)	-0.70(.73)
Caregiver income: \$50,000+	-0.88(.61)	-0.95(.64)	-0.72(.65)
Child race: Black	-0.40(.35)	-0.44(.35)	-0.35(.37)
Child race: Hispanic	-1.65(.59)**	-1.58(.60)**	-1.52(.60)*
Child race: Native American	1.43(1.90)	1.76(1.86)	1.82(1.93)
Child race: Mixed	0.17(.48)	0.13(.49)	0.14(.49)
Parenting stress		0.00(.02)	0.00(.02)
Parent substance use		0.06(.06)	-0.02(.02)
Child behavior problems		0.03(.01)*	0.03(.02)‡
Parent depressive symptoms		-0.00(.02)	0.06(.06)
Parenting sensitivity			0.00(.01)
Parent-partner relationship quality			-0.03(.02)‡
Family functioning			0.00(.01)

*** <.001, ** <.01, * <.05, ‡ <.1

Table 5 shows the results from the regression model including only children without ID. The model revealed that among children without ID, those in the \$50k+ income group were 55.51% less likely to experience maltreatment than those in the <\$15k income group (in Block 2 with covariates and risk factors), holding other factors in the model constant: Est = -.81, SE = .35, exp(B) = .44, $p = .02$. Children with race reported as Black were 38.74% less likely to have allegations of maltreatment than children with race reported as White (in model with risk factors) holding the other factors in the model constant: Est = -.49, SE = .17, exp(B) = .61, $p < .01$. For each 1-unit increase in parenting stress, the likelihood of a maltreatment allegation increased 2%, holding the other variables in the model constant: Est = .02, SE = .01, exp(B) =

1.02, $p = .02$. For each 1-unit increase in child behavior problems, the likelihood of a maltreatment allegation increased by around 2%, holding the other variables in the model constant, $Est = .02$, $SE = .03$, $exp(B) = 1.02$, $p = .03$.

Block 3 of the second regression model revealed that no protective factors were statistically significantly associated with maltreatment allegations among children without ID. The inclusion of protective factors in the model did not reduce the significance of any covariates or risk factors in the model. The effects of parental stress on allegations of maltreatment increased with the inclusion of protective factors ($Est = .03$, $p < .01$).

Table 5

Predictors of Maltreatment Allegations in Children without ID

Characteristics	Block 1: Covariates	Block 2: Risk factors with covariates	Block 3: Risk and protective factors with covariates
Intercept	1.35(.18)***	-0.43(.46)	-0.86(.96)
Child sex: Female	-0.05(.15)	-0.02(.15)	-0.03(.15)
Caregiver income: \$15,000-\$25,000	-0.11(.19)	-0.04(.18)	-0.04(.19)
Caregiver income: \$25,000-\$40,000	-0.21(.25)	-0.15(.25)	-0.18(.25)
Caregiver income: \$40,000-\$50,000	-0.08(.41)	-0.23(.42)	-0.32(.44)
Caregiver income: \$50,000+	-0.91(.35)**	-0.81(.35)*	-0.82(.36)*
Child race: Black	-0.46(.17)**	-0.49(.17)**	-0.58(.18)**
Child race: Hispanic	-0.65(.32)*	-0.59(.32)‡	-0.63(.32)*
Child race: Native American	0.35(1.10)	0.62(1.08)	0.68(.11)
Child race: Asian	1.03(1.26)	1.50(1.24)	1.31(1.27)
Child race: Mixed	0.05(.26)	0.07(.25)	0.06(.25)
Child race: Other	-0.73(.82)	-0.89(.82)	-0.89(.81)
Parenting stress		0.02(.01)*	0.03(.01)**
Parent substance use		0.04(.03)	-0.01(.01)
Child behavior problems		0.02(.01)*	0.02(.01)*
Parent depressive symptoms		-0.01(.01)	0.04(.03)
Parenting sensitivity			0.00(.00)
Parent-partner relationship quality			0.01(.01)
Family functioning			0.00(.00)

*** <.001, ** <.01, * <.05, ‡ <.1

Negative Binomial Regression for Interactions among ID and Risk and Protective Factors

A third negative binomial regression model was run to explore potential interactions between ID and risk and protective factors. ID was included as a predictor, along with the statistically significant predictors from the hierarchical regression models split by ID group (parental stress, child behavior problems, and parent-partner relationship quality). ID was not a significant predictor in this model, $b = 2.22$, $SE = 1.53$, $p = .15$. Parental stress and child behavior problems remained statistically significant, controlling for the other predictors in the model, $b = .02$, $SE = .01$, $p = .02$ and $b = .02$, $SE = .01$, $p = .021$, respectively. Parent-partner relationship was not statistically significant, $b = .01$, $SE = .01$, $p = .45$. The interactions between ID and parental stress, child behavior problems, and parent-partner relationship quality were not statistically significant, $b = -.01$, $SE = .02$, $p = .62$, $b = -.00$, $SE = .012$, $p = .78$, and $b = -.03$, $SE = .02$, $p = .013$, respectively.

Negative Binomial Regression for Exploratory Hypothesis

The negative binomial regression exploring the relation between cognitive and adaptive functioning and maltreatment allegations did not reveal any statistically significant linear nor curvilinear effects.

DISCUSSION

This study confirmed previous findings that counts of maltreatment allegations are higher among children with ID compared to those without ID. Specifically, children with ID were much more likely to experience more allegations of neglect and more allegations of any type of maltreatment compared to the other children in this sample. Counts of physical abuse and sexual abuse were higher among children with ID, but this difference did not reach statistical significance. There appeared to be no difference in allegations of emotional maltreatment between children with and without ID.

Although it was not hypothesized that covariates would be significant in this study, there were some significant relationships among income, race, and maltreatment. Increased income was not surprisingly associated with lower counts of maltreatment allegations, with the \$25,000-40,000 bracket being significant compared to the <\$15,000 bracket for children with ID, and the \$50,000+ bracket being significant compared to the <\$15,000 bracket for children without ID. Hispanic children were less likely than white children to experience counts of maltreatment allegations in children with ID, and both black and Hispanic children were less likely than white children to experience maltreatment among those without ID. Past research has found that girls and boys are equally likely to experience maltreatment. Research on gender differences for children with disabilities has been more mixed. The current study found no evidence to support a difference in maltreatment incidence by gender in children with or without disabilities.

Study findings indicated that child behavior problems were the only risk factor that significantly predicted maltreatment allegations for children with and without ID. Parenting stress predicted maltreatment for children without ID, but not for those with ID. This could be because of the smaller sample size of children with ID compared to those without ID leading to a

lack of statistical power, or due to a lack of variability in the predictor. The absence of an interaction effect between ID status and parenting stress means that it is possibly not the case that parenting stress predicts maltreatment for one group and not for the other. Another possibility is multicollinearity between different predictors resulting in null results. Future follow-ups to this research should further examine this relationship. For children with ID, behavior problems no longer significantly predicted maltreatment when protective factors were added to the model. In contrast, for children without ID, child behavior problems remained significant, indeed increased in significance, when protective factors were included in the model. For children with ID, the effect of risk factors seems to be mitigated by partner relationship quality, which was the only protective factor in the model that approached significance. However, it could be that the significance of child behavior problems was reduced in the subsample with ID because of the smaller sample size, i.e., adding more predictors in the model reduced statistical power.

The third multiple regression model demonstrated that parental stress and child behavior problems were significant predictors of maltreatment for the full sample. Importantly, there were no statistically significant interactions between ID and risk factors when predicting maltreatment allegations. This could mean that the processes contributing to maltreatment are similar in families of children with and without ID. No relationship was found between cognitive and adaptive functioning and maltreatment allegations.

Limitations

There are several limitations to note in the current study. First, the sample of children in this study is not representative. The sample was recruited for high-risk indicators, so we must be careful about drawing inferences from this sample that can be applied to the general population. Utilizing a high-risk sample for this study may help to identify factors that contribute to

maltreatment using a smaller sample than would be necessary in the general population.

However, we do not know if risk and protective factors act differently in this sample than in general.

A second limitation is that this study explores the relationship between disability and maltreatment, and we do not have a measure for parental appraisal of the disability itself. Parental appraisal and attributions have been a hypothesized pathway to maltreatment in disability populations. A measure of parental appraisals of the disability could inform the risks associated with maltreatment and help us to understand why children with ID are more at risk for maltreatment than their peers. More broadly, all the measures in this study were restricted to an existing dataset. Original data collection would have allowed for measures more attuned to issues in disability populations. For example, communication skills and social relatedness between the parent and child could be informative constructs.

Finally, this study is framed as exploring resilience in a high-risk sample, but we are only considering one negative outcome (child maltreatment). While lower counts of maltreatment allegations can indicate family resilience, other developmental outcomes could help to further illuminate factors related to family resilience. Furthermore, this study focused on family-based factors of strength and vulnerability. Broader systemic issues related to the family's context could play an important role in resilience, but predictors beyond the family microsystem were not assessed in this study.

Implications and Future Directions

From this study, we have evidence that at least some of the processes involved in child maltreatment are the same for children with and without ID. This study corroborated the finding that child behavior problems are a primary risk factor for children with and without disabilities.

While parenting stress was only statistically significant for children without disabilities, no interaction was found between child ID status and parenting stress, indicating that parenting stress may also be a process involved in maltreatment of children with ID. Applications of these findings should be employed with caution. More research is needed to better understand why children with ID are more likely to experience maltreatment and more likely to experience higher counts of maltreatment allegations compared to children without ID. Future research should include more measures of parental appraisals of child disability and parental attributions. Studies should also seek to replicate the finding that risk factors are similar in children with ID compared to children without ID.

This study focused on family system-based factors contributing to resilience in high-risk contexts. Future research should examine these risk and protective factors in families of children with ID with a representative sample to estimate more generalizable results. In addition, much research has shown the importance of environment and context in determining health and social outcomes. Future directions for this topic should explore predictors outside the family system to assess whether more systemic issues are at play in maltreatment outcomes for children with disabilities. Finally, future research should tease apart the factors contributing to and protecting against each type of maltreatment separately. Specifically, future work should explore whether factors that predict neglect differ from predictors of abuse, as neglect seems to be a driving source of difference in the counts of maltreatment for children with and without ID.

FIGURES

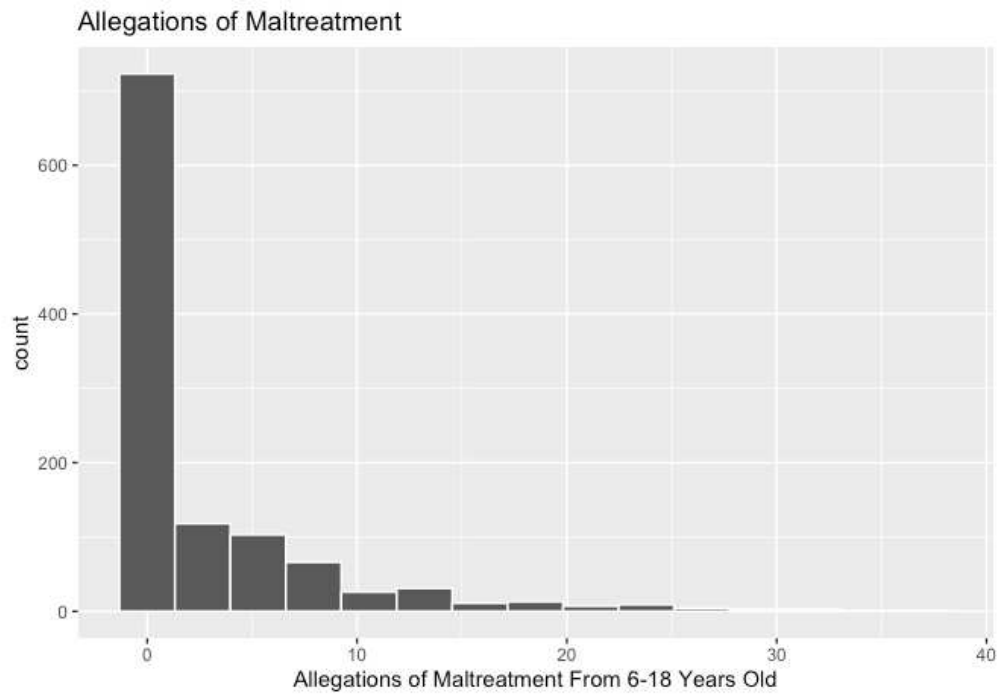


Figure 1

Histogram of Maltreatment Allegations

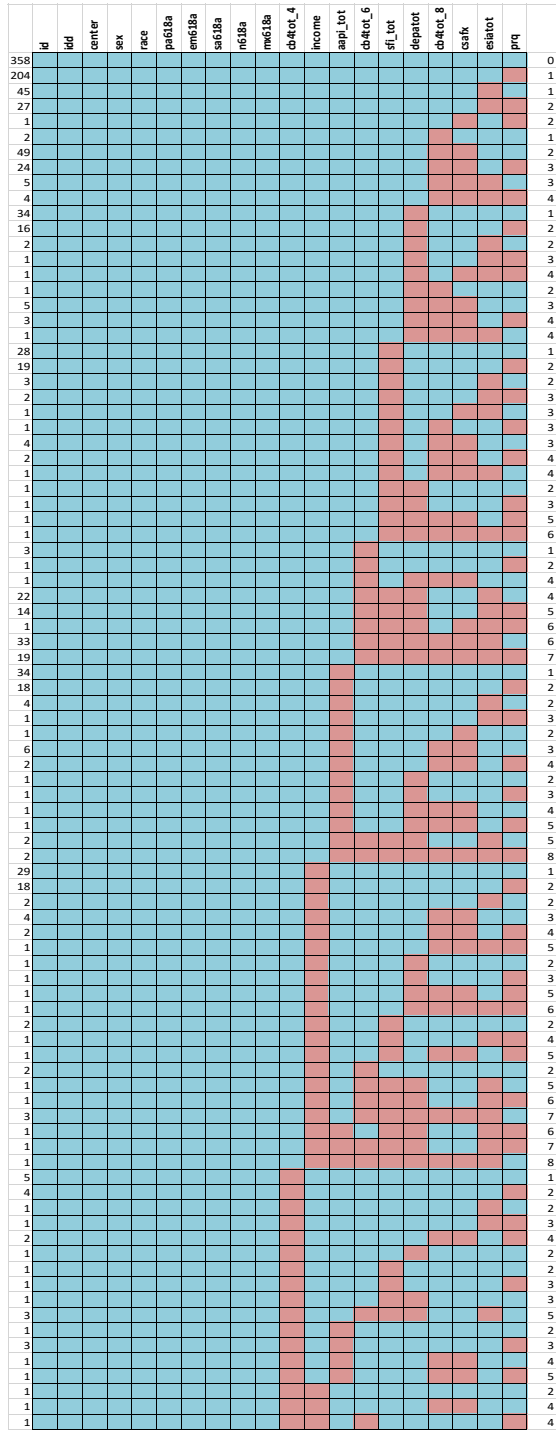


Figure 2

Visualization of missing data (covariates, risk factors, and protective factors). Each column corresponds to a predictor variable. Each row corresponds to a missing data pattern (blue=observed, red=missing). The first column contains a count of how many observations fit

that row's pattern, and the final column contains a count of how many variables are missing in that pattern.

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