DISSERTATION

LATENT PROFILES AND TRAJECTORIES OF FAMILY FUNCTIONING: A RISK AND

RESILIENCE APPROACH TO CHILD MALTREATMENT PREVENTION AND

PROMOTION OF EARLY ACHIEVEMENT

Submitted by

Sarah Prendergast

Department of Human Development and Family Studies

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Spring 2019

Doctoral Committee:

    Advisor: David MacPhee

    Martin Carcasson
    Doug Coatsworth
    Nathaniel Riggs

ABSTRACT

LATENT PROFILES AND TRAJECTORIES OF FAMILY FUNCTIONING: A RISK AND

RESILIENCE APPROACH TO CHILD MALTREATMENT PREVENTION AND

PROMOTION OF EARLY ACHIEVEMENT

Child maltreatment and being unready to learn at kindergarten entry are two societal

problems that are associated with children's later development. Children are at highest risk for

maltreatment during the first four years of life; importantly, this is the same period in which

children gain cognitive and social skills critical for early achievement. Despite progress, rates of

maltreatment remain high and costly to treat, and economic and ethnic disparities in early

achievement persist. Grounded in ecological theory, this dissertation explored trajectories and

classes of family functioning across various levels of risk at birth. In Study 1, change in income,

maternal education, and parenting stress, as well as neighborhood social cohesion, were tested as

predictors of initial levels of maternal aggression and change over time. The results indicated

that associations among the predictors and maternal aggression differed across level of risk. In

Study 2, cumulative family risk and latent classes of family risk at birth were explored as

predictors of kindergarten outcomes and self-reported involvement with Child Protective

Services. The results demonstrated that cumulative risk and three latent classes of family risk

differentially predicted all outcomes. Several policy and programmatic implications are

discussed related to ecological models of prevention, the merits of cumulative risk and risk

combinations, and tailored intervention strategies.

TABLE OF CONTENTS

iv

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

LITERATURE REVIEW

The field of prevention science has made progress in producing innovative solutions to prevent child maltreatment (Daro & Cohn Donnelly, 2015). Beginning in the 1980s, interventions to reduce physical abuse and neglect (e.g., crisis hotlines, parenting education, family resource centers) began to emerge (Daro & Cohn Donnelly, 2015). By the 1990s, the focus of prevention shifted towards programs targeting family processes in the home (e.g., home visitation; Daro & Cohn Donnelly, 2015). These efforts are still underway; however, there is increasing recognition that programs focusing on processes within families, albeit effective in the short term, may not address the entire scope of problems necessary for sustained prevention of maltreatment in the long term (Daro & Dodge, 2009). These prevention efforts have followed trends in research on the etiology of child maltreatment that were originally guided by an individual pathology perspective (Garbarino, 1977). However, a greater understanding of multiple risk factors led to the development of transactional and ecological models (e.g., Belsky, 1980; Cicchetti & Lynch, 1993; Garbarino, 1977) as well as cumulative risk perspectives.

Despite these efforts, national rates of maltreatment remain high. In the United States in 2016, approximately 4 million reports were made to Child Protective Services (CPS) involving 7.4 million children; 676,000 were determined to be victims of child abuse or neglect (U.S. Department of Health and Human Services, 2018). The National Center for Injury Prevention and Control 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, Paulozzi, Melanson, Simon, & Arias, 2008, p. 11). Acts of commission include

physical, sexual, and psychological child abuse, and acts of omission include failing to provide for a child in the form of physical, emotional, medical, or educational needs (Leeb et al., 2008). Other acts of omission, or child neglect, include inadequate supervision or exposure to violent environments (Leeb et al., 2008). For the purposes of this dissertation, child maltreatment is used when referring to all forms of abuse and neglect.

Foundational research has revealed several individual, family, and environmental factors that increase risk for child maltreatment (e.g., Brown, Cohen, Johnson, & Salzinger, 1998; CDC, 2019). However, less is known regarding the effects of changes in risk in early childhood on child maltreatment. Thus, Study 1 of this dissertation contributes to the limited knowledge by assessing trajectories of maternal physical and psychological aggression (i.e., a proxy for abuse) as well as factors that predict change. In addition, past research has found family risk factors, such as violence in the home and socioeconomic status, to be associated with children's school readiness and kindergarten achievement (Holt, Buckley, & Whelan, 2008; Ryan, Fauth, & Brooks-Gunn, 2006) and risk for child maltreatment (Dubowitz et al., 2011; McGuigan & Pratt, 2001). What is less clear, however, is whether cumulative risk or different combinations of family risk variables better predict aspects of children's kindergarten achievement (e.g., social, language, or cognitive skills) and involvement with CPS. Better understanding the extent to which cumulative risk or combinations of family risk differentially predict early achievement and CPS involvement may inform early childhood interventions. For example, current early childhood interventions focus on providing services to high-risk families (i.e., cumulative risk perspective), or tailoring programs based on specific combinations of risk (e.g., combinations of risk perspective). Yet, it is unclear whether a cumulative risk approach in which the highest-risk families receive support to promote children's early learning and prevent maltreatment would be

more effective than a risk-profile approach in which services for early learning support or maltreatment prevention are tailored to specific family needs.

In the sections that follow, I provide an overview of the risk and resilience literature, highlighting the need for more integrated approaches to prevention programs and policies that target multiple aspects of a family's ecology (i.e., family processes, socioeconomic status, neighborhood processes, and children's achievement at school). I also compare cumulative-risk and risk-combinations perspectives for addressing interrelated social problems in early childhood such as the prevention of child maltreatment and reduction of risk-related gaps in early achievement.

Risk and Resilience Perspective

The study of family resilience has evolved from years of research on processes related to individuals' risk and resilience. Individual resilience is defined as the "process of, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances" (Masten, Best, & Garmezy, 1990, p. 426). Researchers examine risk and protective factors in order to elucidate processes that may explain links between adversity and later outcomes (Cowan, Cowan, & Schultz, 1996). Risk factors place individuals at heightened probabilities for experiencing negative outcomes, and are generally thought of in terms of predictor-outcome associations (Cowan et al., 1996). Whereas the link between risk and poor later outcomes can be weakened by the presence of protective factors (Rutter, 2012), vulnerability factors can increase the chances for negative outcomes (Luthar, 2003).

Therefore resilience is not defined as an attribute of an individual, but instead as a dynamic process of risk, vulnerability, and protective factors in relation to outcomes (Luthar, 2003; Masten, 1994). In the past, resilience primarily has been studied within the context of

individual outcomes and less frequently examined related to family dynamics and outcomes. However, a more nuanced understanding of risk, protective, and vulnerability processes related to *family resilience* may help improve policies and programs aimed towards promoting protective processes and mitigating risk. For example, a model integrating both child and family resilience would be able to demonstrate the extent to which functioning in the family system is related to functioning in a child's system (e.g., family routines and children's achievement at school; Masten & Monn, 2015).

Family Resilience

Family resilience draws upon foundational work regarding individual resilience in children (e.g., Garmezy, 1991; Rutter, 1987) as well as major components of family stress theory, systems theory, and positive psychology perspectives (for a review, see Nichols, 2013). Family resilience is "the capacity of a dynamic system to adapt successfully to disturbances that threaten its function, viability, or development" (Masten, 2014, p. 10). What distinguishes family resilience from individual resilience among family members is that the outcome of interest is assessed at the family level of analysis (i.e., involving at least two family members; Patterson, 2002). The extant literature has tended to emphasize outcomes related to parental depression and anxiety, marital dissatisfaction, parent-child conflict, and poor family communication and adaptability (see MacPhee, Lunkenheimer, & Riggs, 2015). Other research has described a few family functions as indicators of family resilience; e.g., family membership, economic support, nurturance, education and socialization, and protection for vulnerable family members (Patterson, 2002). These core family functions indicate that, for example, a high-risk, resilient family would not engage in violence within the home (see Patterson, 2002). As such, Masten and Monn (2015) argued that child maltreatment is an indicator of poor functioning at

the family level of analysis. Thus, family resilience can be described in part by reduced

incidence of maltreatment or avoidance of child abuse (Masten & Monn, 2015).

Due to the multiple ways of operationalizing family resilience (i.e., the absence of harm

versus the presence of positive functioning), it can be difficult to define what a resilient family

should look like. For example, "What are the criteria or standards by which we identify whether

a person, a family, or any other system is adapting well? What is this system 'supposed' to be

doing?" (Masten & Monn, 2015, p. 7). Over the years, various methods of measuring family

resilience have emerged. For example, in the past resilience has been defined as functioning

better than expected following adversity, or as returning to normal functioning following

adversity (Masten, 2007). But others note that family resilience could also be marked by those

families who struggle well (Walsh, 2010). Still others have described family resilience as the

process of continually maintaining or seeking equilibrium (MacPhee, et al., 2015).

Families also typically exhibit various patterns of achieving adaptive outcomes (Walsh,

2010). Thus, not only are there different standards that define what a high-functioning, resilient

family looks like, but the patterns of achieving resilience can also vary (MacPhee et al., 2015;

Ungar, 2016). As such, resilient families may not look the same in part due to the various unique,

complex systems with which families come into contact (Ungar, 2016). For example, one high-

risk family may come into contact with CPS and subsequently be directed to intervention

services, but a similarly high-risk family may not live in a community with high-quality

resources, resulting in a different pattern of resilience. In this way, perhaps the latter family takes

longer to achieve positive functioning (Ungar, 2016). DeHaan, Hawley, and Deal (2013)

therefore urged researchers to study family resilience in a way that (a) documents the variety of

family functioning processes, or pathways, families take rather than labeling families or

dichotomizing them as resilient or not resilient; (b) accounts for differences in functioning outcomes based on the specific stressor(s) being assessed; and (c) can account for resilience both in the short term and long term. Thus, trajectories of family functioning (i.e., physical and psychological aggression) among families with various levels of risk at birth were documented in Study 1 (i.e., long term) and combinations of risk at a specific point in time (i.e., short term) were explored in Study 2.

An Ecological Perspective

Family resilience has been studied among families of children with a developmental disability (e.g., Bayat, 2007), low-income families (e.g., Orthner, Jones-Sanpei, & Williamson, 2004), military families (Saltzman et al., 2011), and families who have experienced natural disasters (e.g., McDermott, Cobham, Berry, & Stallman, 2011). Theories of family resilience also have been proposed for families headed by parents who are lesbian or gay (e.g., Oswald, 2002; Prendergast & MacPhee, 2017) or who are living in times of conflict or war (MacDermid Wadsworth, 2010). Although this research has contributed to the literature by providing information about which factors should be included in a model of family functioning, it is also important to note that these factors do not operate alone; rather, they operate within a complex and dynamic system (Masten, 2007). In other words, "the active ingredients of a risk do not lie in the variable itself, but in the set of processes that flow from the variable, linking risk conditions with specific dysfunctional outcomes" (Cowan et al., 1996, p. 9). Thus, the processes that link risk, vulnerability, and protective factors to particular outcomes should be assessed as a holistic, process-oriented model of family functioning, as was tested in Study 1.

Studying family functioning from a process perspective allows researchers to describe the processes that influence families' progress toward achieving resilient outcomes, which can

inform prevention efforts (DeHaan et al., 2013). This perspective is in contrast to those that focus on labeling some families as resilient at certain points in time and others as not, an arguably less meaningful approach for prevention efforts because it limits the ability to determine how, when, and why families are or become resilient (DeHaan et al., 2013). One way to better understand the various processes of family functioning is to track functioning over time through latent growth curve modeling (LGCM; DeHaan et al., 2013). This particular approach estimates the average path families take; e.g., initially maladaptive but becoming adaptive over time, or initially adaptive but becoming maladaptive over time. For this reason, LGCM was used in Study 1.

Related to DeHaan et al.'s second recommendation, it is also important to consider how processes of family functioning differ depending on the specific type of adversity experienced by the population being studied. For example, whereas for military families an important factor appears to be a family's understanding of the impact of parental deployment on family resilience (e.g., Saltzman et al., 2011), for low-income families, resilience is largely predicted by their economic assets (Orthner et al., 2004). Lietz and Strength (2011) identified commitment to reunification and the family to be a factor specific to families seeking reunification following CPS involvement. Thus, in some cases there are adversity-specific protective and vulnerability factors that make resilience more or less likely. The present dissertation therefore included risk, protective, and vulnerability factors in the model that have been empirically tested among samples of families at elevated risk for maltreatment (e.g., neighborhood environment, maternal education).

Short-Term and Long-Term Studies of Family Functioning

Most researchers are not able to test for change over time in family functioning due to the lack of longitudinal data at the family level of analysis (DeHaan et al., 2013). The present study

was also limited by the lack of family-level data; however, a parent outcome - physical and psychological aggression – measured longitudinally was selected as a proxy for family functioning (Masten & Monn, 2015). Correlational studies can identify the processes most salient to a model of family resilience, but are unable to explain much about how families function over time. In Study 1, changes in income and maternal education between birth and child age 3 were tested as predictors of the various classes, or trajectories, of family functioning, measured by maternal physical and psychological aggression, between child ages 3 to 9. The results inform the field whether changes in risk (i.e., increases or decreases in income and parenting stress; increases in education) throughout early childhood are associated with trajectories of physical and psychological aggression over time.

Another strength of using longitudinal data to assess changes in family functioning over time is that it allows researchers to assess the extent to which constructs such as family functioning are related to outcomes in other systems. From an ecological perspective, human development takes place within several systems (Bronfenbrenner & Morris, 2006). Within the mesosystem, for example, the family system interacts with other systems such as schools or churches. Thus, a pertinent question that could be answered through longitudinal data analysis is whether family functioning is related to outcomes within other ecological systems, with school readiness being a focus of this dissertation.

For example, a child's first formal introduction to the school system begins in kindergarten, when most children in the United States attend half- or full-day programs. Differences in readiness at kindergarten based on income (e.g., Garcia, 2015; Ryan et. al., 2006) and parenting (e.g., Martin, Ryan, & Brooks-Gunn, 2010) are well-documented. Consistent with the ecological perspective that guided the present studies, the literature has also established that

many of the risks for poor kindergarten readiness and achievement overlap with risks for maltreatment (e.g., low income, parental stress, low parental education, negative parenting behaviors, poor parent-child relations). What is less understood is the extent to which the processes tested in the present dissertation related to the prevention of maltreatment (e.g., family functioning and risk) could also apply to the promotion of outcomes in other domains, such as kindergarten achievement. Two-generation approaches (i.e., family-level intervention), as opposed to individualized parent or child services or policies, have the ability to produce outcomes greater than the sum of their parts (Shonkoff & Fisher, 2013). Thus, Study 2 contributes to the literature by testing the extent to which family functioning is related to young children's kindergarten achievement, in addition to the prevention of child maltreatment.

The Current Studies

This dissertation can inform child maltreatment prevention and early childhood achievement programs and policies in several ways. First, in Study 1, trajectories of harsh parental physical and psychological aggression were assessed. Trajectories of parental aggression inform the field about the various paths of functioning families take throughout early childhood, and whether functioning tends to change differently across various levels of family risk. In order to better understand whether predictors of maternal aggression function differently across levels of family risk, several factors were tested as predictors. These factors included the neighborhood environment, household income, parent educational attainment, and parenting stress. Being able to not only describe change over time, but also to explain what predicts various trajectories of family functioning, can improve the focus of prevention efforts by identifying elements that can be targeted by supportive services (e.g., increasing income or education, reducing parenting stress).

9

In Study 2, the extent to which classes of early family risk are related to both kindergarten achievement and involvement with CPS was assessed. Latent class analysis of family functioning revealed various combinations of risk that families experience. As such, these classes can be used to inform prevention efforts, ultimately serving families in a more targeted way based on a specific profile of risk. Class membership at birth was tested as a predictor of kindergarten achievement across a variety of domains such as language, cognitive, and social skills, and whether or not the family has ever come into contact with CPS by age 5. Based on the school readiness literature described in Chapter III, it was hypothesized that more positive classes of family functioning (e.g., absence of parent substance use or violence in the home) would predict greater kindergarten achievement and lower risk for CPS involvement than more negative classes involving higher levels of adversity.

CHAPTER II

STUDY 1: TRAJECTORIES OF MATERNAL AGGRESSION

A central role of the family system is protection. As such, child maltreatment is a broad

indicator of poor family functioning (Masten & Monn, 2015). The National Center for Injury

Prevention and Control 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 et al., 2008, p. 11). Acts of commission include physical, sexual, and

psychological child abuse, and acts of omission include failing to provide for a child in the form

of physical, emotional, medical, or educational needs (Leeb et al., 2008). Other acts of omission,

or child neglect, include inadequate supervision or exposure to violent environments (Leeb et al.,

2008). Thus, it is important to distinguish between the multiple forms of child maltreatment (i.e.,

abuse versus neglect). Scholars have called for more integrated approaches to child maltreatment

prevention (Van Scoyoc, Wilen, Daderko, & Miyamoto, 2015) to address the multitude of

adversities that families and children face; therefore it is also important to incorporate individual,

family, and context variables. The present study focused on risk related to physical and

psychological aggression – a proxy for physical and psychological abuse – and explored

individual, family, and context variables as correlates.

Risk for Maltreatment

Foundational research has identified several factors that predict maltreatment: young

maternal age at birth; 3 or more children in the home; inadequate financial resources; violence in

the home; drug or alcohol abuse present; mother ambivalence, denial, or rejection of pregnancy;

suspected parenting inadequacy; maternal mental health problems; single parenthood; and

mother not having a high school degree (Brown et al., 1998; CDC, 2019). Research regarding

child maltreatment tends to focus more on characteristics of a perpetrator rather than

characteristics of a victim. Even so, research does suggest that children's age is a risk factor for

child maltreatment. Children are at greatest risk before the age of 4 (CDC, 2019). Second,

children with difficult temperaments, developmental delays, disabilities, or other health concerns

also are at elevated risk for evoking child maltreatment (Brown et al., 1998; CDC, 2019).

In terms of gender differences in reported and substantiated cases of maltreatment, using

linked data from the 2003-2014 National Child Abuse and Neglect Data System and Census

data, Kim, Wildeman, Jonson-Reid, and Drake (2017) found that female children had slightly

higher lifetime prevalence of being investigated (37.6% compared to 36.5% for males) and had

higher lifetime prevalence of neglect, sexual abuse, and emotional abuse whereas males had

higher lifetime prevalence of physical abuse. Related to race and ethnicity, some studies show

that African American families have higher lifetime rates (53%) of being investigated by CPS

(Kim et al., 2017). Yet, in 2016, victims of child maltreatment were 44.9% White, 22.0%

Hispanic, and 20.7% African-American (U.S. Department of Health and Human Services, 2018).

Some researchers have attributed the high rates of African American investigation to links

between income and race or ethnicity (Kim & Drake, 2018). Child gender and parent race and

ethnicity therefore were included in the present study as covariates of physical and psychological

aggression.

Related to other risk factors, Dubowitz et al. (2011) followed low-income families for 10

years subsequent to pediatric care and found that mothers with less than a high school education

were 1.55 times more likely to have been involved with CPS, and a history of drug use was

associated with being 1.70 times more likely to have been involved with CPS. In addition, a one

standard deviation increase in depression was associated with a 28% increased chance of being involved with CPS. Other contributing factors that placed families at greater likelihood of having been involved with CPS included being unmarried, receiving public assistance, and having more children in the home (Dubowitz et al., 2011). Other studies report similar findings. For example, Li, Godinet, and Arnsberger (2011) found that married parents were only .19 times as likely to have a CPS report, compared with unmarried parents. Although unmeasured in their study, the authors noted that findings tied to family structure tend to be related to other factors such as social support and financial resources (Li et al., 2011).

In their review of the literature, Herrenkohl, Sousa, Tajima, Herrenkohl, and Moylan (2008) also found that there is substantial overlap between child abuse and domestic violence in the home. For example, using data from the Fragile Families and Child Wellbeing Study (FFCWS), as was used in the present study, mothers who experienced intimate partner violence (IPV) were at higher risk for child maltreatment at child age 3, controlling for depression, parenting stress, and other covariates of IPV (Taylor, Guterman, Lee, & Rathouz, 2009). Thus, Taylor et al. (2009) concluded that IPV poses a unique risk for child maltreatment.

Although previous studies have informed the field of individual risk factors that increase a family's risk for maltreatment, few have utilized ecological models as was tested in the present study. Using an ecological model, Stith et al. (2009) performed a meta-analysis of 867 studies to assess risk for child maltreatment. The results demonstrated that the largest effect sizes for child abuse risk factors were parent anger and hyper-reactivity, family conflict, and low family cohesion. However, this meta-analysis did not assess changes over time in risk, and did not assess the accumulation of risk factors as was addressed in the present study.

Another consistent risk factor examined is a parent's history of being abused as a child (e.g., Dixon, Brown, & Hamilton-Giachritsis, 2005). The extant literature demonstrates great variability in this risk factor's predictive utility such that anywhere from 6.7% to 70% of parents abused as children are also abusive (Berzenski, Yates, & Egeland, 2014). This variability can be attributed, in part, to the study design. That is, retrospective studies tend to find higher rates of intergenerational transmission than prospective studies as is proposed in the present study (Egeland, 1993; Kaufman & Zigler, 1987, 1993). Among families at elevated risk for maltreatment but who have not been involved with CPS in the past, mothers with a history of child maltreatment were significantly more likely to have a CPS report (odds ratio of 2.26; Li et al., 2011). However, results from a meta-analysis indicated that there was not a strong pattern of intergenerational transmission of maltreatment (Thornberry, Knight, & Lovegrove, 2012). As is the case with all risk factors mentioned thus far, no individual risk factor predicts child maltreatment universally; thus, approaches that assess multiple risks are better suited to inform targeted prevention programs.

Trajectories of Physical and Psychological Aggression

Past research investigating family functioning has primarily used cross-sectional designs (DeHaan et al., 2013). However, cross-sectional designs, as compared to longitudinal designs, are misaligned with theory regarding family functioning in that they are unable to test for the processes of becoming resilient and maintaining adaptive self-regulation (MacPhee et al., 2015). However, as Masten and Monn (2015) noted, it can be difficult to determine what level of functioning should represent resilience. DeHaan et al. (2013) therefore recommended that researchers avoid labeling some families as resilient or not, and instead describe the various paths families may take.

Although trajectories of functioning following child maltreatment have been extensively explored (e.g., children's behavior, mental health; Kim, Cicchetti, Rogoush, & Manly, 2009), to the best of my knowledge, only one other study has assessed trajectories using the same measure of family functioning explored by the present study. Kim, Pears, Fisher, Connelly, and Landsverk (2010) used LGCM to assess change in physical and psychological aggression, using data at child ages 1, 2, and 3 years. The results indicated that, on average, parental aggression increased significantly over time, with maternal alcohol use and abuse history predicting parental aggression at age 3, and maternal age predicting change such that older mothers reported harsher parenting over time. However, Kim et al. (2010) did not assess whether families with various levels of risk had different trajectories over time, as was tested in the present study. The present study therefore extends findings from Kim et al. (2010) by testing the extent to which subgroups of families follow different trajectories of physical and psychological aggression, and which factors predict the various trajectories.

Predictors of Change

  Income. Although there is a body of evidence demonstrating that poverty increases children's risk for maltreatment, especially neglect (e.g., Sedlak et al., 2010), there are fewer findings related to *changes* in income over time in early childhood as being a protective or vulnerability factor. In a seminal longitudinal study of risk and resilience among children from age 4 to age 13, environmental risks demonstrated more stability than change (Sameroff, Bartko, Baldwin, Baldwin, & Seifer, 1998). However, for children whose environmental risk changed from high to low across that time period, IQ increased by 13 points (Sameroff et al., 1998). For children whose environmental risk changed from low to high, IQ decreased by 15 points (Sameroff et al., 1998). Based on their findings, the authors suggested that reduction in risk

(e.g., improvement in family income or neighborhood quality) may be a more promising prevention strategy for improving high-risk children's outcomes than increasing individuals' capacity for resilience (Sameroff et al., 1998).

Much of the research investigating the causal effects of income, or changes in income, has focused on child outcomes both in early childhood (e.g., achievement) as well as in adulthood (e.g., employment rates; Duncan, Magnuson, Kalil, & Ziol-Guest, 2011). For example, Duncan, Morris, and Rodriques (2011) found that $1000 in additional annual family income increased preschoolers' cognitive achievement by 6% of a standard deviation. Also, a $3000 increase in annual income between birth and age 5 was associated with a 19% increase in adult income and a 135-hour increase in hours worked per year (Duncan, Ziol-Guest, & Kalil, 2010). Few studies have assessed changes in income as related to indicators of family functioning rather than child outcomes. Tang and Sinanan (2015) demonstrated that increases in income were associated with decreases in parental detachment and intrusiveness during a parent-child task, but were unrelated to changes in sensitivity or stimulation. These findings were strongest for families who had lower incomes at the beginning of the study (Tang & Sinanan, 2015).

The link between economic stress and family functioning has been well-established through studies testing the Family Stress Model (FSM; Conger & Conger, 2002). In this model, economic insufficiency increases stress and undermines parents' functioning, which in turn relates to poor child outcomes. Although several studies have been published on the FSM, most have been cross-sectional (for a review, see Neppl, Senia, & Donnellan, 2016). Using longitudinal data, Neppl et al. (2016) found that families' economic hardship was related to economic pressure at child age 2, which was associated with parent conflict, distress, and harsh punishment when children were between the ages of 3 and 5, which in turn were related to

16

children's externalizing behavior when the children were ages 6 to 10. Thus, it seems likely that changes in income would be related to physical and psychological aggression as well. Indeed, using the FFCWS dataset and the same proxy measures of neglect and physical abuse as was used in the present study, Berger, Font, Slack, and Waldfogel (2017) found that an increase in income through the Earned Income Tax Credit (EITC) was associated with a decrease in neglect and CPS involvement but not physical abuse.

These findings provide preliminary evidence that cash transfers could be effective in preventing child neglect, at least among single mothers with incomes below $45,000 (i.e., families eligible for EITC). However, what is less clear is the extent to which a cash transfer prevention strategy would be uniformly effective for families at various levels of risk for psychological or physical abuse. Additional research is necessary to better understand the extent to which changes in income during the early childhood years predict variation in trajectories across multiple levels of risk (e.g., low, moderate, high). Findings from this line of research could increase the precision of cash assistance prevention strategies by demonstrating whether cash assistance programs reduce the propensity for abuse for all families, or if some groups of families (e.g., those who are at greater risk) could benefit from additional services. In the present study, I addressed this gap in the literature and hypothesized that change in income from age 1 to age 3 would predict variation in trajectories of physical and psychological aggression.

Education. Maternal education also has been linked consistently to parenting and child outcomes (Harding, Morris, & Hughes, 2015). Typically, researchers assess education level as a static characteristic, rather than accounting for change (Magnuson, Sexton, Davis-Kean, & Huston, 2009; Pressler, Raver, & Masucci, 2016). Yet, Pressler et al. (2016) reported that in recent studies, between 5% and 26% of parents increased their education following the birth of a

child. In a study of Head Start families, Pressler et al. (2016) found that 39% of mothers increased their own educational attainment after enrolling their children in preschool. Such changes in maternal education after the birth of a child may not directly relate to children's school readiness (Magnuson et al., 2009). However, Magnuson et al. (2009) demonstrated that increases in education were associated with the quality of the home environment (e.g., more learning materials, responsiveness). Conversely, among mothers with more to gain (i.e., less education to start with at birth), increases in education were significantly associated with children's vocabulary comprehension and expressive language (Magnuson et al., 2009).

Evidence of a link between increases in education and child or family outcomes is particularly salient to two-generation policies and programs. Among Head Start children, increases in maternal education between child ages of 3 and 5 were positively associated with cognitive scores and externalizing behaviors (Harding, 2015). Although the first finding seems to suggest positive effects of maternal education, the latter potentially reflects greater strain placed on families while the mother is pursuing education, potentially explaining increased behavior problems for children (Harding, 2015). Research assessing outcomes related to maternal increases in education is limited, and the research that does exist has tended to focus on child outcomes, generally neglecting family functioning (Pressler et al., 2016). Pressler et al. (2016) addressed this gap by demonstrating that increases in maternal education were negatively associated with poverty-related risk factors by 5th grade, such as family health-related issues, being a single parent, trouble paying for bills, and inability to do fun things as a family. In this way, Pressler et al. (2016) has provided preliminary evidence that increases in education not only are related to child outcomes, but also family outcomes. The present study built on this finding

by testing the extent to which increases in education relate to harsh physical and psychological aggression as well.

Neighborhood cohesion. The neighborhood in which families reside has also been linked to child maltreatment (for a review, see Coulton, Crampton, Irwin, Spilsbury, & Korbin, 2007). The effect that lower-quality neighborhoods have on parent and family functioning is partially attributed to these neighborhoods having greater residential turnover, fewer social services, less support among neighbors, more concentrated poverty, and less safety (e.g., Merritt, 2009; Pinderhughes, Nix, Foster, Jones, & The Conduct Problems Prevention Research Group, 2001). A review of 25 studies demonstrated that neighborhood structure (e.g., income level, unemployment rates, and property values) is consistently correlated with rates of maltreatment (Coulton et al., 2007).

A related body of research has focused on the extent to which families' perceptions of their neighborhood, as opposed to structural measures, is associated with maltreatment as well. In a sample of participants of the Women, Infants, and Children government subsidy program, Maguire-Jack and Showalter (2016) found that neighborhood social cohesion, defined as mutual trust and support among neighbors, was associated with less basic-needs neglect but not neglect from parental substance use or mental health issues or physical abuse. Yet, using structural equation models to test for pathways in the age 3 Fragile Families and Child Wellbeing sample, Guterman, Lee, Taylor, and Rathouz (2009) found that parent perceptions of their neighborhood (e.g., social disorder, informal social control, and social cohesion) predicted child physical abuse but not neglect. Furthermore, parenting variables (e.g., mother's sense of control and parenting stress) mediated the association between perceptions of the neighborhood and all forms of child abuse and neglect.

In a sample of 343 Chicago neighborhoods, Molnar et al. (2016) found that similar neighborhood-level social processes (e.g., social control, cohesion, disorder) were directly associated with neglect and physical abuse, such that greater social control, cohesion, and lower disorder significantly reduced the odds of substantiated abuse and neglect. Guterman et al. (2009) measured child abuse and neglect through behavioral measures reported by the parents at child age 3 that did not meet the criteria for substantiated maltreatment. Molnar et al. (2016) used cross-sectional data from substantiated reports from CPS spanning birth to age 18 to measure child maltreatment. Although Maguire-Jack and Showalter (2016) and Guterman et al. (2009) used the same measure of abuse and neglect as was used in the present study, longitudinal relations between abuse or neglect and perceived neighborhood cohesion has yet to be tested. Further, perceptions of neighborhood social processes might not be uniformly related to physical and psychological aggression across families at all levels of risk. In the present study, parent perceptions of neighborhood social cohesion were examined as a correlate of trajectories of physical and psychological aggression across families with various levels of risk at birth.

Parenting stress. Families experience a variety of stressors that are related to abuse and neglect, including those resulting from circumstances external to family processes, such as income or education level, and those that are internal within family processes, such as parenting stress. Thus, it is important to differentiate between a stressed parent (e.g., as a result of economic stress) and parenting stress (Crnic & Ross, 2017). Parenting stress is defined as "a set of processes that lead to adverse psychological and physiological reactions arising from attempts to adapt to the demands of parenthood" (Deater-Deckard, 2004, p. 6). In this way, stressors should be assessed separate from the cognitive processes involved in appraising and coping with stress (e.g., Crnic & Ross, 2017; Lazarus, 1993). For example, some parents may positively

appraise stressful conditions (e.g., an opportunity for personal growth) and therefore may have

low levels of perceived parenting stress while others may negatively appraise the same stressful

conditions and have high levels of perceived parenting stress (Folkman & Moskowitz, 2004).

Research using Abidin's (1995) Parenting Stress Index (PSI), as was used in the present

study, has demonstrated positive correlations between parenting stress and risk for child abuse

(e.g., Crouch & Behl, 2001; Taylor et al., 2009). Also using the PSI, Williford, Calkins, and

Keane (2007) demonstrated overall decreases in parenting stress across the preschool period

among a sample that included children at-risk for externalizing behaviors, with initial stress

levels at child age 2 being predicted by child factors (e.g., externalizing behaviors such as

aggression) and mother factors (e.g., psychopathology, single parenthood). However, using a

different measure of parenting stress with low-risk families (i.e., 90% were two-parent

households, 60% were Caucasian and employed parents), Crnic, Graze, and Hoffman (2005)

found that parenting stress was relatively stable over the preschool period and predicted

somewhat small amounts of variance in parenting behaviors – such as positivity (5.6%) or

negativity (1.5%) at child age of 60 months. As Crnic et al. (2005) noted, therefore, the link

between parenting stress and behavior is still unclear. Further, both parenting stress and child

abuse potential are highest among families with five or more risk factors (Nair, Schuler, Black,

Kettinger, & Harrington, 2003). Thus, the present study contributes to the literature regarding the

effects that changes in parenting stress across levels of risk have on physical and psychological

aggression.

Related to the external stressors previously reviewed, Duncan et al. (2011) noted that

supplemental programs to boost family income tend to have little effect on improving positive

parenting or reducing harsh parenting, but potentially have positive effects on children by

21

allowing parents to provide child care and other essential care items for children. In this way, it appears that the effects of external stress (e.g., income) and parenting stress may be distinct, in that changes in income may not reduce physical and psychological aggression but changes in parenting stress might. Yet, Duncan et al.'s study did not explore the ways that income or parenting stress might influence parent or child outcomes across the risk spectrum, only for those in welfare or antipoverty programs. Thus, it is important to explore the extent to which variation in income, stress, and education are associated with physical and psychological aggression across all risk levels, not only those at heightened risk, as was explored in the present study.

Theoretical Foundations

Ecological systems theory provides the theoretical foundation of this study (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006). The original ecological model proposed by Bronfenbrenner (1979) provides a foundation for testing the interactions among several contexts of an individual's environment (i.e., the mesosystem, microsystem, exosystem, macrosystem). A later version of the model recognized time (i.e., the chronosystem) as being central to developmental systems and led to the development of the Process-Person-Context-Time (PPCT) model (Bronfenbrenner & Morris, 1998; 2006). The PPCT model includes four aspects of development that, when integrated, capture the dynamic nature of human development. The *processes* referenced in the PPCT model are defined as interactions that take place between individuals and other aspects of their context on a regular basis. Examples of such processes from a family resilience perspective may include interactions between family members and their neighborhood (i.e., mesosystem), parent-child conversations at dinner time (i.e., microsystem), or family routines. The *person* level of the PPCT model is one that is typically

explored by human development research. That is, individual characteristics shape human development by means of cognitive or behavioral skills and personality traits.

From a family resilience perspective, these characteristics could include the aforementioned indicators of family functioning such as protection (i.e., absence of violence, abuse, or neglect). The context, as defined by the PPCT model, includes the various systems with which individuals come into contact as described by ecological theory. In the present study of family functioning, the contexts that may contribute to high-risk families' ability to protect their children from physical or psychological aggression included the neighborhood environment and socioeconomic status (i.e., a cultural macrosystem context). Last, inherently missing from cross-sectional studies is the contribution of *time* to development. A central construct in family resilience is equifinality (Cicchetti & Rogosch, 1996) in that there may be multiple developmental pathways to the same outcome. MacPhee et al. (2015) have likened the processes of resilience as that of continually maintaining or seeking equilibrium. In this way, chronic adversity, such as poverty, in addition to the stressors of everyday life (e.g., transitions to parenthood, birth of a child, children's transitions to formal schooling), can compromise families' ability to regulate and achieve equilibrium – often resulting in poorer family functioning (MacPhee et al., 2015). The PPCT model provides the foundation from which the present study can explore the family system longitudinally from a family risk and resilience perspective.

As such, associations among family- and individual-level variables with neighborhood-level variables also may alter developmental pathways of family functioning. For example, past research has demonstrated that access to social and economic resources may alter how likely it is that families are able to meet the needs of the family unit and regulate towards equilibrium

(Walsh, 2016). Therefore, in this study resources (e.g., increases in income level and education) were analyzed as predictors of trajectories of physical and psychological aggression. In contrast to earlier perspectives of resilience that focused on individual factors (e.g., parenting stress – also included in this study as a predictor), this perspective integrates the study of individual factors or family processes with the broader social ecology of economic and educational opportunities that contribute to trajectories of development (Ungar, 2016).

The Present Study

Guided by ecological theory and risk and resilience perspectives, the present study tested a model of family functioning among families across the spectrum of risk for child maltreatment at birth. Changes in income, changes in maternal education, changes in parenting stress, and neighborhood cohesion were included as predictors of family functioning trajectories. Based on the limited research available, I hypothesized that changes in income, education, and parenting stress would predict the intercept and slope of family functioning trajectories. I also hypothesized that neighborhood cohesion measured at age 3 would be associated with the intercept and slope of family functioning trajectories.

Method

The FFCWS followed a cohort of about 5,000 families with children born between 1998 and 2000 from birth to age 15. The sample was obtained through stratified random sampling of 20 of the 77 United States cities with populations of 200,000 or more (Reichman, Teitler, Garfinkel, & McLanahan, 2001). A detailed description of the sampling design can be found in Reichman et al. (2001). The FFCWS oversampled for nonmartial births as the purpose of the study was to understand better the relationships and family functioning with families comprised of unwed parents with children.

Participants

Data were collected from 4,898 births at 75 hospitals across the United States. Nearly three-quarters of the families were headed by a single parent at birth. The sample is representative of nonmarital births in cities with populations of more than 200,000 (Reichman et al., 2001). Parents were excluded from the study if they planned to place the child in an adoptive home, if the father was not living at the time of birth, if the mother or child was too ill to participate, or if the parent did not speak English or Spanish well enough to be interviewed (Reichman et al., 2001). In some cases, both the biological mother and father completed surveys. However, for the purposes of this study, only family-level data reported by the mother was analyzed. The present study included only data from FFCWS participants with medical records data present at birth ($N = 3529$). Three independent samples t tests were conducted to test for bias[1]. The results demonstrated that those with hospital data present did not differ significantly in the three physical or psychological abuse outcome variables from those without data present. Of the 3529 families with medical records data, 1281 (36%) had complete outcome data at all three time points; models were estimated including the full sample ($N = 3529$). Response rates for the outcome variables in the medical records sample were 66% at age 3, 61% at age 5, and 60% at age 9.

Procedure

The FFCWS core study and supplemental home assessment data are publically available through Princeton and Columbia University collaborations. The core study conducted interviews with parents or primary caregivers when the children were ages 1, 3, 5, 9, and 15 years old. A supplemental study involved home assessments when children were ages 3, 5, and 9 years. Other

---

[1] Year 3: $t(3161) = 0.13$, $p = .90$; Year 5: $t(2896) = 0.53$, $p = .60$; Year 9: $t(2904) = -0.75$, $p = .46$

supplemental studies included information on parents' medical, employment, and incarceration histories, as well as religion, child care, and early childhood education, some of which are only available through contracts with the FFCWS. The Institutional Review Board at Colorado State University and the FFCWS review panel approved the use of the medical records contract data for use in the present study.

Measures

      Racial and ethnic identity. Parent and child racial and ethnic identity were recorded through the baseline parent questionnaire.

      Baseline cumulative risk. Baseline risk indicators were derived from medical records and parent surveys at birth: history of depression; history of family dysfunction/instability; suspected parenting inadequacy; unwanted pregnancy prior to delivery; history of domestic violence/abuse in the household; history of sexual abuse; alcohol use during pregnancy; amphetamine use during pregnancy; cocaine/crack use during pregnancy; heroin use during pregnancy; marijuana use during pregnancy; mother has other caregiving burden (i.e., caring for someone in the house with illness, trauma, or disability); history of inadequate money; history of homelessness; history of poor housing; history of legal/criminal justice issues; young mother at birth (19 years or younger); three or more children in the home; unmarried at birth; family poverty (i.e., 100% of poverty line or less); mother not a high school graduate, and low birth weight at birth. Each of the 22 individual risk factors were coded as 0 (*absent*) or 1 (*present*) and summed for the total risk score (Evans, Li, & Whipple, 2013). Based on Brown et al.'s (1998) finding that risk for all forms of maltreatment increases at four or more risk factors, three groups were identified based on the number of risks present at birth: 0-1 (Low Risk), 2-3 (Moderate

Risk), and 4 or more (High Risk). The frequency of each group is as follows: Low Risk (n = 913; 26%), Moderate Risk (n = 1520; 43%), and High Risk (n = 1096; 31%).

Education. At age 3, mothers were asked if they had increased their education (i.e., in school or training) since age 1. A binary variable indicated whether (1) or not (0) parents increased their educational attainment.

Income-to-poverty ratio. At each data collection time point, primary caregivers reported the total household income from all sources. In addition, respondents provided the number of people living in the household. Household income and size was used by FFCWS researchers to create a household income-to-poverty ratio at age 1 and age 3.

Neighborhood social cohesion. At age 3, primary caregivers answered questions related to the family's neighborhood social cohesion. Respondents answered five questions about the extent to which neighbors get along or can be easily trusted, on a scale from 1 (*strongly agree*) to 5 (*strongly disagree*). Negatively worded items were reverse coded so that higher scores indicate greater social cohesion. Scores were averaged to form a neighborhood social cohesion composite score (α = .80).

Parent physical and psychological aggression. At ages 3, 5, and 9, 17 items from the Parent-Child Conflict Tactics Scales (Straus, 1990; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998) were included as indicators of psychological aggression (α = .60) and physical aggression (α = .55)[2]. Examples of physical aggression included: hit him/her on the bottom with something like a belt, hair brush, a stick or some other hard object; and slapped him/her on the hand, arm, or leg. Examples of psychological aggression included: shouted, yelled, or screamed

---

[2] Low-reliability of scales has been previously discussed by Straus et al., (1998). Parents who use one form of physical aggression (i.e., hitting with a belt) do not systemically report using other forms (i.e., pinching). Yet, any one item on the scale could reflect a case of child maltreatment.

at child; threatened to spank or hit but did not actually do it. Eight items from the original

measure that assess severe physical assault were not included in the FFCWS. Parents responded

on a 8-point scale ranging from 0 (*never*) to 6 (*more than 20 times in the past year*), with 7

indicating *not in the past year, but has occurred previously*. Following Straus et al.'s

recommendation, scores of 0 through 2 remained the same and all scores of 3 through 6 were

recoded to the midpoint of each of their ranges (e.g., 3 = 4 which is the midpoint of "3 to 5 times

in the past year", 4 = 8 which is the midpoint of "6 to 10 times in the past year", 5 = 15 which is

the midpoint of "11 to 20 times in the past year", and 6 = 25 which is the recommend midpoint

of "25 or more times in the past year"). A score of 7 was recoded to 0 (Straus et al., 1998).

Physical and psychological aggression was combined into one score by adding scores from all

items in the scale to form a yearly frequency score for each family.

Parenting stress. Four items from the Parenting Stress Index (Abidin, 1995) were used

to measure parenting stress at ages 1 and 3. Items included: Being a parent is harder that I

thought it would be; I feel trapped by my responsibilities as a parent; I find taking care of my

child(ren) is more work than pleasure; I often feel tired, worn out, or exhausted from raising a

family. Items were rated on four-point scale ranging from 1 (*strongly agree*) to 4 (*strongly

disagree*). Item responses were averaged to form a composite at ages 1 ($\alpha = .63$) and 3 ($\alpha = .63$).

Analytic Procedure

Floor effects were evident for the physical and psychological aggression outcomes at

each time point. Problem behaviors are difficult to model longitudinally because they often are

not normally distributed and tend to have larger percentages of the sample scoring in the lowest

range (Feldman, Masyn, & Conger, 2009), as was evident in the present study. For example,

26% of participants scored between 0 and 10 times at age 3, between 0 and 11 times at age 5, and

between 0 and 4 times at age 9. Two-part modeling is a solution for censored-zero outcomes

(Feldman et al., 2009), in which a growth model is fit for the binary part of the distribution (0 vs.

continuous) and another model is fit for the continuous part of the distribution. However, in the

present study lower scores accumulated across a range of scores, not just zero, which rendered

that approach inappropriate for use in the present study. The best solution for the present study

was to discretize the distribution of physical and psychological aggression in order to perform

growth modeling with categorical outcomes so that assumptions of normality were not required.

All models were estimated using a robust maximum likelihood estimation (MLR) using

Mplus software, version 7 (Muthén & Muthén 1998-2017). MLR is preferable to multiple

imputation (MI) for handling missing data, especially when advanced statistical software is

available (Allison, 2012). Additionally, MLR provides maximum likelihood parameter estimates

with standard errors that are robust to nonnormality. Growth modeling with categorical outcomes

using Mplus allows for nonsymmetrical distributions (Feldman et al., 2009) and assumes an

underlying continuous latent variable, y*, exists in the real world (see Feldman et al., 2009 for a

complete description). Thus, physical and psychological aggression was discretized into 10

categories to reflect the original distribution. The categories were discretized as follows:

Category 1 = 0-10 times, Category 2 = 10.1-25.29 times, Category 3 = 25.30-37.94 times,

Category 4 = 37.95-50.59 times, Category 5 = 50.60-63.52 times, Category 6 = 63.25-75.88

times, Category 7 = 75.89 -88.53 times, Category 8 = 88.54-101.18 times, Category 9 = 101.19-

126.47=9 times, and Category 10 = 126.48-215 times. All models were conducted using the

categorical outcomes.

All models were specified as ordered logit link models whereby the ordinal outcomes

represented y* (Feldman et al., 2009). Thresholds, or location parameters, for each category

separate the underlying latent continuous variable into the 10 distinct categories of physical and psychological aggression. For example, when the intercept is less than the first threshold, or tau, then it falls within category 1, and if the intercept value is between tau 1 and tau 2, then it falls within category 2, and so on. This process is cumulative in that each threshold distinguishes between scoring in or above a category (Grimm et al., 2017).

Thresholds were constrained to be constant across time for each category to meet the longitudinal threshold invariance assumption (Grimm et al., 2017). Thresholds, therefore, provide information about the proportion of participants scoring in each category (Grimm et al., 2017). Following recommendations by Grimm et al. (2017), all intercepts were fixed at zero to identify the model, and variances and covariances were freely estimated. The intercept and slope were assumed to follow a multivariate normal distribution (Grimm et al., 2017). The total number of cases included in the following models was 3014 (i.e., 515 cases were not included in estimation due to missing outcome data at all three ages).

In order to estimate change in income-to-poverty ratio and parenting stress between age 1 and age 3, two latent change score models were fit according to McArdle's (2009) latent change score model. Latent difference, or change, score modeling (McArdle, 2009) is superior to subtracting two raw scores in that it accounts for the change in true scores while accounting for measurement error (Grimm et al., 2017). In addition, the five observed indicators of neighborhood cohesion at age 3 were included in the model as indicators of a latent neighborhood variable. The latent neighborhood cohesion measurement model fit was assessed according to tests of absolute fit (the Root Mean Square Error of Approximation; RMSEA and the Standardized Root Mean Square Residual; SRMR) and a test of comparative fit (CFI). The CFI of .90 and SRMR of .07 indicated sufficient fit to the data (CFI values between .90 and .95

and SRMR values less than .08 are adequate; Hu & Bentler, 1999). The RMSEA of .19 was less

than adequate (values less than .05 indicate good fit to the data (MacCallum, Browne, &

Sugawara, 1996). The two latent change scores, latent neighborhood cohesion, observed

increased maternal education, and observed covariates were included as predictors in the

conditional models.

Results

Descriptive statistics for all demographic and study variables are presented in Tables 1.1

and 1.2. On average, mothers were 25.05 years old ($SD = 5.99$) at the baseline measurement. The

sample included nearly equal numbers of male ($n = 1839$; 52.1%) and female ($n = 1690$; 47.9%)

focal children. At baseline, the average household consisted of approximately two adults ($M =$

2.35, $SD = 1.04$) and one child ($M = 1.29$, $SD = 1.33$) and had an average income-to-poverty

ratio of 2.13 ($SD = 2.32$). At baseline, 23.2% of mothers ($N = 817$) were married to the focal

child's biological father and 54% of unmarried mothers were in a steady relationship with the

focal child's biological father ($N = 1879$).

Table 1.1

Demographic Information for Biological Mothers and Fathers

	Bio-Mothers		Bio-Fathers	
	n	*%*	*n*	*%*
Race/Ethnicity				
White, non-Hispanic	691	19.6	595	16.9
Black, non-Hispanic	1666	47.2	1748	49.6
Hispanic	1023	29.0	1027	29.1
Other	141	4.0	155	4.4
Missing	8	0.2	4	0.1
Education				
Less than high school	1297	36.8		
High school or equiv.	1062	30.1		
Some college, technical training	831	23.5		
College or graduate degree	339	9.6		
Missing	0	0.0		
Total	3529	100	3529	100

Table 1.2

Descriptive Statistics for all Study Variables

	N	Min.	Max	*M*	*SD*	Skew
Study Variables						
Cumulative risk – birth	3529	0	14	2.86	2.06	1.24
Parenting stress – age 1	2698	1	4	2.18	0.69	0.37
Parenting stress – age 3	3011	1	4	2.26	0.67	0.24
Poverty-to-income – age 1	3155	0	35.90	1.75	2.10	3.75
Poverty-to-income – age 3	3061	0	27.20	1.86	2.18	3.84
Neighborhood (willing to help) – age 3	2395	1	5	3.81	1.25	-1.04
Neighborhood (close-knit) – age 3	2387	1	5	3.50	1.38	-0.60
Neighborhood (trust each other) – age 3	2385	1	5	3.31	1.41	-0.42
Neighborhood (get along) – age 3	2389	1	5	3.60	1.29	-0.60
Neighborhood (share values) – age 3	2380	1	5	3.12	1.36	-0.10
Physical and psychological aggression – age 3	2341	1	10	3.66	2.54	--
Physical and psychological aggression – age 5	2156	1	10	3.54	2.43	--
Physical and psychological aggression – age 9	2135	1	10	2.44	1.90	--

Single-Group Latent Growth Curve Model

A single-group LGCM with categorical outcomes was fit to estimate the average

trajectory for the entire sample. The first estimated threshold was -1.99 and the last threshold

was 5.33. Unstandardized results demonstrated that the average response propensity (i.e., slope)

decreased by .25 per year, $B = -0.25$, $SE = 0.01$, $p < .001$. Figure 1.1 displays the average linear

trajectory graphed according to the measurement model $E(y^*_{ti}) = \alpha_{00} + \alpha_{01}a_t$ (Masyn, Petras, &

Liu, 2014). Time was centered at age 3 in this model; thus, the average response propensity was

calculated as $E(y^*_{ti}) = 0 + (-.25)a_t$. According to this equation, the response propensities at age 3

and age 4 were within category 3 (i.e., between 25.30 and 37.94 times per year). At ages 5

through 9, the average response propensity was within category 2 (i.e., between 10.1 and 25.29

times per year).
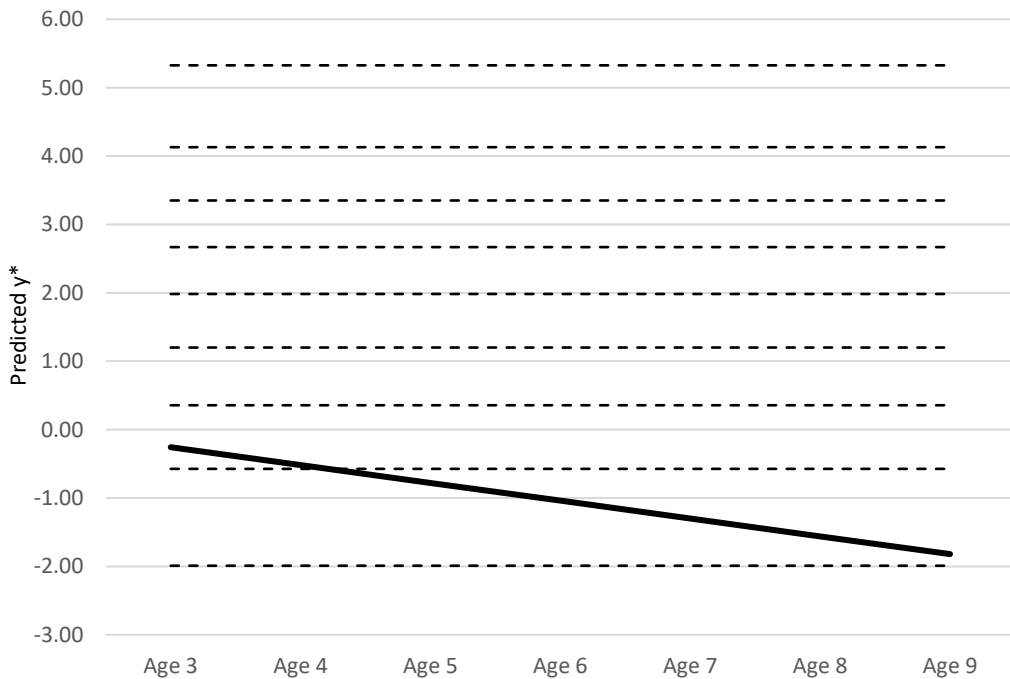
Figure 1.1. Single-group trajectory of physical and psychological aggression.

There was significant variance in the intercept, $B = 4.80$, $SE = 0.39$, $p < .001$, and in the slope, $B = 0.03$, $SE = 0.01$, $p = .01$. The intercept and slope were significantly negatively correlated, $B = -.20$, $SE = 0.05$, $p < .001$. Thus, mothers who endorsed more frequent physical and psychological aggression at age 3 tended to decline more over time. The proportions of observed responses at each age are listed in Table 1.3 and the proportions of estimated responses at each age are displayed in Figure 1.2.

Table 1.3

Observed Proportions of Maternal Aggression by Child Age

Categories of Maternal Aggression	Age 3 %	Age 5 %	Age 9 %
0 to 10 times	0.26	0.25	0.43
10.2 to 25.29 times	0.18	0.18	0.24
25.30 to 37.94 times	0.13	0.15	0.12
37.95 to 50.59 times	0.12	0.12	0.09
50.60 to 63.52 times	0.09	0.10	0.05
63.25 to 75.88 times	0.07	0.07	0.03
75.89 to 88.53 times	0.05	0.05	0.02
88.54 to 101.18 times	0.05	0.03	0.01
101.19 to 126.47 times	0.04	0.03	0.02
126.48 to 215 times	0.03	0.02	0.01
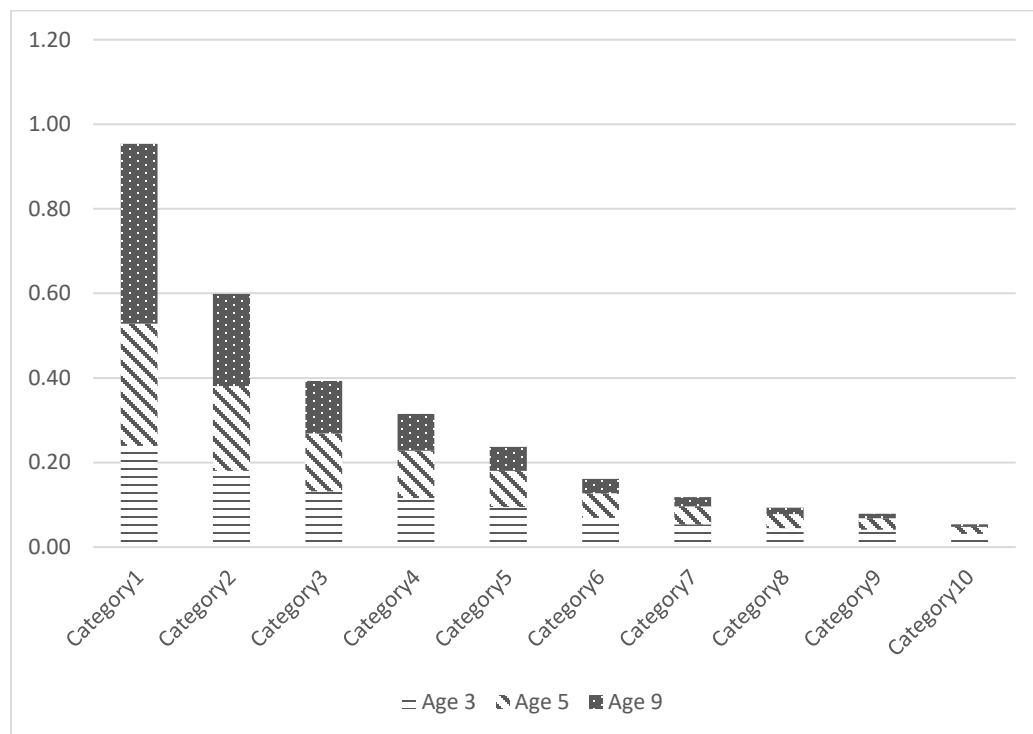
Figure 1.2. Proportion of participants in each category of physical and psychological aggression at each time point.

Latent Growth Curve Model by Risk Group

Next, I explored the extent to which average maternal aggression at age 3 (i.e., the intercept), change over time in maternal aggression (i.e., the slope), or associations between predictors and aggression at age 3 differed based on family risk level. There are two approaches to estimate group-based differences in trajectories. One approach would be to explore the extent to which subgroups of individuals exist in the overall population using Growth Mixture Modeling (GMM), an empirically driven choice. Given that the single-group LGCM revealed that this sample changed similarly over time (i.e., very little variance in the slope; $B = 0.03$, $SE = 0.01$, $p = .01$), the GMM approach would not be appropriate for this study. However, exploring the extent to which associations among predictors and maternal aggression at age 3 was a central goal of this study. Mplus does not allow for group-specific means, variances, and covariances to

be specified for each risk group when conducting a LGCM. Thus, an alternate approach was to explore associations among predictors and maternal aggression at age 3 using GMM with predefined groups, or *known classes* as is used in Mplus language. A known-class GMM differs from a typical GMM in that classes are specified *a priori* rather than through the estimation process. The three known classes represented families at Low Risk (0-1 risks), Moderate Risk (2-3 risks), and High Risk (4 or more risks), based on findings indicating that that risk for all forms of maltreatment increases at four or more risk factors (Brown et al.,1998). Thus, a latent growth curve was estimated for each risk group: Low, Moderate, and High using GMM with known classes. Descriptive statistics by risk group are presented in Tables 1.4 and 1.5.

Table 1.4

Descriptive Statistics by Risk Group

	Low	Moderate	High
	M (*SD*)	*M* (*SD*)	*M* (*SD*)
Maternal age	28.63 (5.52)	24.19 (5.38)	23.27 (5.94)
Child gender	1.47 (0.50)	1.48 (0.50)	1.48 (0.50)
Parenting stress – age 1	2.08 (0.62)	2.15 (0.69)	2.30 (0.72)
Parenting stress – age 3	2.20 (0.62)	2.24 (0.67)	2.37 (0.71)
Income-to-poverty – age 1	3.44 (2.95)	1.34 (1.33)	0.86 (0.98)
Income-to-poverty – age 3	3.60 (3.11)	1.42 (1.30)	0.93 (0.96)

Note Child gender was coded as 1 = male and 2 = female.

Table 1.5

Maternal Racial and Ethnic Group by Risk Group

	Low Risk		Moderate Risk		High Risk	
	n	*%*	*n*	*%*	*n*	*%*
White, non-Hispanic	324	35.5	228	15.0	139	12.7
Black, non-Hispanic	315	34.5	698	45.9	653	59.6
Hispanic	201	22.0	551	36.3	271	24.7
Other	72	7.9	39	2.6	30	2.7
Missing	1	0.1	4	0.3	3	0.3
Total	913	100	1520	100	1096	100

Low risk. Unstandardized results for the Low Risk group demonstrated that the average response propensity significantly decreased by .26 per year, $B = -0.26$, $SE = 0.02$, $p < .001$. According to this equation, the response propensities at age 3 and age 4 were within category 3 (i.e., between 25.30 and 37.94 times per year). At ages 5 through 9, the average response propensity was within category 2 (i.e., between 10.1 and 25.29 times per year). There was significant variance in the intercept, $B = 3.94$, $SE = 0.42$, $p < .001$, but not in the slope, $B = 0.004$, $SE = 0.004$, $p = .25$, meaning that mothers varied in initial level of aggression at age 3 but similarly declined overtime. The intercept and slope were significantly negatively correlated, $B = -.13$, $SE = 0.06$, $p = .03$.

Moderate risk. Results for the Moderate Risk group demonstrated that the average response propensity decreased by .26 per year, $B = -0.26$, $SE = 0.02$, $p < .001$ According to this equation, the response propensities at age 3 and age 4 were within category 3 (i.e., between 25.30 and 37.94 times per year). At ages 5 through 9, the average response propensity was within category 2 (i.e., between 10.1 and 25.29 times per year). There was significant variance in the

intercept, $B = 4.86$, $SE = 0.47$, $p < .001$, and in the slope, $B = 0.04$, $SE = 0.02$, $p = .01$. The

intercept and slope were significantly negatively correlated, $B = -.19$, $SE = 0.07$, $p < .001$.

High risk. Results for the High Risk group demonstrated that the average response

propensity decreased by .23 per year, $B = -0.23$, $SE = 0.02$, $p < .001$. According to this equation,

the response propensities at age 3 and age 4 were within category 3 (i.e., between 25.30 and

37.94 times per year). At ages 5 through 9, the average response propensity was within category

2 (i.e., between 10.1 and 25.29 times per year). There was significant variance in the intercept, B

$= 5.95$, $SE = 0.64$, $p < .001$, and in the slope, $B = 0.06$, $SE = 0.02$, $p = .001$. The intercept and

slope were significantly negatively correlated, $B = -0.35$, $SE = 0.09$, $p < .001$.

Group differences. Wald tests were conducted to test the extent to which the High Risk

group significantly varied from the Low Risk or Moderate Risk groups in the slope, intercept

variance, slope variance, or covariance. The results from the overall omnibus test revealed that

the three groups significantly differed, $\chi^2 = 52.22$, $df = 8$, $p < .0001$. Eight subsequent pairwise

Wald tests demonstrated that the High Risk and Low Risk groups significantly differed in

intercept variance, $\chi^2 = 9.84$, $df = 1$, $p = .002$, and in slope variance, $\chi^2 = 28.53$, $df = 1$, $p < .0001$,

but not in the covariance, $p = .055$, or average slope, $p = .17$. That is, the two groups did not

differ in average change over time, but did differ significantly in the amount of variability

surrounding the average initial level of aggression at age 3 and average change over time. The

High Risk group did not significantly differ from the Moderate Risk group in intercept variance,

$p = .09$, slope variance, $p = .67$, covariance, $p = .17$, or average slope, $p = .13$.

Conditional Model by Group

To test the hypothesis that change in income, education, and parenting stress between age

1 and age 3, as well as neighborhood cohesion, would predict variance in the intercept, a

conditional GMM with known classes was conducted. Maternal race or ethnicity, child gender, and cumulative risk were added to the model as covariates. Additional cases were deleted from estimation due to missing data on covariates, resulting in a total sample of 3046. The Brant Wald Test for Proportional Odds was computed in Mplus for all observed variables (i.e., change in education, race/ethnicity, child gender, and cumulative risk). The results demonstrated that the overall test was significant for the physical and psychological aggression outcome at age 3 ($\chi^2 = 72.14$, $p < .001$), age 5 ($\chi^2 = 61.63$, $p = .001$), and age 9 ($\chi^2 = 65.03$, $p < .001$). The individual tests demonstrated that child gender, maternal race or ethnicity, and cumulative risk violated the proportional odds assumption for at least one time point, but change in education met the assumption for proportional odds for the physical or psychological aggression outcome at age 3 ($p = .14$), age 5 ($p = .41$), and age 9 ($p = .56$). Thus, child gender, maternal race or ethnicity, and cumulative risk were omitted in the following final model.

Low risk. For the Low Risk group, latent change in parenting stress, $\beta = 0.12$, $SE = 0.05$, $p = .006$, and latent neighborhood social cohesion, $\beta = -0.28$, $SE = 0.05$, $p < .001$, were significantly associated with the intercept. Thus, increases in parenting stress between child age 1 and age 3 were associated with higher levels of maternal aggression at age 3 and higher levels of neighborhood social cohesion at age 3 were associated with lower levels of maternal aggression at age 3. Latent change in income-to-poverty ratio, $\beta = -0.01$, $SE = 0.03$, $p = .74$ and change in maternal education, $\beta = 0.02$, $SE = 0.04$, $p = .70$, were not significantly associated with the intercept. This model accounted for 9.4% of the variance in the intercept, $R^2 = 0.094$, $SE = 0.03$, $p = .001$.

Moderate risk. For the Moderate Risk group, latent neighborhood social cohesion, $\beta = -0.20$, $SE = 0.04$, $p < .001$, and change in maternal education, $\beta = 0.09$, $SE = 0.04$, $p = .01$, were

significantly associated with the intercept. Thus, higher levels of neighborhood social cohesion at age 3 were associated with lower levels of maternal aggression at age 3 and increases in maternal education were associated with increases in maternal aggression at age 3. Latent change in parenting stress, $\beta = 0.05$, $SE = 0.04$, $p = .17$, latent change in income-to-poverty ratio, $\beta = -0.07$, $SE = 0.04$, $p = .10$, were not significantly associated with the intercept. This model accounted for 5.5% of the variance in the intercept, $R^2 = 0.055$, $SE = 0.02$, $p = .002$.

High risk. For the High Risk group, latent change in parenting stress, $\beta = 0.10$, $SE = 0.04$, $p = .02$, and latent neighborhood social cohesion, $\beta = -0.21$, $SE = 0.05$, $p < .001$, were significantly associated with the intercept. Thus, increases in parenting stress between child age 1 and age 3 were associated with higher levels of maternal aggression at age 3 and higher levels of neighborhood social cohesion at age 3 were associated with lower levels of maternal aggression at age 3. Latent change in income-to-poverty ratio, $\beta = 0.02$, $SE = 0.06$, $p = .73$, and increases in maternal education, $\beta = 0.07$, $SE = 0.04$, $p = .12$, were not significantly associated with the intercept. This model accounted for 5.9% of the variance in the intercept, $R^2 = 0.059$, $SE = 0.02$, $p = .013$.

Discussion

The purpose of this study was to identify trajectories of physical and psychological aggression, and predictors of the trajectories across three risk levels. Results demonstrated that, on average, physical and psychological aggression decreased between age 3 and 9. In terms of differences based on risk group, the High Risk group did not differ from the Moderate or Low Risk groups in the intercept or slope, but did differ significantly from the Low Risk group in intercept and slope variance. Thus, the High Risk group was similar to the Moderate and Low Risk groups in average level of maternal aggression at age 3 and in average change in aggression

over time. However, the High Risk group did significantly differ from the Low and Moderate Risk groups in the amount of variability in the intercept and slope, suggesting the group was more heterogeneous than the other two groups.

I also tested the extent to which change in income-to-poverty ratio, increases in maternal education, changes in parenting stress between child ages 1 and 3, and the neighborhood environment at age 3 are associated with physical and psychological aggression. Findings demonstrated that the effects varied across risk group. In the Low Risk and High Risk groups, for example, increases in parenting stress was associated with more maternal aggression at age 3. Specific to the Moderate Risk group, increases in maternal education were associated with more maternal aggression at age 3. Across all three groups, greater neighborhood social cohesion was associated with less maternal aggression at age 3.

Trajectories of Aggression

The first goal of this study was to explore trajectories of physical and psychological aggression, a marker of family functioning, across early childhood. Results from the LGCM indicated that aggression tended to decline between age 3 and age 9. Using the same measure of aggression, Kim et al. (2010) found that aggression increases between child ages 1 and 3. Together, findings from Kim et al. (2010) and the present study support evidence that risk for maltreatment is greatest for children under the age of 4 (CDC, 2019), and declines following early childhood. Cumulative risk perspectives would suggest that families with more risk factors would have higher levels of aggression than would families with fewer risk factor. However in the present study, the three risk groups reported similar levels of average aggression; thus, this finding was contrary to my expectations.

41

There are several potential explanations for why cumulative risk was unrelated to the intercept and slope in this study. First, much of the variability in frequency of aggression was reduced when the outcome variables were discretized. Discretizing the outcome variables was necessary in this study because the raw data did not meet the assumptions of normality for LGCM at any of the three time points measured. Second, it is possible that a more proximate measure of cumulative risk, assessed at age 2 or 3 years, would have been more strongly related to aggression between ages 3 and 9. Measuring the frequency of aggressive behaviors was a strength, in that it allowed for greater variability than would other measures of abuse (e.g., a dichotomous CPS involvement variable) yet it also was a weakness in that the data were skewed.

Parenting Stress versus Stressed Parents

A second goal of the present study was to explore the relations among several forms of stress and parent aggression. First, some research has found parenting stress to be stable from year to year during preschool period and only slightly associated with parenting behaviors among low-risk families (Crnic et al., 2005), while others have demonstrated parenting stress decreases during the same period among families with children at-risk for externalizing problems (Williford et al., 2007). In the present study, changes in parenting stress were associated with physical and psychological aggression across all risk levels, such that a one unit increase in parenting stress was associated with .10 and .12 unit increases in aggression in the Low Risk and High Risk groups, respectively.

The measure of parenting stress used in this study addresses parenting stress through appraisal processes (e.g., "being a parent is harder than I thought") rather than level of parenting stress (e.g., number of daily hassles). As such, the stress-related findings from this study align with past theories regarding appraisal processes (e.g., Lazarus, 1993) and models of stress and

child maltreatment (Hillson & Kuiper, 1994), both of which attempt to explain connections between environmental risk and maltreatment outcomes through appraisals and coping. Findings from the present study demonstrate that parenting appraisals are correlates of parent aggression for Low and High Risk families. However, parenting stress was not measured by the hospital risk assessment used in the present study (for mothers with other children at home) and is also not typically assessed during hospital check-up visits either. Thus, it might be pertinent to include measures of appraisals of stress when assessing family risk.

Income-to-poverty ratios and education level were assessed in the present study as non-parenting stressors. Research pertaining to socioeconomic status demonstrates that both income and education are associated with child outcomes, such as cognition, achievement, and socioemotional development (see Bradley & Corwyn, 2002). Yet, few studies have explored how *changes* in income or education relate to parent and child outcomes. Limited research suggests that increases in income and education can influence children's outcomes, even more so for children from the lowest SES. However, Tang and Sinanan's (2015) finding that increases in income are associated with decreases in negative parenting was not supported by the present study.

One possible explanation for this unexpected finding is that income in the present study may not have increased substantially enough to influence physical and psychological aggression. Between 44% and 47% of the sample were at or below 100% of the poverty level at ages 1 and 3. Limited research has explored whether more proximal changes in income influence harsh punishment or aggression. In a Danish sample, Wildeman and Fallesen (2017) found that a 30% decrease of monthly disposable income was associated with increases in out-of-home placements for children. Thus, perhaps sudden monthly shocks are more closely related to harsh punishment

than a decline between child age 1 and 3. Important to note is that the Great Recession occurred during the study period, and research with the same sample found that the Great Recession, economic uncertainty, and unemployment rates were all associated with increased risk for physical abuse (Brooks-Gunn, Schneider, & Waldfogel, 2013).

In addition, this study only included maternal aggression, yet another study has found that male employment is associated with decreased risk for maltreatment and female employment is associated with increased risk for maltreatment (Lindo, Schaller, & Hansen, 2018). Thus, it is likely that broader economic conditions, and gender-specific differences in effects of employment not accounted for in this study, also contributes to levels of parent aggression. These findings also reiterate the need for the findings from the present study to be replicated in more typical economic conditions.

Further, studies exploring changes in income (e.g., Duncan et al., 2011) tend to include both supplemental income (e.g., subsidized cash assistance programs or tax credits) and earned income. However, the present study focused on natural variation in income, and did not explore income changes due to policies or programs. The finding that income-to-poverty ratios at age 3 were highly correlated with ratios at age 1 ($r = .80$) is supported by Sameroff et al.'s (1998) work that found environmental risks to demonstrate more stability than change. As such, efforts to reduce risk, such as through increasing income, may be an effective intervention strategy. For example, external increases through state policies such as minimum wage (Raissian & Bullinger, 2016) or economic influences such as gasoline prices (McLaughlin, 2017) are associated with maltreatment rates. This idea – that economic policies translate into family functioning – also has been supported using the same dataset as in the present study. Berger et al. (2017) demonstrated that increases in income through the EITC are associated with decreases in neglect and CPS

involvement but not physical abuse among families who earn below $45,000 a year. Important to note, however, is that increases in income through the EITC were not associated with physical abuse, as was demonstrated with income-to-poverty ratios in the present study as well.

It is possible that stability in income-to-needs ratios was due, in part, to career prospects not improving during that period either. Thus, the present study also explored whether increasing education is associated with physical and psychological aggression. Previous studies have viewed maternal education as a stable attribute, yet Pressler et al. (2016) reported that between 5% and 26% of parents increased their education following the birth of a child. In the present study, about 16% of mothers in each risk group increased their education between child ages 1 and 3. Further, it appears that mothers may be more likely to attend school once children enter preschool or kindergarten, such that Pressler et al. (2016) found that 39% of mothers with children in Head Start increased their educational attainment after enrolling their children in preschool.

In this study, increases in education were not predictive of physical and psychological aggression in the Low Risk or High Risk groups, but were in the Moderate Risk group. The direction in the Moderate Risk group was positive, suggesting that increasing education was associated with more physical and psychological aggression. This trend is in contrast to previous research demonstrating that increases in maternal education were associated with higher-quality home environments (e.g., responsiveness; Magnuson et al., 2009), but is consistent with other research that found maternal increases in income were associated with more externalizing problems for children (Harding, 2015). It is possible that attending school while parenting 1 to 3 year olds increases stress and subsequently parent aggression, or children's problem behaviors, in the short-term, but promotes positive parent and child outcomes in the longer-term.

One potential explanation for why increasing education appears to have a greater effect in the Moderate Risk group than the other two groups is that Moderate Risk mothers attended school at higher rates than the other two groups. However, it was not the case that the Moderate Risk group (17.4%) was comprised of more mothers completing school than the Low Risk (16.7%) or High Risk groups (19.6%) in this study. As was demonstrated by Magnuson et al. (2009), mothers with more to gain (i.e., lower education to start) may benefit more from increasing education. In the present study, about 14% of mothers who had high school education or less at birth increased their education between age 1 and age 3, and 18.5% of mothers with college education or more increased their education between age 1 and age 3. Thus, it may be important for future studies to distinguish between the effects of completing secondary education versus postsecondary education during early childhood.

Neighborhood Cohesion and Maternal Aggression

In testing an ecological model of child maltreatment, the third goal of this study was to explore associations with the perceived neighborhood environment. The findings demonstrated that neighborhood cohesion at age 3 was significantly negatively associated with harsh punishment regardless of level of risk. This finding supports Molnar et al. (2016), which demonstrated that neighborhood social processes, including cohesion, are associated with reduced odds of substantiated neglect and physical abuse. Together, these findings support the extant literature on social disorganization and ecological models of child maltreatment (Coulton et al., 2007) but are in contrast to Maguire-Jack and Showalter (2016) in which neighborhood cohesion was associated with less basic-needs neglect, but not physical abuse.

In their review of studies that assessed geographically defined neighborhoods and maltreatment rates, Coulton et al. (2007) found considerable variation in the influence that

46

structural neighborhood characteristics (e.g., income levels) have on different forms of maltreatment. The authors concluded, based on limited research available, that neglect may be more strongly associated with structural measures of neighborhoods than physical or sexual abuse. Maguire-Jack and Showalter (2016) suggested that social disorder and control may be driving the association in Molnar et al. (2016) given that those measures were not explored in their study. Yet, social disorder and control were not included in the present study either, and an association between cohesion and physical and psychological aggression was detected.

Few studies to date have explored structural and social neighborhood processes together (Coulton, 2007). One such study found that when social disorder (i.e., process) was added to a model in which disadvantage (i.e., structure) significantly predicted physical abuse, disadvantage was no longer significant (Freisthler & Maguire-Jack, 2015). Although the present study addressed a gap in the literature by exploring neighborhood processes (i.e., perceived cohesion), the findings are limited in that geographical, structural neighborhood data were not included as well. For future studies to better understand the role that neighborhood processes, rather than structural features, have on physical and psychological aggression and abuse, both should be included and tested within a multilevel framework (Coulton et al., 2007).

In the present study, age 3 neighborhood social cohesion was included as a correlate of maternal aggression; however, nearly 40% of low risk, 50% of moderate risk, and 60% of high risk families moved between age 3 and age 5. This study did not explore changes in neighborhood social cohesion during this period; thus, the effects of moving on aggression remains unclear. Residential stability is typically viewed as being protective (e.g., Coulton, 2007), yet Freisthler and Maguire-Jack (2015) found that length of residence was positively associated with physical abuse. Thus, the extent to which residential stability is protective

against maltreatment appears to depend on the quality of neighborhood processes present. For example, Fauth, Leventhal, and Brooks-Gunn (2004) compared low-income minority families who were randomly assigned to remain in their neighborhood or to move to a higher-income neighborhood. Those who moved were less likely to experience violence and were more satisfied with community resources, but were less likely to socialize with neighbors. Thus, it may be that moving to a better neighborhood improves structural features, but not neighborhood processes like cohesion, which in this study was a correlate of physical and psychological aggression. Future studies should explore the influence that moving has on perceived neighborhood processes, and the extent to which perceptions are tied to structural neighborhood indicators.

Strengths and Limitations

The findings from this study contribute to the literature in three major areas: (a) the relevance of hospital risk screeners in identifying families at-risk for maltreatment, (b) the contributions of parenting stress and nonparenting stress to physical and psychological aggression, and (c) the contributions of social processes, as compared to structural indicators, of neighborhoods to physical and psychological aggression. Despite these strengths, there are several limitations to note. First, the distribution of the physical and psychological aggression outcome variable was discretized. Discretizing the outcome variables limited the variability of the frequency of harsh physical and psychological aggression, making it difficult to detect any potential mean differences between the three risk groups. Thus, this study could not conclude whether hospital risk assessments are effective for distinguishing aggressive families from less-aggressive families.

Second, the final conditional models including all covariates and predictors accounted for a small amount of the covariance in the intercept (i.e., 5% to 9% in each risk group). It seems

plausible that even small reductions in parent aggression would have positive benefits on family functioning and children's later outcomes, although this was not tested in the present study. For example, a longitudinal study found that greater corporal punishment was associated with greater cognitive declines, relative to average cognitive development, four years later at ages 5-9 (Murray & Paschall, 2009). The effect was small and children who were not hit by their parents gained 5.5 points on a 100-point cognitive ability test. Making comparisons to public health models of population prevention, the authors suggested that even small increases in overall cognition at the population level could have large impacts on the nation as a whole (Murray & Paschall, 2009).

Third, income-to-poverty ratio was used to measure change in income, but initial income level was not considered. One of the few studies exploring associations among changes in income and parenting behavior found that significant increases in household income, using the same income-to-poverty ratio, is associated with more positive parenting and less negative parenting behaviors, only among families who were initially poor (Tang & Sinanan, 2015). The current study did not account for initial income-to-needs ratios but the association between increases in income and parent aggression likely is moderated by initial income. Thus, future studies should explore the moderating effects of initial status in order to extend findings from the present study and replicate findings from Tang and Sinanan (2015).

Fourth, initial education level was not accounted for in the increased education variable. As previous research has demonstrated (e.g., Magnuson, 2009), the effects of increased education on parent aggression may have differed depending on whether the increase was to a high school degree, technical training, or a college degree. Lastly, child characteristics were not accounted for in this model, but transactional models of parent-child relationships point to

children's problem behaviors as both elicitors and outcomes of parent aggression (e.g., Lansford et al., 2011) and therefore should be included in future models of family functioning.

Last, the three risk groups were established based on an empirical study that found risk for all forms of maltreatment to increase among families with four or more risk factors (Brown et al., 1998). However, the results indicated that the High Risk group had the most variability in aggression. Thus, it is possible that the cut-off value of four or more risk factors did not capture a unique group of families at high risk for aggression. Future studies are needed to better understand the association between the accumulation of risk and aggression.

Implications

The results from this study have several programmatic and policy implications. The cumulative risk assessment at birth did not differentiate mean levels of aggression at age 3 as was anticipated. This could be due to the limitations of the measure, but also could suggest that more proximal risk assessments would be more informative to predicting aggression. Conversely, it also may suggest that universal-but-individualized services after birth would benefit all families in reducing levels of aggression. For example, interventions such as Triple P-Positive Parenting Program are based on a public health model of prevention. The program includes multiple levels of interventions and services, based on family need (Sanders, 2008). Regardless of their efficacy, these types of interventions recognize the need for parent and family support to occur within integrated systems of care and address needs across multiple levels of need.

In this way, the findings from the present study may support a public health approach to family support, because changes in parenting stress and the neighborhood environment were associated with aggressive parenting even among families identified at birth as low risk. Further,

the finding that neighborhood cohesion was associated with parent aggression across all levels of risk suggests the need for multilevel interventions, such as those that target community- and neighborhood-level processes, not just parent or family processes. Assessments at birth through hospital screeners can be used to identify family needs and direct services accordingly. However, the hospital risk assessment used in the present study measured several social address variables, but not individual- or family-level processes. Results from the present study suggest that process variables, such as parent appraisals of stress and neighborhood cohesion, would be important to include in a risk assessment as well.

Conclusion

The findings from this study support an ecological model of family functioning, such that parent-, family-, and environmental-level factors contribute to parent aggression over the course of childhood. The results extend previous findings on parenting stress by demonstrating that early increases in parenting stress are associated with higher levels of parent aggression in childhood. Unexpectedly, changes in income were not associated with parent aggression, and increases in maternal education were negatively associated with parent aggression in the Moderate Risk group. Although neighborhood cohesion was associated with parent aggression as well, additional research is necessary to better understand the role of neighborhood processes and structural neighborhood characteristics within an ecological model of family functioning. Overall, the results suggest that primary, universal prevention approaches that are tailored according to family needs may be appropriate for supporting families following the birth of a child.

CHAPTER III

STUDY 2: CUMULATIVE RISK AND CLASSES OF RISK AS PREDICTORS OF

KINDERGARTEN ACHIEVEMENT AND CPS INVOLVEMENT

Despite years of progress, adversity-related gaps in school readiness remain critical to address. School readiness is defined as the extent to which children are ready to learn at kindergarten entry across a variety of domains, including physical well-being and motor development, social and emotional development, approaches to learning, language development, and cognition and general knowledge (National Education Goals Panel, 1995). These domains of school readiness have long-term predictive utility in terms of children's later school achievement and success (Davoudzadeh, McTernan, & Grimm, 2015; Duncan et al., 2007; Grissmer, Grimm, Aiyer, Murrah, & Steele, 2010). A nationally representative longitudinal study of first-time kindergartners found that approximately 35-45% of children were not ready at school entry (Hair, Halle, Terry-Humen, Lavelle, & Calkins, 2006), which can be partially attributed to experiences of family adversity related to poverty (Ryan et al., 2006). An analysis of three large, nationally representative datasets demonstrated that the gap between low- and high-income children has narrowed somewhat over the past 10 years, but at the current rate, it would take another 60 to 110 years in order to fully close (Reardon & Portilla, 2016).

Children who grow up in families facing adversity are at greater risk for being poorly adjusted (i.e., displaying internalizing or externalizing problems) when compared to peers who grow up in less risky environments (e.g., Luthar, 2003). Being well-adjusted is a developmental competency for young children and therefore would represent resilience among those at-risk (Masten & Coatsworth, 1998). Yet promoting positive adjustment may be particularly

challenging for families who experience multiple adversities, such as those at-risk for child maltreatment. For example, children born to mothers with heightened potential for child maltreatment had elevated levels of externalizing and internalizing problems at age 3 (Schatz-Stevens, Cockburn, & Lefever, 2015). Among a national sample of US families, children who were rated by their parents as ever having behavioral problems were also rated as being less prepared for school entry in social, language, motor, and play skills (Montes, Lotyczewski, Halterman, & Hightower, 2012). Children who are raised in families with high potential for child maltreatment, therefore, may be at greater risk for experiencing problem behaviors as well as being less prepared for school entry later on.

Predictors of School Readiness and Child Maltreatment

Parenting stress and mental health problems, less nurturing rearing practices, low socioeconomic status, and violence in the home are among the elements common to both child maltreatment (Brown et al., 1998; CDC, 2019) and being unready for school (Chazan-Cohen et al., 2009; David, LeBlanc, & Self-Brown, 2015; Farver, Xu, Eppe, Lonigan, 2006; Garcia, 2015). Children who are reported for suspected child maltreatment are at-risk for being unready at school entry, regardless of whether the report is substantiated or unsubstantiated (Bell, Bayliss, Glauert, & Ohan, 2018). Thus, many of the risk factors related to maltreatment and to being unprepared at school entry co-occur. Further, children are at greatest risk for child maltreatment before age 4 (CDC, 2019) and children typically enter kindergarten at age 5. The intervention point for preventing child maltreatment and promoting readiness at kindergarten therefore occur during the same developmental period of preschool.

Research regarding child maltreatment tends to focus more on characteristics of a perpetrator rather than characteristics of a victim. However, research demonstrates that

children's age is a risk factor for child maltreatment, with those younger than 4 being at greatest risk (CDC, 2019). Second, children with developmental delays, disabilities, or other health concerns are also at elevated risk for experiencing child maltreatment (Brown et al., 1998; CDC, 2019). Similarly, developmental disabilities and poor health outcomes in early childhood also predict poorer school readiness (Kull & Coley, 2015).

Other factors that predict maltreatment include: young maternal age; three or more children in the home; inadequate financial resources; violence in the home; drug/alcohol abuse present; mother ambivalence, denial, or rejection of pregnancy; suspected parenting inadequacy; maternal mental health problems; single parent; and mother not a high school graduate (Brown et al., 1998; CDC, 2019). Some of these predictors of maltreatment also are associated with school readiness. For example, Hair et al. (2006) found that children who were categorized in a comprehensive and positive profile of school readiness, as compared to other less prepared or high-risk profiles, were more likely to be White, non-Hispanic, and female. Children in this profile were also more likely to have two parents in the home who spoke English and were older, had more education, and were more economically advantaged.

Using the same nationally representative sample, Farkas and Hibel (2008) explored some of the determinants of being unready at school entry (i.e., scoring in the bottom 20% of students on cognitive and behavioral measures). The strongest predictors of cognitive readiness, and to a lesser degree behavioral readiness, were related to the mother and/or father not completing high school and not speaking English at home. The strongest effects for being behaviorally unready were related to being male, from a single-father home, or being adopted. Other smaller effects were detected related to race/ethnicity, income, family structure, and number of siblings in the home, with some being mediated by the home environment and parenting. Thus, poor school

readiness and child maltreatment share common risk factors that are tied to family processes, such as family structure, rearing practices, and socioeconomic status. Yet, the concept of multifinality (Cicchetti & Rogosch, 1996) indicates that children and families with similar risks can experience different developmental outcomes, partially due to the variety of ecological contexts with which families come into contact (e.g., Ungar, 2016).

Ecological Systems Theory

Ecological systems theory provides the theoretical foundation of this study (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006). The original ecological model proposed by Bronfenbrenner (1979) provides a foundation for testing the interactions among several contexts of an individual's environment (i.e., the mesosytem, microsystem, exosystem, macrosystem). A later version of the model recognized time (i.e., the chronosystem) as being central to developmental systems and led to the development of the Process-Person-Context-Time (PPCT) model (Bronfenbrenner & Morris, 1998; 2006). The PPCT model includes four aspects of development that, when integrated, capture the dynamic nature of human development. The *processes* referenced in the PPCT model are defined as interactions that take place between individuals and other aspects of their context on a regular basis. Farkas and Hibel's (2008) finding – that the home environment and parenting mediate the association between social address variables such as income and children's school readiness – is an example of family processes within the PPCT model.

The *person* level of the PPCT model is one that is typically explored by human development research. That is, individual characteristics shape human development as well by means of cognitive or behavioral skills and personality traits. The *context*, as defined by the PPCT model, includes the various systems with which individuals come into contact as described

by ecological theory. In the present study of family resilience, the contexts that may contribute to high-risk families' ability to protect their children from abuse or neglect and promote school readiness include the neighborhood they reside in, their social networks of family and friends, and the family's socioeconomic status (i.e., a macrosystem context). Last, inherently missing from cross-sectional studies is consideration of the role of *time* in development. The PPCT model provides the foundation from which the present study explored the family system longitudinally in order to better understand whether combinations of family risk and cumulative family risk predict children's school readiness and the prevention of child maltreatment.

Cumulative Risk

Similar to risk for child maltreatment, poor school readiness increases as risk accumulates. For example, children with four risk factors have predicted probabilities of about 40% for being unprepared in reading, math, and behavioral skills, and children with nine risk factors have predicted probabilities of 89% for being unready in reading, 74% for math, and 49% for learning-related behavior (i.e., approaches to learning; Farkas & Hibel, 2008). Related to a cumulative risk perspective (e.g., Sameroff et al., 1987), greater numbers of risk factors predict poorer developmental outcomes for children (Evans, Li, & Whipple, 2013), specifically school readiness (Mistry, Benner, Biesanz, Clark, & Howes, 2010). For example, the more risk factors children experience throughout infancy and into the preschool years, the less prepared they are for school entry at kindergarten in domains of social skills and behavior problems, as well as early math and literacy skills (Pratt, McClelland, Swanson, & Lipscomb, 2016). Yet, the extent to which combinations of risk, as compared to cumulative risk, are better suited for predicting early achievement or maltreatment is unclear. Thus, the present study tested both cumulative risk and combinations of risk as predictors of kindergarten achievement and involvement with CPS.

In a study of poverty-related risks, Roy and Raver (2014) tested two competing models, cumulative risk and a person-centered approach (i.e., profile analysis), and determined that not all risk factors have equal predictive utility. Although results from the profile analysis told a story similar to the cumulative risk model, with more risk associated with worse outcomes, the profile analysis results suggested that the particular combination of risks (e.g., high stress, single parent) mattered more. For example, children in the single-parent, stressed households had high levels of both internalizing and externalizing problems but children from deep poverty and crowded households did not (Roy & Raver, 2014). Further, a cumulative risk approach may not be appropriate for studying all types of maltreatment. For example, O'Hara et al. (2015) found that neglected children who also experienced physical abuse (i.e., cumulative risk) performed better on cognitive functioning tasks than if they only experienced neglect. Thus, it appears that a cumulative risk model may be less informative when assessing cognitive outcomes in neglected children, in that they may benefit from additional risk factors if those risks include interactions with others. The present study focused specifically on indicators of physical and psychological abuse.

Better understanding how different combinations of family functioning at birth might relate to children's kindergarten achievement and future involvement with CPS can help improve the precision with which interventions target families' needs. MacPhee et al. (2015) therefore called for research to explore profiles of family resilience in order to provide greater insight into the extent to which different profiles might produce the same outcome (i.e., equifinality). For example, although much of the focus of child maltreatment interventions tends to be on children with substantiated reports (i.e., instances where abuse or neglect was founded), other research has demonstrated that children with unsubstantiated reports prior to kindergarten entry also are

more likely to experience poor academic and behavioral outcomes in early childhood (Fantuzzo, Perlman, & Dobbins, 2011). It would therefore be beneficial to understand better the family functioning variables that may predict family resilience to maltreatment as well as children's readiness for school among families at various levels of risk for maltreatment. Some families might, for example, benefit from services specific to children's school readiness (e.g., language skills), in addition to typical child maltreatment prevention strategies (e.g., parenting skills, parent-child interactions, mental health), while other combinations of family risk may not. The present study therefore addressed this gap in the literature by identifying typologies of family risk at birth as being predictive of children's kindergarten achievement—assessed in terms of social skills, cognitive functioning, and language skills—as well as CPS involvement.

Combinations of Risk

The assertion is well supported that child maltreatment can be prevented with strategies that also promote school readiness. For example, the federally funded Maternal, Infant, and Early Childhood Home Visiting (MIECHV) program directs resources to states to implement home visiting programs that are evidence based and target child abuse and neglect, promote child development and school readiness, improve maternal and infant health, and encourage positive parenting (U.S. Department of Health and Human Services, 2019). In order to identify these evidence-based programs, the United States Department of Health and Human Services conducts an up-to-date review of the home visiting literature, organized by outcome and quality of the study (Health Resources & Services Administration, 2019). Of the 45 program models reviewed, studies of high or moderate quality demonstrated that seven program models have reported

favorable outcomes for both child development and school readiness outcomes as well as for the reduction of child maltreatment[3].

Yet, there is much to learn about how these programs, as a major maltreatment prevention strategy, can more consistently promote both child and family outcomes (Gaylor & Spiker, 2012). For example, home visiting programs appear to benefit some subgroups of families more than others (e.g., single parent, teen parent, low income; Gaylor & Spiker, 2012). Although most home visiting programs improve parenting practices and child behavioral outcomes (Gaylor & Spiker, 2012), more research is warranted to identify subgroups of families who would benefit from comprehensive supports related to specific school readiness outcomes (e.g., language delays, cognitive stimulation, or social skills), mental health treatment, stress reduction, and substance use reductions as well. That is, the extent to which combinations, or profiles, of family processes and risk factors predict school readiness is currently not well known (Pratt et al., 2016).

Pratt et al. (2016) demonstrated that three typologies of family risks differentially predicted school readiness outcomes, these being (a) low risk; (b) low resourced—single and minority; and (c) low resourced—harsh parenting and depression present. Children in the low-risk profile scored the highest across all domains of readiness when compared to children in profiles characterized by higher-risk profiles (Pratt et al., 2016). Additionally, children in the low resourced – single and minority profile scored higher in achievement and self-regulation and had fewer behavioral problems than did children in the low resourced – harsh parenting and depression profile (Pratt et al., 2016). Thus, it is evident that the number of risk factors, as well

---

[3] Child First, Early Head Start-Home Visiting, Early Start-New Zealand, Healthy Families America, Nurse-Family Partnership, Parents as Teachers, and SafeCare

as the combination of risks present in each family, matters in terms of predicting school readiness outcomes. Sturge-Apple, Davies, and Cummings (2010) found that three profiles of family functioning existed among a sample of 6 year olds and their families: cohesive, disengaged, and enmeshed. The three family functioning profiles differentially predicted children's externalizing and internalizing problems across three years. For example, children from enmeshed families exhibited greater increases in internalizing problems than children from cohesive families (Sturge-Apple et al., 2010). The present study focused on three broad aspects of family functioning and risk: parent stress and mental health, violence or substance abuse in the home, and family resources.

Parental stress and mental health. In accord with the Family Stress Model (e.g., Conger & Elder, 1994), parental stress and depression predict various aspects of children's development. For example, in a sample of Latino families, mothers' perceived stress was found to predict children's language and social skills (Farver et al., 2006). Among low-income families, trajectories of maternal depression predicted children's achievement at school entry (Campbell, Matestic, von Stauffenberg, Mohan, & Kirchner, 2007). Similarly, in the nationally representative Early Head Start Research and Evaluation Project, both parental depression and stress predicted children's behavioral problems at prekindergarten (Chazan-Cohen et al., 2009). In addition to behavioral problems, the effects of parenting stress were pervasive, such that stress at 14 months predicted all domains of school readiness assessed later on (i.e., approaches to learning, emotion regulation, vocabulary, and letter identification; Chazan-Cohen et al., 2009). Using longitudinal data, Callender, Olson, Choe, and Sameroff (2012) found that both maternal and paternal depression predicted negative cognitions about parenting, which in turn were related to harsher parenting practices and more externalizing problems at age 5. As well, parenting stress

60

and mental health are predictive of child maltreatment (e.g., Guterman et al., 2009; Whipple & Webster-Stratton, 1991). Though not specific to substantiated maltreatment, a longitudinal study of children under 3 demonstrated that a one standard deviation increase in maternal depression is associated with a 28% increased chance of being involved with CPS.

Violence and substance abuse in the home. A review of the literature by Carpenter and Stacks (2009) found associations between children witnessing interpersonal violence in the home during early childhood and several outcomes foundational to kindergarten readiness, namely emotion regulation and cognitive development. Similarly, households where violence is frequent place children at greater risk for all forms of child maltreatment (McGuigan & Pratt, 2001). A history of drug use was associated with being 1.70 times more likely to have been involved with CPS (Dubowitz et al. 2011). Substance abuse is also related to greater child abuse potential among fathers and mothers (Ammerman, Kolko, Kirisci, Blackson, & Dawes, 1999) as well as behavioral and cognitive outcomes among preschool-aged children (Shulman, Shapira, & Hirshfield, 2000).

Family resources. Income as well as parents' educational attainment—both indicators of socioeconomic status (SES)—explain variations in children's school readiness at kindergarten and risk for child maltreatment. For example, gaps between low-income and middle- to upper-income families place children at unequal opportunities for success beginning in kindergarten (Ryan et al., 2006). Parental educational attainment is also associated with children's school readiness (e.g., Garcia, 2015; Hanson, Diamond, Lieber, Horn, & Fleming, 2011; Merz et al., 2014). This relation typically is explained by the quality of the home learning environment such that parents who have higher educational attainment also tend to provide more stimulating and age-appropriate home learning environments for their children (e.g., Son & Morrison, 2010).

Further, the effects of maternal age on children's school readiness depend on maternal education, with higher education and older age at birth having the best outcomes (Augustine, Prickett, Kendig, & Crosnoe, 2015).

Related to school readiness, SES has been linked to children's health, cognitive and academic achievement, and socio-emotional skills (for a review, see Bradley & Corwyn, 2002). Beyond the effects of income, material resources, such as adequate housing, also contribute to academic outcomes among disadvantaged children (Masten, Cutuli, Herbers, Hinz, Obradovic, & Wenzel, 2014). In terms of risk for maltreatment, Dubowitz et al. (2011) followed low-income families with children younger than 40 months for 10 years, and found that mothers with less than a high school education were 1.55 times more likely to have been involved with CPS. Other contributing factors that placed families at greater likelihood of having been involved with CPS included being unmarried, receiving public assistance, and having more children in the home (Dubowitz et al., 2011).

The Present Study

The present study assessed the extent to which combinations of family risk (i.e., classes) and cumulative family risk predict children's kindergarten achievement and involvement with CPS. This study extends Pratt et al. (2016) by testing competing models of cumulative risk and combinations of risk in predicting CPS involvement as well. Based on limited research (Pratt et al., 2016; Sturge-Apple et al., 2010), I hypothesized that at least three classes of family risk would be supported by the data, and that profile membership would predict children's kindergarten achievement and family involvement with CPS. Together, the findings illuminated family classes that can be used to target both child maltreatment prevention strategies and the promotion of school readiness among at-risk families.

Method

The FFCWS followed a cohort of about 5,000 families with children born between 1998 and 2000 from birth to age 15. The sample was obtained through stratified random sampling 20 of the 77 United States cities with populations of 200,000 or more (Reichman et al., 2001). A detailed description of the sampling design can be found in Reichman et al. (2001). The FFCWS oversampled for nonmarital births as the purpose of the study was to better understand the relationships and family functioning with families comprised of unwed parents with children.

Participants

Data were collected from 4,898 births from 75 hospitals across the United States. Nearly three-quarters of the families were headed by a single parent at birth and subsequently deemed "fragile families." The sample is representative of nonmarital births in cities with populations of more than 200,000 (Reichman et al., 2001). Parents were excluded from the study if they planned to place their child in an adoptive home, if the father was not living at the time of birth, if the mother or child was too ill to participate, or if the parent did not speak English or Spanish well enough to be interviewed (Reichman et al., 2001). In some cases, both the biological mother and father completed surveys. However, for the purposes of this study only data reported by the mother were analyzed. The present study included only data from FFCWS participants with medical records data present at birth ($N = 3529$). Further, the present study focused on children's kindergarten outcomes ($N = 1039$), which were only collected from teachers in 10 of the 20 FFCWS cities. Thus, the final sample was limited to families with both hospital medical records data and teacher survey data, $N = 757$.

On average, mothers were 25.23 years old at the time of the child's birth ($SD = 6.04$). The average family household included two adults ($M = 2.31$, $SD = 0.97$) and one child ($M =$

1.29, *SD* = 1.39) and had an income-to-poverty ratio of 2.48 (*SD* = 2.61). There were

approximately equal numbers of male (*n* = 373; 49.3%) and female (*n* = 384; 50.7%) focal

children. Other demographic information is presented in Table 2.1. Those not included in the

present study (*n* = 2772) had significantly more risk at birth (mean difference of .40; Cohen's *d* =

.22) than those included in the present study (*n* = 757), *t*(1372.71) = -5.52 *p* < .001. There were

no significant differences between the two groups in CPS contact, *p* = .77.

Table 2.1

Demographic Information Reported by Biological Mothers and Fathers

	Bio-Mother		Bio-Father	
	N	*%*	*N*	*%*
Race/Ethnicity				
White, non-Hispanic	190	25.1	166	22.0
Black, non-Hispanic	331	43.7	358	47.4
Hispanic	207	27.3	200	26.5
Other	28	3.7	32	4.2
Missing	1	0.1	1	0.1
Education				
Less than high school	233	30.8		
High school or equivalent	215	28.4		
Some college or technical training	216	28.5		
College or graduate degree	93	12.3		

Procedure

The FFCWS core study and supplemental home assessment data are publically available

through Princeton and Columbia University collaborations. The core study conducted interviews

with parents or primary caregivers when the children were ages 1, 3, 5, 9, and 15 years old. A

supplemental study involved home assessments when children were ages 3, 5, and 9. Other

supplemental studies included information on parents' medical, employment, and incarceration

histories, as well as religion, child care, and early childhood education, some of which are only

available through contracts with the FFCWS. The Institutional Review Board at Colorado State University and the FFCWS review panel approved the use of the medical records contract data for use in the present study.

Measures

Racial and ethnic identity. Mother racial and ethnic identity was recorded through the baseline parent questionnaire.

Child disability status. At age 5, teachers indicated whether or not the child had a diagnosed disability.

Baseline risk. Baseline risk indicators were derived from medical records and parent surveys at birth: history of depression; history of family dysfunction/instability; suspected parenting inadequacy; unwanted pregnancy prior to delivery; history of domestic violence/abuse in the household; history of sexual abuse; poor nutrition during pregnancy; tobacco use during pregnancy; alcohol use during pregnancy; amphetamine use during pregnancy; cocaine/crack use during pregnancy; heroin use during pregnancy; marijuana use during pregnancy; nonprescription drug use during pregnancy; mother has other caregiving burden (i.e., caring for someone in the house with illness, trauma, or disability); history of inadequate money; history of homelessness; history of poor housing; history of legal/criminal justice issues; young mother at birth (19 years or younger); three or more children in the home; unmarried at birth; family poverty (i.e., 100% of poverty line or less); and mother not a high school graduate. Each of the 24 individual risk factors was coded as 0 (*absent*) or 1 (*present*).

Letter-word recognition. The Woodcock–Johnson Tests of Achievement-Revised (Woodcock & Johnson, 1989) is an individually administered test of children's achievement in reading, mathematics, and written language. For this study, the letter-word recognition test

administered during the home visit was used. The first five items of the test measured symbolic learning (i.e., matching picture with objects) and the rest of the 57 total items measured the children's ability to identify letters and words. The easiest items were presented first and all scores were standardized. This assessment has good reliability (α = mid-.90s). When compared to other cognitive and knowledge tests, this assessment has good convergent validity as well.

Problem behaviors. Items from the aggression, attention problems, and social skills problems subscales of the Child Behavior Checklist (CBCL/4-18; Achenbach, 1991) were reported by kindergarten teachers. Teachers rated children's aggression (19 questions), attention problems (nine questions) and social skill problems (six questions) in the classroom at the end of the kindergarten year on a scale of 1 (*not true*) to 3 (*very true or often true*). Sample items from the aggression subscale include child threatens others, child screams a lot, and child gets in many fights. Items from the attention problems subscale include can't sit still and has trouble paying attention. The social skill problems subscale includes child is not well liked by others and child gets teased. The CBCL is widely used for measuring children's behavioral problems, and has high concurrent and discriminant validity (Furlong, 1998).

CPS involvement. A binary outcome indicated whether parents reported that they had come into contact with CPS related to the focal child by age 5, based on suspected maltreatment perpetrated by the parent or someone living in the household.

Analytical Procedure

In order to test the extent to which cumulative risk predicts children's kindergarten achievement and CPS involvement, structural equation modeling was performed. All models were estimated using a robust maximum likelihood estimation (MLR) using Mplus software, version 7 (Muthén & Muthén 1998-2017). MLR is preferable to multiple imputation (MI) for

handling missing data, especially when advanced statistical software is available (Allison, 2012).

Additionally, MLR provides maximum likelihood parameter estimates with standard errors that

are robust to nonnormality. All 24 baseline risk factors were summed for the cumulative risk

score (Evans et al., 2013). Missing data was present on all predictor variables for 49 cases. The

final sample included in the cumulative risk regression model was 708.

Latent Class Analysis (LCA) was performed to test the extent to which family risks at

birth form unique classes. For the LCA, 16 of the 24 individual risk factors, defined as 0 (*not*

present) or 1 (*present*), were collapsed into the three categories assigned in the hospital screening

assessment to ease interpretation. The three categories were psychosocial history (i.e.,

depression, parenting inadequacy, unwanted pregnancy), drug or health risk (i.e., using drugs or

alcohol during pregnancy), and situational history (i.e., inadequate money, homelessness). The

other five risk factors (i.e., more than three children, young mother, low education, poverty

status, and being unmarried at birth) remained as individual risk factors. Thus, eight risks were

included in the LCA and all 24 were included in the cumulative risk model. All cases were

included in the LCA (*N* = 757)

In order to test the extent to which classes of risk at birth differentially predict

kindergarten achievement and involvement with CPS, a latent class analysis (LCA) was

performed. Successive models were fit by beginning with two classes and continuing to add

classes until fit statistics indicated poor fit. A posterior probability was estimated for each

individual for each class. In LCA, the class with the highest posterior probability is chosen as the

"most likely" class for each individual (Wickrama, Lee, O'Neal, & Lorenz, 2016).

The optimal number of classes was judged according to the Bayesian information criteria (BIC),

sample-size adjusted BIC, entropy indices, as well as prior theory. Models with lower BIC and

sample-size adjusted BIC estimates indicate better fit to the data (Feldman et al., 2009). In addition, entropy was assessed such that models with higher entropy values indicate greater separation between classes (Ramaswamy, DeSarbo, Reibstein, & Robinson, 1993).

Kindergarten outcomes and CPS involvement were added to the LCA as distal outcomes using the Lanza, Tan, and Bray (2013) method for auxiliary variables. Missing data was present on all kindergarten outcomes and CPS involvement. Listwise deletion is applied to the auxiliary variables using the Lanza, Tan, and Bray (2013) method for adding distal outcomes. Thus, 23 cases were deleted for the aggression auxiliary variable ($N = 734$), 19 cases were deleted for the attention problems auxiliary variable ($N = 738$), 18 cases were deleted for the social skills problems auxiliary variable ($N = 739$), 4 cases were deleted for the letter-word recognition auxiliary variable ($N = 753$), and 5 cases were deleted for CPS involvement auxiliary variable ($N = 752$).

Results

Descriptive statistics for all study variables are presented in Tables 2.2 and 2.3. Families in the present study had an average of 2.67 cumulative risk factors at birth, which ranged from 0 to 13 out of a possible 24. Half of the sample had between 0 and 2 risk factors (see Table 3).

Table 2.2

Descriptive Statistics for all Study Variables

Variable Names	*N*	Range	*M* (*SD*)	Skewness
Cumulative risk	757	0-13	2.67 (2.01)	1.07
Aggression	734	19-57	23.20 (6.21)	2.15
Attention problems	738	9-27	12.22 (3.59)	1.17
Social skills problems	739	6-16	7.19 (1.61)	1.89
Letter-word recognition	753	58-186	101.12 (14.87)	0.50
CPS contact	752	0-1	0.12 (0.33)	2.33

Table 2.3

Number and Percentage of Families by Cumulative Risk Score

Cumulative Risk Score	*N*	*%*
0	103	13.6
1	130	17.2
2	147	19.4
3	158	20.9
4	107	14.1
5	56	7.4
6-13	56	7.4

Cumulative Risk Model

In order to test the extent to which cumulative risk at birth predicts kindergarten outcomes and CPS involvement, all outcome variables (i.e., kindergarten aggression, attention problems, social skills problems, and CPS involvement) were regressed onto cumulative risk at birth. No missing data was present, thus all cases were included in this model ($N = 757$). Cumulative risk significantly predicted end-of-year kindergarten aggression, $\beta = .11$, $SE = .04$, $p = .002$, attention problems, $\beta = .11$, $SE = .04$, $p = .002$, social skills, $\beta = .08$, $SE = .04$, $p = .02$, letter-word recognition skills, $\beta = -.25$, $SE = .04$, $p < .001$, and CPS involvement, $\beta = .25$, $SE = .04$, $p < .02$. This model accounted for 1% of the variance in aggression, 1% of the variance in attention problems, 0.7% of the variance in social skills problems, 6.0% of the variance in letter-word recognition, and 6% of the variance in CPS involvement.

The child's diagnosed disability status and mother's ethnicity/race were entered into the model as covariates of the kindergarten outcomes. Missing data were evident on covariates for 49 participants; thus, the total sample size with covariates included in the model was 708. Disability status (i.e., 1 = *none*, 2 = *yes*) was significantly associated with each of the kindergarten outcomes but not CPS involvement, and mother ethnicity/race was uncorrelated

with any outcomes (Table 2.4). Beyond the effects of disability status, total risk at birth

significantly predicted end-of-year kindergarten aggression, attention problems, and letter-word

recognition skills.

Total risk did not significantly predict social skill problems, $p = .10$, above and beyond

the effect of disability status. In terms of CPS involvement, total risk was also a significant

predictor, $p < .001$. The full model including covariates accounted for 4% of the variance in

aggression, 12% of the variance in attention problems, 5% of the variance in social skills

problems, 7% of the variance in letter-word recognition, and 6.0% of the variance in CPS

involvement.

Table 2.4

Associations of Disability Status and Ethnicity/Race with Kindergarten Achievement and CPS Involvement

Predictors	Aggression			Attention			Social Skills			Letter-Word			CPS		
	β	SE	p	β	SE	p	β	SE	p	β	SE	p	β	SE	p
Risk	.10	.04	.01	.10	.04	.01	.06	.04	.10	-.25	.04	<.001	.23	.05	<.001
Disability	-.16	.05	<.001	-.33	.04	<.001	-.21	.05	<.001	.10	.03	.01	-.08	.06	.14
Ethnicity/race	.03	.04	.36	-.01	.04	.89	.07	.04	.06	-.03	.04	.50	-.04	.07	.60
R^2		.04			.12			.05			.07			.06	

Latent Class Analysis

      Table 2.5 presents the fit statistics that were used to select the best fitting model. The

two-, four-, and five-class models required additional start values to be added to the model

estimation process either for replicating the best log likelihood or for estimating the bootstrap

likelihood ratio test (BLRT; Nylund, Asparouhov, & Muthén, 2007) values. The three-class

model was chosen because it had the smallest BIC, highest entropy, and significant likelihood

ratio tests (LRTs) and BLRTs.

Table 2.5

Model Fit Indices Used to Select Number of Classes of Family Risk

Model	BIC	Entropy	Smallest Class (%)	LRT p	BLRT p
2 class	5948.224	0.650	39%	<.0001	<.0001
3 class	5899.257	0.719	11%	<.0001	<.0001
4 class	5926.955	0.656	11%	.07	.02
5 class	5965.767	0.692	3%	.17	.11

      The results from the LCA are displayed in Figure 2.1. The Psychosocial-Substance Use

class contained 11.1% of the sample and differed from the other two classes in that mothers in

this class have high probabilities of having psychosocial and health/drug problems. The Low-

Risk Class contained 36% of the sample and was distinct from the other two classes in that

participants in that class had low risk scores at birth. The Low Education-Unmarried class

contained 52.9% of the sample and was similar to the Psychosocial-Substance Use class in that

participants in this class had high probabilities of having a high school or less education, being

unmarried at birth, and living in poverty. Similar to the Low Risk class but different from the

Psychosocial-Substance Use class, mothers in the Low-Education-Unmarried class had low
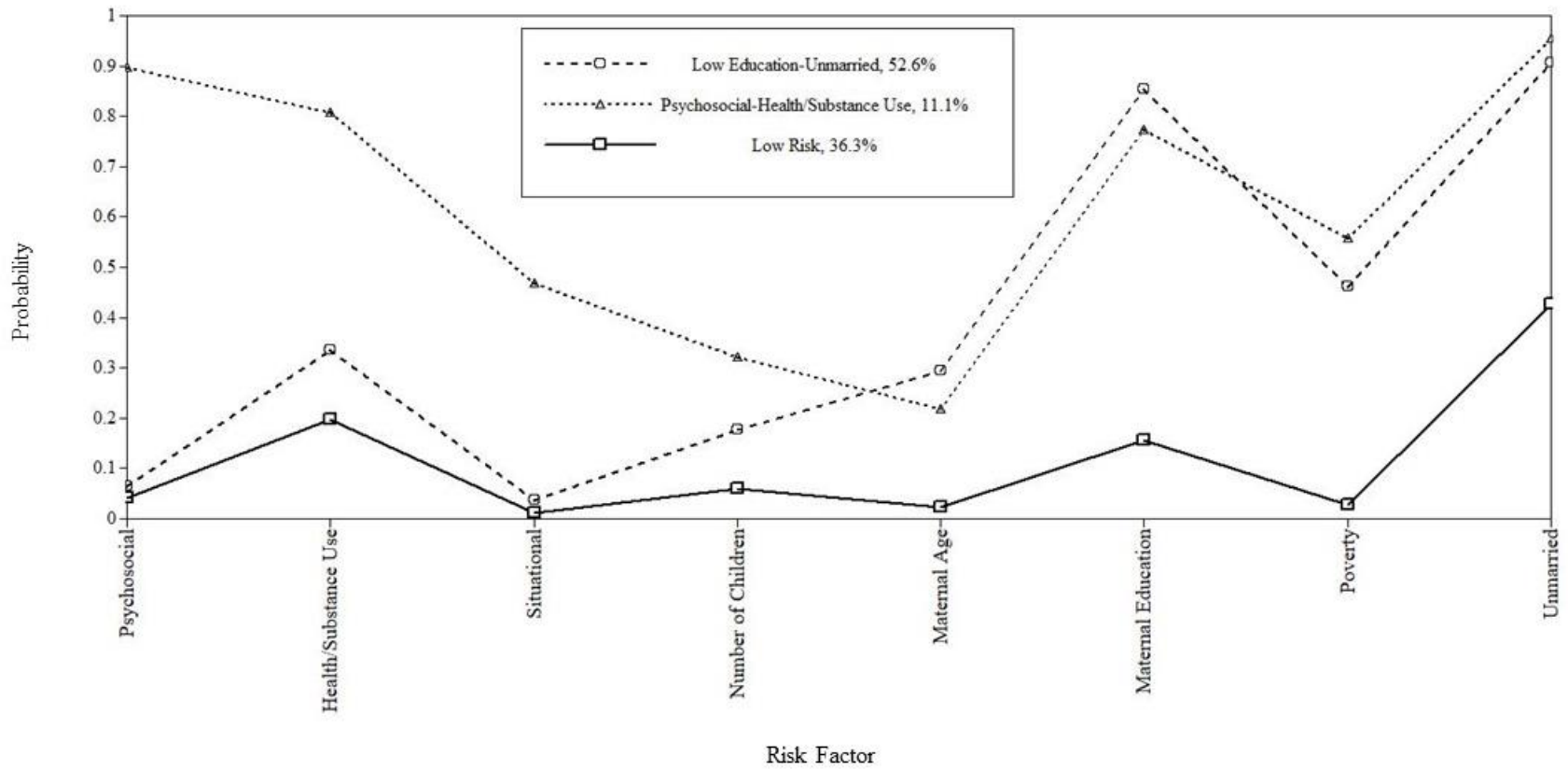
probabilities of psychosocial or substance use problems.

Figure 2.1. Estimated latent class probabilities by risk factor and class.

Latent Classes as Predictors of Kindergarten Outcomes and CPS Involvement

Kindergarten aggression, attention problems, social skills problems, and CPS contact were added to the best fitting three-class model as outcomes using the Lanza et al. (2013) method for adding distal outcomes. This approach allows outcome variables to be added to the model without changing class specifications in the LCA, and includes an omnibus test of class comparisons for each outcome variable along with pairwise chi-square comparisons for each outcome between each class with the other classes. Class means and standard errors for the outcome variables are presented in Tables 2.6 and 2.7.

Aggression. In terms of aggression problems, the overall test indicated significant differences between the three classes, $\chi^2 = 20.45$, $p < .001$. Pairwise comparisons demonstrated that the Low Education-Unmarried class significantly differed from the Low-Risk class, $\chi^2 = 14.12$, $p < .001$, and the Psychosocial-Substance Use class significantly differed from the Low Risk Class, $\chi^2 = 10.62$, $p = .001$. The Low Education-Unmarried class did not differ significantly from the Psychosocial-Substance Use class, $p = .15$.

Attention problems. Related to attention problems, the overall omnibus test was significant, $\chi^2 = 12.40$, $p = .002$. Pairwise comparisons demonstrated that all three classes differed significantly from each other. The difference between the Low Education-Unmarried class and the Psychosocial-Substance Use class was significant, $\chi^2 = 4.09$, $p = .04$, as was the difference between the Low Education-Unmarried class and the Low-Risk class, $\chi^2 = 5.31$, $p = .02$, and between the Psychosocial-Substance Use class and the Low-Risk class, $\chi^2 = 10.26$, $p = .001$.

Social problems. The overall test of differences in social skill problems also was significant, $\chi^2 = 8.69$, $p = .013$. The Low Education-Unmarried class differed significantly from

the Psychosocial-Substance Use class, $\chi^2 = 7.08$, $p = .008$, and the Psychosocial-Substance Use class differed significantly from the Low-Risk class, $\chi^2 = 8.68$, $p = .003$, but the Low Education-Unmarried class and the Low-Risk class were not significantly different, $p = .48$.

Letter-word recognition. In terms of letter-word recognition, the overall test was significant, $\chi^2 = 100.22$, $p < .001$. The Low Education-Unmarried class was significantly different from the Low-Risk class, $\chi^2 = 89.74$, $p < .001$, and the Psychosocial-Substance Use class was significantly different from the Low-Risk class, $\chi^2 = 50.15$, $p = .001$, but the Low Education-Unmarried class and the Psychosocial-Substance Use class were not significantly different, $p = .40$.

CPS involvement. The overall test for CPS involvement also was statistically significant, $\chi^2 = 11.16$, $p = .004$. The Low Education-Unmarried class and the Psychosocial-Substance Use class differed significantly, $\chi^2 = 5.36$, $p = .02$, as did the Psychosocial-Substance Use class and the Low Risk class, $\chi^2 = 10.81$, $p = .001$. There was not a significant difference between the Low Education-Unmarried class and the Low Risk class in CPS involvement, $p = .09$. The probabilities and odds ratios related to CPS involvement are presented in Table 2.7.

Covariates. The overall test for disability status was not significant, $p = .58$, but the overall test for ethnicity/race was, $\chi^2 = 43.91$, $p < .001$. The Low Education-Unmarried class differed significantly from the Low Risk class, $\chi^2 = 28.67$, $p < .001$, and from the Psychosocial-Substance Use class, $\chi^2 = 11.43$, $p = .01$. The Psychosocial-Substance Use class also differed from the Low Risk Class, $\chi^2 = 16.69$, $p = .001$ (see Table 2.8).

Table 2.6

Latent Class (Combinations of Risk) Differences in Kindergarten Outcomes

Risk Profile	Aggression Problems M (SE)	Attention Problems M (SE)	Social Skill Problems M (SE)	Letter-Word Recognition M (SE)
Low Education-Unmarried	23.63 (0.33)	12.34 (0.18)	7.15 (0.08)	97.44 (0.66)
Psychosocial-Substance Use	24.98 (0.87)	13.38 (0.48)	7.82 (0.24)	96.11 (1.43)
Low Risk	21.98 (0.30)	11.72 (0.20)	7.06 (0.09)	108.18 (0.92)

Table 2.7

Probability of CPS Involvement by Latent Class (Combinations of Risk)

	Probability	SE	Odds Ratio	SE
Low Education-Unmarried				
Yes	0.13	0.02	2.25	1.29
Psychosocial-Substance Use				
Yes	0.27	0.05	5.71	3.41
Low Risk				
Yes	0.06	0.03	1.00	0.00

Table 2.8

Probability of Ethnicity/Race by Latent Class (Combinations of Risk)

	Probability	*SE*	Odds Ratio	*SE*
Low Education-Unmarried				
White, non-Hispanic	0.12	0.03	1.00	0.00
Black, non-Hispanic	0.50	0.03	9.18	4.41
Hispanic	0.36	0.04	10.63	6.90
Other	0.01	0.01	0.73	0.55
Psychosocial-Substance Use				
White, non-Hispanic	0.22	0.07	1.00	0.00
Black, non-Hispanic	0.55	0.07	5.62	2.68
Hispanic	0.18	0.04	2.93	1.65
Other	0.05	0.02	1.45	1.00
Low Risk				
White, non-Hispanic	0.54	0.07	1.00	0.00
Black, non-Hispanic	0.24	0.04	1.00	0.00
Hispanic	0.15	0.05	1.00	0.00
Other	0.08	0.02	1.00	0.00

Post-hoc analyses using each family's most-likely class from the LCA demonstrated that all classes differed in level of cumulative risk. The Low Education-Unmarried class, on average, had 3.22 (*SE* = 1.05) risks at birth with a range of 2 to 7. The Psychosocial-Substance Use class, on average, had 6.15 (*SE* = 2.11) risks at birth with a range of 2 to 13. The Low-Risk class, on average, had 0.77 (*SE*= .71) risks at birth with a range of 0 to 3. Results from a one-way ANOVA demonstrated that the class means differed significantly, $F(2,754) = 850.91$, $p < .001$. Tukey's HSD post-hoc analysis demonstrated that the Low Education-Unmarried class had fewer cumulative risks (95% CI = -3.25 to -2.62, $p < .001$) than the Psychosocial-Substance Use class, and more cumulative risks (95% CI 2.25 to 2.66, $p < .001$) than the Low-Risk class. The Psychosocial-Substance Use class had more cumulative risks (95% CI = 5.06 to 5.71, $p < .001$) than the Low-Risk class.

Discussion

The present study tested two risk models, one based on cumulative family risk and the other based on combinations of risk, in order to better understand how family functioning relates to children's kindergarten achievement and CPS involvement. The results from the cumulative risk model revealed that, controlling for disability status, cumulative risk predicted children's kindergarten aggression problems, attention problems, letter-word recognition skills, and CPS involvement by age 5. Cumulative risk did not predict children's social skill problems, beyond the effects of disability status. The LCA model identified three classes of family risk: Low Education-Unmarried, Psychosocial-Substance Use, and Low Risk. All three classes differentially predicted children's kindergarten outcomes and CPS involvement.

Association of Cumulative Risk with Kindergarten Outcomes CPS Involvement

Consistent with the extant literature (e.g., Farkas & Hibel, 2008) and cumulative risk perspectives (e.g., Sameroff et al., 1987), the present study demonstrated that cumulative risk is associated with several kindergarten outcomes. Specifically, greater risk at birth was associated with greater aggression and attention problems and worse letter-word recognition skills among kindergarten students, controlling for disability status. However, controlling for disability status, cumulative risk at birth was unrelated to children's kindergarten social skills. It could be that aggression, attention, and letter-word recognition measured children's cognitive development, while social skills problems measured children's social development. The link between contextual risk (e.g., poverty) and children's cognitive development is well-established (see Farah et al., 2006).

Yet, social learning theory (Bandura, 1971), as well as risk and resilience perspectives, support the presupposition that supportive social environments (e.g., parenting) could buffer

78

children from poor social skills (Lengua, Honorado, & Bush, 2007). Lengua et al. (2007) found that children's cognitive self-regulation (i.e., effortful control) and parenting both predicted later social competence. Interestingly, however, was that different parenting skills predicted effortful control (i.e., scaffolding) than predicted social competence (i.e., warmth). The authors did not take into account the ways in which different individual risk factors, or combinations thereof, predicted children's outcome as was tested in the present study. Because the profile analysis revealed that children from the Psychosocial-Substance Use class had more social problems than the other two classes, it may be that – similar to Lengua et al.'s (2007) finding – different parenting risks, or combinations thereof, predict the more cognitive-based outcomes in this study than predict the social competence outcome. Without covariates in the model, cumulative risk at birth accounted for very small amounts of variance in all kindergarten outcomes (i.e., 0.7-1.2%; 6% for letter-word recognition). With covariates included in the model, the amount of variance accounted for was larger (i.e., 4-11%); thus, disability status is a bigger contributor to children's kindergarten outcomes in this study than cumulative risk at birth.

Cumulative risk also predicted CPS involvement. This finding is consistent with the goals of child protection, which are to identify children at high risk for maltreatment in order to mitigate adverse family and child effects. The findings from the present study do not indicate whether higher-risk families are more likely to abuse or neglect their children; rather, the findings only demonstrate that higher-risk families are more likely to be contacted by CPS than the lower-risk families in the study. Rates of maltreatment remain high and costly; over 7 million reports were made to CPS in 2016 involving over 4 million children (U.S., Department of Health and Human Services, 2018), which costs the U.S. $124 billion annually (Fang, Brown, Florence, & Mercy, 2012).

Thus, it appears that risk assessments at birth would be a feasible first step in prevention efforts by identifying families that may come into contact with CPS later on, potentially as victims. Important to note, however, is the fact that this cumulative risk model only accounted for 6% of the variance in CPS involvement, suggesting other unaccounted for variables would contribute more predictive utility to the model, and perhaps would be less likely to result in false positives that label families. For example, Dubowitz et al. (2011) found that low maternal education, maternal drug use, maternal depressive symptoms, and more than one child in the home were all associated with increased risk for maltreatment reports. Yet, the results also demonstrated that children's performance on a mental development index was associated with increased risk for a maltreatment report. This child-level risk factor was not accounted for in the present study.

Although findings like Dubowitz et al. (2011) support professionals in better understanding risk factors to assess related to maltreatment, the findings do not provide much guidance on the type of support families may need. For example, lower-risk families may need more limited support (e.g., parenting education) but higher-risk families may require greater support (e.g., home visitation). Neither the findings from studies such as Dubowitz et al. (2011) nor the findings from the present study's cumulative risk model provide much insight into the type of support families may need. Thus, classes of risk at birth were also identified in order to better understand whether different combinations of family risks are differentially associated with children's kindergarten outcomes or CPS involvement.

Differences in Kindergarten Outcomes and CPS Involvement among Latent Classes

Consistent with previous research (Pratt et al., 2016), three classes of family risk were identified in the present study: (a) Low Education-Unmarried, (b) Psychosocial-Substance Use,

and (c) Low Risk. The three classes identified in the present study closely map onto those identified by Pratt et al. (2016), which were (a) low-resourced – single and minority, (b) low-resourced – harsh parenting and depression, and (c) low risk. I hypothesized that the various classes identified through LCA would differentially predict children's aggression, attention, and social skill problems, as well as their letter-word skills and involvement with CPS.

In terms of aggressive problems and letter-word recognition skills, there were no significant differences between the Low Education-Unmarried and Psychosocial-Substance Use classes, but both significantly differed from the Low Risk class, which scored the lowest in aggressive child behaviors and highest in letter-word recognition skills. Thus, it appears that a cumulative risk perspective aligns better with aggressive problems and letter-word recognition skills in early childhood. Related to attention problems, however, all three classes significantly differed; children from the Psychosocial-Substance Use class demonstrated the worst attention problems.

The Low Risk and Low Education-Unmarried classes did not differ significantly in social skill problems or CPS involvement but the Psychosocial-Substance Use class significantly differed from both classes. This finding - that the Psychosocial-Substance Use class had the greatest likelihood of being involved with CPS by age 5 - aligns with the well-documented finding that substance use, violence in the home, and mental health issues dysregulate emotions and self-regulation (e.g., Gross & Muñoz, 1995; Levendosky, Leahy, Bogat, Davidson, & von Eye, 2006), which contribute to harsh discipline (e.g., Lorber & Slep, 2005) and children's behavioral problems (Levendosky et al., 2006). Yet because CPS involvement is not a measure of substantiated maltreatment, it is also likely that certain risk factors, such as drug or substance use, violence in the home, and mental health issues, increase the likelihood that these families

81

will be reported to CPS as compared to other risk factors such as being young or having a high school education.

An alternative explanation is that parents with substance use or mental health problems may receive other services and therefore are more likely to be surveilled for maltreatment. This hypothesis, termed surveillance bias, was tested in a national sample and determined to have significant, but small effects (Drake, Jonson-Reid, & Kim, 2017). Drake et al. (2017) included families who had an initial referral to CPS, and who were subsequently referred to mental health or social services. Because the present study did not include child welfare records, but rather self-report of any involvement with CPS in the past five years, the level of CPS involvement and official child welfare response (i.e., whether the CPS case was investigated and resulted in a report or not) were not taken into account. The extent to which combinations of risk at birth not only predict future involvement, but also predict the extent to which future involvement results in an investigation, is an important factor for future research to explore. This is due, in part, to the fact that previous studies indicate that children investigated by CPS (regardless of substantiation) return to the system at similar rates (Kohl, Jonson-Reid, & Drake, 2009). As such, the potential for a risk assessment at birth to identify families that may be involved in CPS investigations later on could reduce burden on the CPS system by intervening to promote positive family functioning beginning at birth. Yet, the question of whether cumulative risk or risk combinations should be used to identify families is still unclear.

Cumulative Risk versus Classes of Risk

The results from the cumulative risk and risk class models differed in several ways. First, after controlling for disability status, the cumulative risk model did not detect an association between cumulative risk and social skill problems. However, the profile analysis model

demonstrated that children from the Psychosocial-Substance Use class had significantly more social skill problems than either of the other classes. Important to note is that the Psychosocial-Substance Use class was similar to the Low Education-Unmarried class in that both had high probabilities of having a high school or less education and being unmarried at birth, but differed in that mothers in the Psychosocial-Substance Use class also were more likely to have substance use or mental health problems. Further, the Low Education-Unmarried Class fared similar to the Low Risk class in social skills and CPS involvement but not in aggression, attention, or letter-word scores. Children from the Psychosocial-Substance Use Class scored the lowest across all domains. This finding replicates Pratt et al. (2016), who found that the Low Resourced: Parental Harshness//Depressed profile demonstrated worse school readiness outcomes than the other two classes of families. Thus, it appears that the addition of psychosocial-substance use problems to a single-parent, low-education family is particularly detrimental to children's development and increases the likelihood of becoming involved with CPS.

Second, a post-hoc One-Way ANOVA demonstrated that the three classes significantly differed in the number of risks, such that the Psychosocial-Substance Use class had the most cumulative risks, yet there was considerable variation in the range of cumulative risks within each class. For example, the standard error was over 2 for the Psychosocial-Substance Use class, and 1 or under for the other two classes. This suggests that a profile analysis approach may be more informative than a cumulative risk approach in that there was considerable variability in number of risks within each identified class, but each class differentially predicted children's outcomes and CPS involvement.

Collectively, these findings suggest that children from low-resourced families with psychosocial or substance use problems (unmeasured in Pratt et al., 2016) may need the most

support for school readiness and kindergarten achievement. The cumulative risk model also suggests that children from families with more risk struggle more with aggression, attention, and letter-word recognition skills, and are more likely to come into contact with CPS. However, the cumulative risk model is not nuanced enough to indicate specific risk factors that contribute to each outcome. Thus, the profile analysis complements the cumulative risk model and may aid professionals in targeting services based on risk. However, neither approach provide insights into mediating mechanisms, or the family processes that account for kindergarten and CPS outcomes, such as disciplinary practices, age-appropriate stimulation, or family routines. Further, it is possible that different mediating mechanisms account for the associations between combinations of family risk and the various kindergarten outcomes and CPS involvement.

For example, the Family Stress Model (Conger & Conger, 2002) hypothesizes that economic insufficiency increases parent distress and undermines parents' functioning, which subsequently leads to poor child outcomes. Though both the Low Education-Unmarried and Psychosocial-Substance Use are both similarly low-income, the children in that Psychosocial-Substance Use Class fare worse in kindergarten outcomes. Thus, the lack of psychosocial-substance use problems (i.e., parent distress) in the Low Education-Unmarried class suggests that the mediating or protective processes also may differ across classes. Future research should explore family processes that contribute to the links between family risk and kindergarten and CPS outcomes. Such research could identify intervention strategies, or outcomes likely to be influenced by interventions that mitigate risk (i.e., reduce parent stress, increase parent education).

Commonalities in Maltreatment Prevention and Early School Achievement

The results from this study demonstrate that cumulative risk at birth predicts both kindergarten outcomes and CPS involvement by age 5. Complementing these findings, the profile analysis demonstrated that children from the Psychosocial-Substance Use class struggle with kindergarten achievement and are the most likely to become involved with CPS. These results indicate that higher-risk families may benefit from intervention strategies and services that seek to mitigate risk for maltreatment and promote school readiness and early achievement. This concept is not new, but few programs currently exist that effectively target both. For example, seven of 45 models reviewed by the Department of Health and Human Services (e.g., home visitation; Department of Health and Human Services, 2019) are effective at targeting both. Further, a review of prevention programs found only small to modest impacts on maltreatment rates (Geeraert, Van den Noorgate, Grietens, & Onghena, 2004), and although several initiatives to promote school readiness have been implemented in recent years, gaps in school readiness remain (Reardon & Portilla, 2016).

From the PPCT model perspective (Bronfenbrenner & Morris, 1998; 2006), it may be the case that limited progress in preventing maltreatment and promoting school readiness is partially attributed to interactions among family risk classes, children's outcomes, and environments being unaccounted for in some interventions. For example, families in the Psychosocial-Substance Use Class are likely to be single mothers with high school or less education, who have psychosocial or substance use problems at the child's birth, are living in poverty, and who have children with more aggression, attention, social skills, and letter-word recognition problems than lower-risk children by age 5. These factors, combined with a greater likelihood of being involved with CPS, signal the need for multi-faceted, social-ecological approach to prevention. That is, individual strategies - such as those that focus on individual parent processes and which offer a

single solution to complex, multiply determined social problems - are insufficient. Indeed, moderate program effects tend to fade when local communities and public institutions are not involved (Daro & Dodge, 2009).

Strengths and Limitations

The present study tested two competing models of risk and resilience in a large sample of families with various levels of risk. Longitudinal data allowed for advanced statistical analyses to be performed in order to identify classes of risk at birth and to understand associations with children's later outcomes using reliable and valid parent-reported, teacher-reported, and observed measures. Despite these strengths, a few study limitations should be noted.

First, the sample size of the present study was reduced to families with kindergarten and medical records data present. Though *t* test results revealed no significant differences in CPS outcomes between mothers with data present and those without, they may have differed in kindergarten outcomes. Thus, the generalizability of the findings from the final sample may be limited based on other characteristics untested in this study. The classes identified in the present study, therefore, will need to be validated in other samples given the exploratory nature of these analyses. Second, risk classes were identified at one time point only. Although using data measured at age 3 allowed for temporal precedence to predict outcomes at age 5, the risk factors included in the model could have changed throughout early childhood. Lastly, the two competing models could not be statistically compared; thus, the overall benefits of using one approach compared to the other is still unknown.

Implications

Several policy and programmatic implications stem from the present study. First, by kindergarten, children born to families with a greater number of early risk factors have more

aggression and attention problems, worse preliteracy skills, and greater chances of being involved with CPS. Thus, risk assessments at birth appear to be a feasible approach for identifying children who may later come into contact with the CPS system and who may be academically and socially behind other peers by the end of kindergarten. Second, results from the profile analysis indicated that different classes of risk contribute to different child and family outcomes. Thus, families may benefit from services that are tailored to their specific needs. Taken together, these results suggest that a cumulative risk assessment can be used to identify family needs, and classes based on different constellations of risk can identify the types of services needed.

Third, children from the Psychosocial-Substance Use class fared the worst on all outcomes, including involvement with CPS. This finding supports innovative policies such as the Family First Prevention Services Act (Bipartisan Budget Act, 2018) that enables child welfare funds from Title IV-E of the Social Security Act to be used for mental health and substance use services in order to prevent the placement of children into foster care. The goal of this policy is to preserve families and reduce out-of-home placements. However, the results from this study suggest that children's academic and social skills could benefit from the cascading effects (Masten & Cicchetti, 2010) of this policy as well. That is, functioning at earlier time points alters functioning later on within the family unit, individual level, or across generations (Masten & Monn, 2015). Last, the profile analysis results indicate that similar sets of risk factors predict children's kindergarten functioning as do CPS involvement. Yet, early childhood policies are fragmented across health, education, and human services systems (Shonkoff, 2010). There is a clear need for coordinated, research-based early childhood framework within government service agencies (Shonkoff, 2010). As such, coordinating policies and programs relevant to both early

achievement and child welfare prevention could be an efficient way to reduce adversity-related gaps in early achievement and CPS caseloads.

Conclusion

This study demonstrates that cumulative early risk and combinations of risk are associated with several kindergarten outcomes and family involvement with CPS by age 5. Overall, the results support hospital cumulative risk assessments as a feasible way to document family risk at birth and predict child and family functioning at least five years later. The findings also suggest that, when compared to a cumulative risk approach, a risk profile approach may be better suited for identifying specific processes to target in a tailored intervention. In this study, families in the Psychosocial-Substance Use class fared the worst overall. As such, policies such as the Family First Prevention Services Act, which aim to address parent mental health and substance use issues as a way to keep families together and prevent foster care placements, are supported by this study.

CHAPTER IV

GENERAL DISCUSSION

Despite progress made in the field, rates of maltreatment remain high (U.S. Department of Health and Human Services, 2018) and costly (Fang et al., 2012). Further, economic and ethnic disparities in early achievement are being reduced, but – at the current rate – are estimated to take 60 to 110 years to fully close (Reardon & Portilla, 2016). Thus, both maltreatment and school readiness are social issues that remain critical to address. Accordingly, the overarching purposes of this dissertation were to explore (a) trajectories of aggression, and predictors of the intercepts and slopes, among families with various levels of risk at birth, and (b) the extent to which a cumulative risk model and classes of risk model predict kindergarten achievement and involvement with CPS. Both studies were grounded in cumulative risk perspectives, family stress model (FSM; Conger & Conger, 2002), and ecological systems theory (Bronfenbrenner & Morris, 1998; 2006).

Study 1 results demonstrated that, on average, physical and psychological aggression decreases between age 3 and 9. In terms of differences based on risk group, the High Risk group did not differ significantly from the Moderate or Low Risk groups in initial level of aggression at age 3 or in change over time, but did differ in variability at age 3 and in change over time, suggesting that the High Risk group is a more heterogeneous group. Findings also demonstrated that the effects of the predictors (i.e., change in income, education, and parenting stress; neighborhood cohesion) differed across risk group. In the Low Risk and High Risk groups, for example, increases in parenting stress were associated with higher levels of aggression at age 3, and greater neighborhood social cohesion was associated with less aggression at age 3. In the

Moderate Risk group, increases in maternal education were associated with greater levels of aggression at age 3 and greater neighborhood social cohesion was associated with less aggression at age 3.

Study 2 results from the cumulative risk model revealed that, controlling for disability status, greater numbers of risk at birth are associated with more aggression problems and attention problems, lower letter-word recognition skills, and increased likelihood of CPS involvement by age 5. Cumulative risk did not predict children's social skill problems, beyond the effects of disability status. The LCA model identified three classes of family risk: Low Education-Unmarried, Psychosocial-Substance Use, and Low Risk. All three classes differentially predicted children's kindergarten outcomes and CPS involvement. Overall, this dissertation makes important contributions to maltreatment prevention and school readiness literature by testing the merits of cumulative risk and risk classes, and second by providing evidence to support ecological and coordinated prevention approaches.

Merits of Cumulative Risk and Risk Classes for Prevention

In terms of the cumulative risk perspective, hospital risk assessments at birth appear to be a feasible approach to identify families' levels and combinations of risk. Although maternal psychosocial risk assessments are recommended by government and professional organizations, the recommendations are not uniform or mandated (Harrison & Sidebottom, 2008). Uniform risk screeners are important for identifying families that qualify for a variety of federal-, state-, and community-level programs. However, there is limited research related to the validation and evaluation of screening tools worldwide (e.g., Spyridou, Schauer, & Ruf-Leuschner, 2014). Results from the present studies suggest that hospital screeners are predictive of child outcomes through at least kindergarten. However, more research is necessary to develop uniform, valid,

and reliable screeners with a more representative sample. The present studies relied on data that represented births in cities in the United States with populations of 200,000 or more, and therefore the generalizability of the findings is limited.

Uniform risk assessments, when combined with a profile analysis approach, could allow practitioners to more strategically refer families to federal- and state-funded programs based on level and type of risk. Statewide or national data from such risk assessments could inform the development of policies and programs to address risk factors that may be specific to geographic region. One example of statewide legislative approach comes from the state of West Virginia. In 2009, West Virginia signed into law a requirement that all maternal health service providers conduct a uniform risk assessment of all expectant mothers beginning in 2011 (West Virginia Legislative Rule §64-4E-5).

This type of statewide legislative approach is innovative in that it allows for risk at birth to be tracked statewide, and for comparisons of needs to be made across the state. Comparisons by geographic region are important to track, given the heterogeneity of the United States. For example, hospital risk screening data collected from a sample of women in Appalachia revealed that mothers in that region had few psychosocial risk factors but smoked during pregnancy at much higher rates than is reported nationally (Jesse, Seaver, & Wallace, 2003). In this region, programs to reduce maternal smoking, even among low-risk mothers, might be an important prevention goal. Thus, the collection of such data at birth could help address gaps in the present literature related to the validity and predictive utility of hospital risk assessments.

Ecological and Coordinated Prevention Approaches

Considered together, the results from both studies of this dissertation also inform the field of the variety of systems that contribute to risk for child maltreatment and early childhood gaps

in achievement. In terms of the family system, Study 1 demonstrated that changes in parenting stress predict average level of maternal aggression at age 3, regardless of level of risk at birth. Study 1 similarly demonstrated that an aspect of the environmental system, neighborhood cohesion, is also associated with average level of aggression at age 3 among families with low- and high-risk levels at birth.

Changes in income were not predictive of aggression intercepts in Study 1, yet descriptive results indicated that most families did not change income-to-needs ratios between child age 1 and 3. Thus, families who began the study in poverty tended to remain in poverty through age 3. Findings from Study 1 indicate that risk classes or profiles approaches are well-suited for understanding the types of services to direct to families with various levels of risk. Further, the case for coordinating programs and aligning policies that address both child welfare and early achievement is supported in that combinations of risk predicted kindergarten outcomes and risk for involvement with the CPS system. Important to note, however, is that the negative association between increases in maternal education and aggression at age 3 was unexpected. This association warrants additional research to test this association in other samples in order to determine whether replication is supported. If the finding is supported by other studies, programs or policies that support parent educational attainment may need to be evaluated in order to determine the extent to which caregivers in school or training programs need additional support.

Together, the findings from Study 1 and 2 also suggest that current prevention models and policies might direct tailored support to all families within a community, regardless of level of initial risk. That is, individual strategies - such as those that focus on individual parent processes and which offer a single solution to complex, multiply determined social problems - are insufficient. Indeed, moderate program effects tend to fade when local communities and

public institutions are not involved (Daro & Dodge, 2009). However, current policies and programs that support families and children are fragmented (i.e., housed in various agencies and systems), reactive (e.g., designed in response to a tragedy), and are sometimes duplicated across various systems and agencies (Jenson & Fraser, 2015). Accordingly, Jenson and Fraser (2015) argued that social policymaking would benefit from a public health framework that is informed by risk and resilience perspectives.

Communities that Care (CTC; Hawkins, Catalano, & Associates 1992) is one example of an evidence-based program that is grounded in a public health and risk and resilience perspective. Though CTC is designed to prevent youth problem behaviors, the model provides a framework for other community initiatives to target family and early childhood outcomes as well. The results from the present studies suggest that this type of community-based intervention could benefit families by targeting social cohesion and parenting stress.

Conclusion

Overall, the results from this dissertation highlight the effects of risk at birth, both in terms of later family functioning (i.e., physical and psychological aggression, CPS involvement) and child outcomes (i.e., kindergarten social skills, cognition). The findings contribute to the literature by comparing the predictive utility of cumulative risk and classes of risk at birth, as well as by assessing dynamic changes in risk (as compared to measuring risk at one point in time). Neighborhood cohesion and parenting stress appear to be important contributors to parent aggression, regardless of initial level of risk at birth. Accordingly, this dissertation supports the use of a public health framework, informed by risk and resilience perspectives, to guide the development of programs and policies intended to support children and families.

References

Abidin, R. R. (1995). *Manual for the Parenting Stress Index*. Odessa, FL: Psychological Assessment Resources.

Achenbach, T. M. (1991). *Manual for Child Behavior Checklist/ 4-18 and 1991 Profile*. Burlington, VT: University of Vermont, Dept. of Psychiatry.

Allison, P. (2012, April). *Handling missing data by maximum likelihood.* In *SAS global forum* (Vol. 312).

Ammerman, R. T., Kolko, D. J., Kirisci, L., Blackson, T. C., & Dawes, M. A. (1999) Child abuse potential in parents with histories of substance use disorder. *Child Abuse & Neglect, 23,* 1125–1238. doi: 10.1016/S0145-2134(99)00089-7

Augustine, J., Prickett, K. C., Kendig, S., & Crosnoe, R. (2015). Maternal education and the link between birth timing and children's school readiness. *Social Science Quarterly*, *96*, 970–984. http://doi.org/10.1111/ssqu.12150.

Bandura, A. (1971). Social learning theory. New York, NY: General Learning Press.

Bayat, M. (2007). Evidence of resilience in families of children with autism. *Journal of Intellectual Disability Research*, *51*, 702-714. doi: 10.1111/j.1365-2788.2007.00960.x.

Bell, M. F., Bayliss, D. M., Glauert, R., & Ohan, J. L. (2018). School readiness of maltreated children: Associations of timing, type, and chronicity of maltreatment. *Child Abuse & Neglect, 76,* 426-439. doi: 10.1016/j.chiabu.2017.12.001.

Belsky, J. (1980). Child maltreatment: An ecological integration. *American Psychologist, 35*, 320-335. doi: 10.1037/0003-066X.35.4.320

Berger, L. M., Font, S. A., Slack, K. S., & Waldfogel. (2017). Income and child maltreatment in unmarried families: evidence from the earned income tax credit. *Review of Economics of the Household, 15,* 1345-1372. doi: 10.1007/s11150-016-9346-9

Berzenski, S. R., Yates, T. M., & Egeland, B. (2014). A multidimensional view of continuity in intergenerational transmission of child maltreatment. In J. E. Korbin, & R. D. Krugman (Eds.), *Handbook of child maltreatment* (pp. 115-129). New York, NY: Springer. doi: 10.1007/978-94-007-7208-3.

Bipartisan Budget Act of 2018. Retrieved from: https://www.congress.gov/bill/115th-congress/house-bill/1892/text

Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual Review of Psychology, 53,* 371–399. doi: 10.1146/annurev.psych.53.100901.135233.

Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist, 32,* 513-531. doi: 10.1037/0003-066X.32.7.513.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.

Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology. Vol. 1. Theoretical models of human development* (6th ed., pp. 793-828). Hoboken, NJ: John Wiley & Sons.

Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental processes. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology. Vol. 1. Theoretical models of human development* (5th ed., pp. 993-1028). New York: John Wiley & Sons.

Brooks-Gunn, J., Schneider, W., & Waldfogel, J. (2013). The Great Recession and the risk for child maltreatment. *Child Abuse & Neglect, 37*, 721-729. doi: https://doi.org/10.1016/j.chiabu.2013.08.004

Brown, J., Cohen, P., Johnson, J. G., & Salzinger, S. (1998). A longitudinal analysis of risk factors for child maltreatment: Findings of a 17-year prospective study of officially recorded and self-reported child abuse and neglect. *Child Abuse & Neglect, 11,* 1065-1078. doi: https://doi.org/10.1016/S0145-2134(98)00087-8

Callender, K. A., Olson, S. L., Choe, D. E., & Sameroff, A. J. (2012). The effects of parental depressive symptoms, appraisals, and physical punishment on later child externalizing behavior. *Journal of Abnormal Child Psychology, 40,* 471-483. doi: 10.1007/s10802-011-9572-9.

Campbell, S. B., Matestic, P., von Stauffenberg, C., Mohan, R., & Kirchner, T. (2007). Trajectories of maternal depressive symptoms, maternal sensitivity, and children's functioning at school entry. *Developmental Psychology, 43,* 1202–1215. doi: 10.1037/0012-1649.43.5.1202.

Carpenter, G. L., & Stacks, A. M. (2009). Developmental effects of exposure to intimate partner violence in early childhood: a review of the literature. *Children and Youth Services Review, 31,* 831–839. doi: 10.1016/j.childyouth.2009.03.005

Centers for Disease Control and Prevention (2019). Child abuse and neglect: Risk and protective factors. Available from: https://www.cdc.gov/violenceprevention/childabuseandneglect/riskprotectivefactors.html

Chazan-Cohen, R., Raikes, H., Brooks-Gunn, J., Ayoub, C., Pan, B. A., Kisker, E. E., ... & Fuligni, A. S. (2009). Low-income children's school readiness: Parent contributions over the first five years. *Early Education and Development*, *20*, 958-977. doi: 10.1080/10409280903362402.

Cicchetti, D., Lynch, M. (1993). Toward an ecological / transactional model of community violence and child maltreatment: Consequences for children's development. *Psychiatry, 56,* 96–118. doi: 10.1080/00332747.1993.11024624

Cicchetti, D., & Rogosch, F. A. (1996). Equifinality and multifinality in developmental psychopathology. *Development and Psychopathology*, *8*, 597-600. doi: 10.1017/S0954579400007318

Conger, R. D., Conger, K. J. (2002). Resilience in Midwestern families: Selected findings from the first decade of a prospective, longitudinal study. *Journal of Marriage and Family, 64*, 361–373. doi: 10.1111/j.1741-3737.2002.00361.x.

Conger, R. D., & Elder, G. H., Jr. (1994). *Families in troubled times: Adapting to change in rural America.* Hawthorne, NY: Aldine DeGruyter.

Coulton, C. J., Crampton, D. S., Irwin, M., Spilsbury, J. C., & Korbin, J. E. (2007). How neighborhoods influence child maltreatment: A review of the literature and alternate pathways. *Child Abuse & Neglect, 31,* 1117-1142. doi: 10.1016/j.chiabu.2007.03.023.

Cowan, P. A., Cowan, C. P., & Schultz, M. S. (1996). Thinking about risk and resilience in families. In E. M. Hetherington & E. A. Blechman (Eds.), *Stress, coping, and resiliency in children and families* (pp. 1-38). Hillsdale, NJ: Erlbaum.

Crouch, J. L., & Behl, L. E. (2001). Relationships among parental beliefs in corporal punishment, reported stress, and physical child abuse potential. *Child Abuse & Neglect*, *25*, 413-419. doi: https://doi.org/10.1016/S0145-2134(00)00256-8

Crnic, K. A., Gaze, C., & Hoffman, C. (2005). Cumulative parenting stress across the preschool period: Relations to maternal parenting and child behavior at age 5. *Infant and Child Development*, *14*, 117-132. doi: 10.1002/icd.384

Crnic, K., & Ross, M. (2017). Parenting stress and parental efficacy. In K. D. Deater-Deckard, & R. Panneton (Eds.), *Parental stress and early child development*: *Adaptive and maladaptive outcomes.* Cham, Switzerland: Springer. doi: 10.1007/978-3-319-55376-4

Daro, D., & Dodge, K. A. (2009). Creating community responsibility for child protection: possibilities and challenges. *Future of Children, 19,* 67-93. doi: PMC3730282

Daro, D., & Cohn Donnelly, A. (2015). Reflections on child maltreatment research and practice: Consistent challenges. In D. Daro, A. Cohn Donnelly, L. A. Huang, & B. J. Powell (Eds.), *Advances in child abuse prevention knowledge: The perspective of new leadership* (pp. 3-18). Cham, Switzerland: Springer International. doi: 10.1007/978-3-319-16327-7

David, K., LeBlanc, B., & Self-Brown, M. (2015). Violence exposure in young children: Child-oriented routines as a protective factor for school readiness. *Journal of Family Violence, 30*, 303-314. doi: htts://doi.org/10.1007/s10896-015-9676-z.

Davoudzadeh, P., McTernan, M. L., & Grimm, K. J. (2015). Early school readiness predictors of grade retention from kindergarten through eighth grade: A multilevel discrete-time survival analysis approach. *Early Childhood Research Quarterly, 32,* 182-192. doi: 10.1016.j.ecresq.2015.04.005.

Deater-Deckard, K. (2004). *Parenting stress.* New Haven, CT: Yale University.

DeHaan, L. G., Hawley, D. R., & Deal, J. E. (2013). Operationalizing family resilience as process: Proposed methodological strategies. In D. S. Becvar (Ed.), *Handbook of family resilience* (pp. 17-29). St. Louis, MO: Springer. doi: 10.1007/978-1-4614-3917-2/

Dixon, L., Browne, K., & Hamilton-Giachritsis, C. (2005). Risk factors of parents abused as children: A mediational analysis of the intergenerational continuity of child maltreatment (part I). *Journal of Child Psychology and Psychiatry*, *46*, 47-57. doi: 10.1111/j.1469-7610.2004.00339.x.

Drake, B., Jonson-Reid, M., & Kim, H. (2017). Surveillance bias in child maltreatment: a tempest in a teapot. *International Journal of Environmental Research and Public Health*, *14*, 971. doi: 10.3390/ijerph14090971

Dubowitz, H., Kim, J., Black, M. M., Weisbart, C., Semiatin, J., & Magder, L. S. (2011). Identifying children at high risk for a child maltreatment report, *Child Abuse & Neglect, 35,* 96-104. doi: 10.1016/j.chiabu.2010.09.003.

Duncan, G., Magnuson, K., Kalil, A., & Ziol-Guest, K. (2012). The importance of early childhood poverty. *Social Indicators Research, 108*, 87–98. doi: 10.1007/s11205-011-9867-9.

Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., ... & Sexton, H. (2007). School readiness and later achievement. *Developmental Psychology*, *43*, 1428. doi: 10.1037/0012-1649.43.6.1428

Duncan, G. J., Morris, P. A., & Rodrigues, C. (2011). Does money really matter? Estimating impacts of family income on young children's achievement with data from random-assignment experiments. *Developmental Psychology*, *47*, 1263–1279. doi: 10.1037/a0023875

Duncan, G. J., Ziol-Guest, K. M., & Kalil, A. (2010). Early childhood poverty and adult attainment, behavior, and health. *Child Development, 81,* 306–325. doi: 10.1111/j.1467-8624.2009.01396.x.

Egeland, B. (1993). A history of abuse is a major risk factor for abusing the next generation. In R. J. Gelles & D. R. Loseke (Eds.), *Current controversies on family violence* (pp. 197–208). Newbury Park, CA: Sage.

Evans, G. W., Li, D., & Whipple, S. S. (2013). Cumulative risk and child development. *Psychological Bulletin, 139*, 1342-1396. doi: 10.1037/a0031808

Fang, X., Brown, D. S., Florence, C. S., & Mercy, J. A. (2012). The economic burden of child maltreatment in the United States and implications for prevention. *Child Abuse & Neglect*, *36*, 156-165. doi: https://doi.org/10.1016/j.chiabu.2011.10.006

Fantuzzo, J. W., Perlman, S. M., & Dobbins, E. K. (2011). Types and timing of child maltreatment and early school success: A population-based investigation. *Children and Youth Services Review, 33*, 1404-1411. doi: 10.1016/j.childyouth.2011.04.010.

Farah, M. J., Shera, D. M., Savage, J. H., Betancourt, L., Giannetta, J. M., Brodsky, N. L., ... & Hurt, H. (2006). Childhood poverty: Specific associations with neurocognitive development. *Brain Research*, *1110*, 166-174. doi: 10.1016/j.brainres.2006.06.072

Farkas, G., & Hibel, J. (2008). Being unready for school: Factors affecting risk and resilience. In A. Booth & A. C. Crouter (Eds.), *Disparities in school readiness: How families contribute to transitions into school* (pp. 3-30). New York, NY: Erlbaum.

Farver, J. A. M., Xu, Y., Eppe, S., & Lonigan, C. J. (2006). Home environments and young Latino children's school readiness. *Early Childhood Research Quarterly*, *21*, 196-212. doi: 10.1016/j.ecresq.2006.04.008

Fauth, R. C., Leventhal, T., & Brooks-Gunn, J. (2004). Short-term effects of moving from public housing in poor to middle-class neighborhoods on low-income, minority adults' outcomes. *Social Science & Medicine*, *59*, 2271-2284. doi: 10.1016/j.socscimed.2004.03.020

Feldman, B. J., Masyn, K. E., & Conger, R. D. (2009). New approaches to studying problem behaviors: A comparison of methods for modeling longitudinal, categorical adolescent drinking data. *Developmental Psychology*, *45*, 652-676. doi: 10.1037/a0014851.

Folkman, S., & Moskowitz, J. T. (2004). Coping: Pitfalls and promise. *Annual Review of Psychology*, *55*, 745-774. doi: https://doi.org/10.1146/annurev.psych.55.090902.141456

Freisthler, B., & Maguire-Jack, K. (2015). Understanding the interplay between neighborhood structural factors, social processes, and alcohol outlets on child physical abuse. *Child Maltreatment*, *20*, 268-77. doi: 10.1177/1077559515598000

Furlong, M. J. (1998). [Test review of the Child Behavior Checklist]. In J. C. Impara & B. S. Plake (Eds.), *The thirteenth mental measurements yearbook.* Lincoln, NE: Buros Center for Testing.

Garbarino, J. (1977). The human ecology of child maltreatment: A conceptual model for research. *Journal of Marriage and the Family, 39*, 721-736. doi: 10.2307/350477.

Garcia, E. (2015). *Inequalities at the starting gate: Cognitive and noncognitive skills gaps between 2010–2011 kindergarten classmates*. Washington, DC: Economic Policy Institute. Retrieved from http://www.epi.org/publication/inequalities-at-the-starting-gate-cognitive-and-noncognitive-gaps-in-the-2010-2011-kindergarten-class/

Garmezy, N. (1991). Resiliency and vulnerability to adverse developmental outcomes associated with poverty. *American Behavioral Scientist*, *34*, 416–430. doi: 10.1177/0002764291034004003

Gaylor, E., & Spiker, D. (2012). Home visiting programs and their impact on young children's school readiness. *Encyclopedia on Early Childhood Development* (pp. 7 – 13). Retrieved from: http://www.child-encyclopedia.com/home-visiting/according-experts/home-visiting-programs-and-their-impact-young-childrens-school

Geeraert, L., Van den Noortgate, W., Grietens, H., & Onghena, P. (2004). The effects of early prevention programs for families with young children at risk for physical child abuse and neglect: A meta-analysis. *Child Maltreatment*, *9*, 277-291. doi: 10.1177/1077559504264265

Grimm, K. J., Ram, N., & Estabrook, R. (2017). *Growth modeling: Structural equation and multilevel modeling approaches.* New York, NY: Guilford.

Grissmer, D., Grimm, K. J., Aiyer, S. M., Murrah, W. M., & Steele, J. S. (2010). Fine motor skills and early comprehension of the world: Two new school readiness indicators. *Developmental Psychology, 46,* 1008-1017. doi: 10.1037/a0020104

Gross, J. J., & Muñoz, R. F. (1995). Emotion regulation and mental health. *Clinical Psychology: Science and Practice*, *2*, 151-164. doi: https://doi.org/10.1111/j.1468-2850.1995.tb00036.x

Guterman, N. B., Lee, S. J., Taylor, C. A., & Rathouz, P. J. (2009). Parental perceptions of neighborhood processes, stress, personal control, and risk for physical child abuse and neglect. *Child Abuse & Neglect, 33,* 897-906. doi: 10.1016/j.chiabu.2009.09.008

Hair, E., Halle, T., Terry-Humen, E., Lavelle, B., & Calkins, J. (2006). Children's school readiness in the ECLS-K: Predictions to academic, health, and social outcomes in first grade. *Early Childhood Research Quarterly, 21,* 431-454. doi: 10.1016/j.ecresq.2006.09.005.

Hanson, M. J., Diamond, K., Lieber, K., Horn, E., & Fleming, K. (2011). Neighborhood community risk influences on children's development and school readiness. *Journal of Infants & Young Children, 24,* 87-100. doi: 10.1097/IYC.0b013e3182008dd0.

Harding, J. F. (2015). Increases in maternal education and low-income children's cognitive and behavioral outcomes. *Developmental Psychology, 51,* 583-599. doi: 10.1037/a0038920.

Harding, J. F., Morris, P. A., & Hughes, D. (2015). The relationship between maternal education and children's academic outcomes: A theoretical framework. *Journal of Marriage and Family, 77,* 60-76. doi: 10.1111/jomf.12156

Harrison, P., & Sidebottom, A. (2008). Systematic prenatal screening for psychosocial risks. *Journal of Health Care for the Poor and Underserved, 19*, 258-276. doi: 10.1353/hpu.2008.0003

Hawkins, J. D., Catalano, R. F., & Associates. (1992). *Communities that care: Actions for drug abuse prevention*. San Francisco, CA: Jossey-Bass.

Health Resources and Services Administration (2019) *Home visiting*. Retrieved from: https://mchb.hrsa.gov/maternal-child-health-initiatives/home-visiting-overview

Herrenkohl, T. I., Sousa, C., Tajima, E. A., Herrenkohl, R. C., Moylan, C. A. (2008). Intersection of child abuse and children's exposure to domestic violence. *Trauma, Violence & Abuse, 9,* 84–99. doi: 10.1177/1524838008314797

Hillson, J. M., & Kuiper, N. A. (1994). A stress and coping model of child maltreatment... *Clinical Psychology Review*, *14*, 261-285. doi: https://doi.org/10.1016/0272-7358(94)90025-6

Holt, S., Buckley, H., & Whelan, S. (2008). The impact of exposure to domestic violence on children and young people: A review of the literature. *Child Abuse & Neglect, 32*, 797–810. doi: 10.1016/j.chiabu.2008.02.004

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55.

Jenson, J. M., & Fraser, M. W. (2015). A risk and resilience framework for child, youth, and family policy. In J. M. Jenson, & M. W. Fraser (Eds.), *Social policy for children and families: A risk and resilience perspective* (3rd ed., pp. 5-21). Thousand Oaks, CA: SageSage.

Jesse, D. E., Seaver, W., & Wallace, D. C. (2003). Maternal psychosocial risks predict preterm birth in a group of women from Appalachia. *Midwifery, 19*, 191-202. doi: https://doi.org/10.1016/S0266-6138(03)00031-7

Kaufman, J., & Zigler, E. (1987). Do abused children become abusive parents? *American Journal of Orthopsychiatry, 57,* 186–192. doi: 10.1111/j.1939-0025.1987.tb03528.x

Kaufman, J., & Zigler, E. (1993). The intergenerational transmission of abuse is overstated. In R. J. Gelles & D. R. Loseke (Eds*.), Current controversies on family violence* (pp. 209–221). Newbury Park, CA: Sage.

Kim, H. K., Pears, K. C., Fisher, P. A., Connelly, C. D., & Landsverk, J. A. (2010). Trajectories of maternal harsh punishment during the first 3 years of life. *Child Abuse and Neglect, 34,* 897-906. doi: 10.1016/j.chiabu.2010.06.002

Kim, H., & Drake, B. (2018). Child maltreatment risk as a function of poverty and race/ethnicity in the USA. *International Journal of Epidemiology*, *47*, 780-787. doi: https://doi.org/10.1093/ije/dyx280

Kim, H., Wildeman, C., Jonson-Reid, M., & Drake, B. (2017). Lifetime prevalence of investigating child maltreatment among US children. *American Journal of Public Health*, *107*, 274-280. doi: 10.2105/AJPH.2016.303545

Kim, J., Cicchetti, D., Rogosch, F. A., & Manly, J. T. (2009). Child maltreatment and trajectories of personality and behavioral functioning: Implications for the development of personality disorder. *Development and Psychopathology*, *21*, 889–912. doi: 10.1017/S0954579409000480

Kohl, P. L., Jonson-Reid, M., & Drake, B. (2009). Time to leave substantiation behind: Findings from a national probability study. *Child Maltreatment*, *14*, 17-26. doi: 10.1177/1077559508326030

Kull, M. A., & Coley, R. L. (2015). Early physical health conditions and school readiness skills in a prospective birth cohort of U.S. children. *Social Science & Medicine, 53*, 142- 145. doi: 10.1016/j.socscimed.2015.08.030

Lansford, J. E., Criss, M. M., Laird, R. D., Shaw, D. S., Pettit, G. S., Bates, J. E., & Dodge, K. A. (2011). Reciprocal relations between parents' physical discipline and children's externalizing behavior during middle childhood and adolescence. *Development and Psychopathology*, *23*, 225-238. doi: 10.1017/S0954579410000751

Lanza, S. T., Tan, X., & Bray, B. C. (2013). Latent class analysis with distal outcomes: A flexible model-based approach. *Structural Equation Modeling: A Multidisciplinary Journal*, *20*, 1-26. doi: PMC4240499

Lazarus, R. S. (1993). From psychological stress to the emotions: A history of changing outlooks. *Annual Review of Psychology*, *44*, 1-22.

Leeb, R. T., Paulozzi, L., Melanson C., Simon, T., Arias, I. (2008). *Child maltreatment surveillance: Uniform definitions for public health and recommended data elements, version 1.0.* Atlanta (GA): Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Retrieved from: https://www.cdc.gov/violenceprevention/pdf/cm_surveillance-a.pdf

Lengua, L. J., Honorado, E., & Bush, N. R. (2007). Contextual risk and parenting as predictors of effortful control and social competence in preschool children. *Journal of Applied Developmental Psychology*, *28*, 40-55. doi: PMC3115727

Levendosky, A. A., Leahy, K. L., Bogat, G. A., Davidson, W. S., & von Eye, A. (2006). Domestic violence, maternal parenting, maternal mental health, and infant externalizing behavior. *Journal of Family Psychology*, *20*, 544. doi: 10.1037/0893-3200.20.4.544

Li, F., Godinet, M. T., & Arnsberger, P. (2011). Protective factors among families with children at risk of maltreatment: Follow up to the early school years. *Children and Youth Services Review, 33,* 139-148. doi: 10.1016/J.CHILDYOUTH.2010.08.026

Lietz, C. A., & Strength, M. (2011). Stories of successful reunification: A narrative study of family resilience in child welfare, *Families in Society: The Journal of Contemporary Social Services, 92,* 1-8. doi: 10.1606/1044-3894.4102.

Lindo, J. M., Schaller, J., & Hansen, B. (2018). Caution! Men not at work: Gender-specific labor market conditions and child maltreatment. *Journal of Public Economics, 163,* 77-98. doi: https://doi.org/10.1016/j.jpubeco.2018.04.007

Lorber, M. F., & Slep, A. M. (2005). Mothers' emotion dynamics and their relations with harsh and lax discipline: Microsocial time series analyses. *Journal of Clinical Child and Adolescent Psychology, 34*, 559-568. doi: 10.1207/s15374424jccp3403_11

Luthar, S. S. (Ed.) (2003). *Resilience and vulnerability: Adaptation in the context of childhood adversities*. New York, NY: Cambridge University.

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1,* 130–149.

MacDermid Wadsworth, S. M. (2010). Family risk and resilience in the context of war and terrorism. *Journal of Marriage and Family, 72*, 537-556. doi: :10.1111/j.1741-3737.2010.00717.x.

MacPhee, D., Lunkenheimer, E., & Riggs, N. (2015). Resilience as regulation of developmental and family processes. *Family Relations, 64,* 153-175. doi: 10.1111/fare.12100

Magnuson, K. A., Sexton, H. R., Davis-Kean, P. E., & Huston, A. C. (2009). Increases in maternal education and young children's language skills. *Merrill-Palmer Quarterly, 55*, 319-350. doi: 10.1353/mpq.0.0024

Maguire-Jack, K., & Showalter, K. (2016). The protective effect of neighborhood social cohesion in child abuse and neglect. *Child Abuse & Neglect*, *52*, 29-37. doi: https://doi.org/10.1016/j.chiabu.2015.12.011

Martin, A., Ryan, R. M., & Brooks-Gunn, J. (2010). When father's supportiveness matters most: Maternal and paternal parenting and children's school readiness. *Journal of Family Psychology, 24*, 145-155. doi: 10.1037/a0018073.

Masten, A. S. (1994). Resilience in individual development: Successful adaptation despite risk and adversity. In M. C. Wang & E. W. Gordon (Eds.), *Educational resilience in inner-city America: Challenges and prospects* (pp. 3-25). Hillsdale, NJ:Erlbaum.

Masten, A. S. (2007). Resilience in developing systems: Progress and promise as the fourth wave rises. *Development and Psychopathology, 19,* 921-930. doi: 10.1017/S0954579407000442.

Masten, A. S. (2014). Global perspectives on resilience in children and youth. *Child Development, 85,* 6-20. doi:10.1007/s10567-013-0150-2

Masten, A. S., Best, K. M., & Garmezy, N. (1993). Resilience and development: Contributions from the study of children who overcome adversity. *Development and Psychopathology, 2,* 425-444. doi: 10.1017/S0954579400005812.

Masten, A. S., & Cicchetti, D. (2010). Developmental cascades. *Development and Psychopathology*, *22*, 491-495. doi: 10.1017/S0954579410000222

Masten, A. S., & Coatsworth, J. D. (1998). The development of competence in favorable and unfavorable environments: Lessons from research on successful children. *American Psychologist, 53,* 205-220. doi: 10.1037/0003-066X.53.2205

Masten, A. S., Cutuli, J. J., Herbers, J. E., Hinz, E., Obradović, J., & Wenzel, A. J. (2014). Academic risk and resilience in the context of homelessness. *Child Development Perspectives*, *8*, 201–206. http://doi.org/10.1111/cdep.12088

Masten, A. S., & Monn, A. R. (2015). Child and family resilience: A call for integrating science, practice, and training. *Family Relations, 64,* 5-21. doi: 10.1111/fare.12103

Masyn, K. E., Petras, H., & Liu, W. (2014). Growth curve models with categorical outcomes. In *Encyclopedia of criminology and criminal justice* (pp. 2013-2025). New York, NY: Springer.

McArdle, J. J. (2009). Latent variable modeling of differences and changes with longitudinal data. *Annual Review of Psychology, 60,* 577–605. doi: 10.1146/annurev.psych.60.110707.163612

McDermott, B. M., Cobham, V. E., Berry, H., & Stallman, H. M. (2010). Vulnerability factors for disaster-induced child post-traumatic stress disorder: the case for low family resilience and previous mental illness. *Australian and New Zealand Journal of Psychiatry*, *44*, 384-389. doi: 10.3109/00048670903489916.

McGuigan, W. M. & Pratt, C. C. (2001). The predictive impact of domestic violence on three types of child maltreatment. *Child Abuse & Neglect, 25,* 869-883. doi: 10.1016/S0145-2134(01)00244-7

McLaughlin, M. (2017). Less money, more problems: how changes in disposable income affect child maltreatment. *Child Abuse & Neglect*, *67*, 315-321. doi: https://doi.org/10.1016/j.chiabu.2017.03.006

Merritt, D. H. (2009). Child abuse potential: Correlates with child maltreatment rates and structural measures of neighborhoods. *Children and Youth Services Review, 31*, 927-934. doi: 10.1016/j.childyouth.2009.04.009.

Merz, E. C., Landry, S. H., Williams, J. M., Barnes, M. A., Eisenberg, N., Spinrad, T. L., … & the School Readiness Research Consortium. (2014). Associations among parental education, home environment quality, effortful control, and preacademic knowledge. *Journal of Applied Developmental Psychology*, *35*, 304–315. doi: 10.1016/j.appdev.2014.04.002

Mistry, R. S., Benner, A. D., Biesanz, J. C., Clark, S. L., & Howes, C. (2010). Family and social risk, and parental investments during the early childhood years as predictors of low-income children's school readiness outcomes. *Early Childhood Research Quarterly*, *25*, 432-449. doi: 10.1016/j.ecresq.2010.01.002.

Molnar, B. E., Goerge, R. M., Gilsanz, P., Hill, A., Subramanian, S., Holton, J. K., …… & Beardslee, W. R. (2016). Neighborhood-level social processes and substantiated cases of child maltreatment. *Child Abuse & Neglect, 51,* 41-53. doi: 10.1016/j.chiabu.2015.11.007.

Montes, G., Lotyczewski, B. S., Halterman, J. S., & Hightower, A. D. (2012). School readiness among children with behavior problems at entrance into kindergarten: results from a US national study. *European Journal of Pediatrics, 171*, 541-548. doi: 10.1007/s00431-011-1605-4.

Muthén, L.K. and Muthén, B.O. (1998-2012). *Mplus User's Guide (7th ed.)*Los Angeles, CA: Muthén & Muthén.

Nair, P., Schuler, M. E., Black, M. M., Kettinger, L., & Harrington, D. (2003). Cumulative environmental risk in substance abusing women: early intervention, parenting stress, child abuse potential and child development. *Child Abuse & Neglect*, *27*, 997-1017. doi: https://doi.org/10.1016/S0145-2134(03)00169-8

National Education Goals Panel. (1995). *National educational goals report executive summary: Improving education through family-school-community partnerships*. Washington, DC: Author.

Neppl, T. K., Senia, J. M., & Donnellan, M. B. (2016). The effects of economic hardship: Testing the family stress model over time. *Journal of Family Psychology, 30*, 12–21. doi: 10.1037/fam0000168

Nichols, W. C. (2013) Roads to understanding family resilience: 1920s to the twenty-first century. In D. Becvar (Ed.) *Handbook of family resilience* (pp. 3-16). New York, NY: Springer. doi: 10.1007/978-1-4614-3917-2_1

Nylund, K. L., Asparouhov, T., & Muthén, B. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling: A Multidisciplinary Journal, 14,* 535–569.

O'Hara, M., Legano, L., Homel, P., Walker-Descartes, I., Rojas, M., & Laraque, D. Children neglected: Where cumulative risk theory fails. *Child Abuse & Neglect, 45*, 1-8. doi: 10.1016/j.chiabu.2015.03.007 0145-2134.

Orthner, D. K., Jones-Sanpei, H., & Williamson, S. (2004). The resilience and strengths of low-income families. *Family Relations*, *53*, 159-167. doi: 10.2307/3700259

Oswald, R. (2002). Resilience within the family networks of lesbians and gay men: Intentionality and definition. *Journal of Marriage and Family, 64*, 374-383. doi: http://www.jstor.org/stable/3600111.

Patterson, J. M. (2002). Integrating family resilience and family stress theory. *Journal of Marriage and Family, 64,* 349-360. doi: 10.1111/j.1741-3737.2002.00349.x

Pinderhughes, E. E., Nix, R., Foster, E. M., Jones, D., & The Conduct Problems Prevention Research Group. (2007). Parenting in context: Impact of neighborhood poverty, residential stability, public services, social networks, and danger on parental behaviors. *Journal of Marriage and the Family*, *63*, 941–953. doi: 10.1111/j.1741-3737.2001.00941.x.

Prendergast, S., & MacPhee, D. (2017). Family resilience amid stigma and discrimination: A conceptual model for families headed by same-sex parents. *Family Resilience, 67,* 26-40. doi: 10.1111/fare.12296.

Pratt, M. E., McClelland, M. M., Swanson, J., & Lipscomb, S. T. (2016). Family risk profiles and school readiness: A person-centered approach. *Early Childhood Research Quarterly, 36,* 462-474. doi: 10.1016/j.ecresq.2016.01.017

Pressler, E., Raver, C. C., & Masucci, M. D. (2016). Increasing low-income mother's educational attainment: Implications for anti-poverty programs and policy. *Journal of Applied Research on Children, 7,* 1-26. Retrieved from: http://digitalcommons.library.tmc.edu/childrenatrisk/vol7/iss1/12/

Raissian, K. M., & Bullinger, L. R. (2017). Money matters: Does the minimum wage affect child maltreatment rates? *Children and Youth Services Review*, *72*, 60-70. doi: https://doi.org/10.1016/j.childyouth.2016.09.033

Ramaswamy, V., DeSarbo, W. S., Reibstein, D. J., & Robinson, W. T. (1993). An empirical pooling approach for estimating marketing mix elasticities using PIMS data. *Marketing Science, 12,* 103–124. doi: 10.1287/mksc.12.1.103

Reardon, S. F., & Portilla, X. A. (2016). Recent trends in income, racial, and ethnic school readiness gaps at kindergarten entry. *AERA Open, 2,* 1-18. doi: 10.1177/2332858416657343.

Reichman, N., Teitler, J., McLanahan, S. (2001). Fragile families: Sample and design. *Children and Youth Services Review, 23,* 303–26. doi: 10.1016/S0190-7409(01)00141-4

Roy, A. L., & Raver, C. C. (2014). Are all risks equal? Early experiences of poverty-related risk and children's functioning. *Journal of Family Psychology, 28*, 391–400. doi: 10.1037/a0036683

Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *American Journal of Orthopsychiatry, 57,* 316-331. doi: 10.1111/j.1939-0025.1987.tb03541.x.

Rutter, M. (2012). Resilience as a dynamic concept. *Development and Psychopathology, 24*, 335-344. doi: 10.1017/S0954579412000028.

Ryan, R. M., Fauth, R. C., & Brooks-Gunn, J. (2006). Childhood poverty: Implications for school readiness and early childhood education. In B. Spodek & O. N. Saracho (Eds.), *Handbook of research on the education of young children* (2nd ed).) (pp. 323-346) Mahwah, NJ: Earlbaum.

Saltzman, W. R., Lester, P., Beardslee, W. R., Layne, C. M., Woodward, K., & Nash, W. P. (2011). Mechanisms of risk and resilience in military families: Theoretical and empirical basis of a family-focused resilience enhancement program. *Clinical Child and Family Psychology Review*, *14*, 213-230. doi: 10.1007/s10567-011-0096-.

Sameroff, A. J., Bartko, W. T., Baldwin, A., Baldwin, C., & Seifer, R. (1998). Family and social influences on the development of child competence. In M. Lewis & C. Feiring (Eds.), *Families, risk, and competence* (pp. 161-185). Mahwah, NJ: Erlbaum.

Sanders, M. R. (2008). Triple P-Positive Parenting Program as a public health approach to strengthening parenting. *Journal of Family Psychology*, *22*, 506. doi: 10.1037/0893-3200.22.3.506

Schatz-Stevens, J., Cockburn, B., & Lefever, J. (2015). The role of physiological regulation in understanding the influence of child abuse potential on children's behavioral problems. *NHSA Dialog, 18,* 71-84.

Shonkoff, J. P. (2010). Building a new biodevelopmental framework to guide the future of early childhood policy. *Child Development*, *81*, 357-367. doi: 10.1111/j.1467-8624.2009.01399.x.

Shulman, L. H., Shapira, S. R., & Hirshfield, S. (2000). Outreach developmental services to children of patients in treatment for substance abuse. *American Journal of Public Health*, *90*, 1930–1933. doi: PMC1446441

Sedlak, A. J., Mettenburg, J., Basena, M., Petta, I., McPherson, K., Greene, A., & Li, S. (2010). *Fourth national incidence study of child abuse and neglect (NIS-4): Report to Congress*. Washington, DC: Department of Health and Human Services, Administration for Children and Families. Retrieved from: https://www.acf.hhs.gov/sites/default/files/opre/nis4_report_congress_full_pdf_jan2010.pdf

Shonkoff, J. P., & Fisher, P. A. (2013). Rethinking evidence-based practice and two-generation programs to create the future of early childhood policy. *Development and Psychopathology*, *25*, 1635–1653. doi: 10.1017/S0954579413000813

Son, S.-H., & Morrison, F. J. (2010). The nature and impact of changes in the home learning environment on growth of language and academic skills of preschool children. *Developmental Psychology, 46,* 1103–1118. doi:10.1037/a0020065

Stith, S. M., Lui, T., Davies, C., Boykin, E. L., Alder, M. C., Harris, J. M., Som, A., McPherson, M., & Dees, J. E. M. E. G. (2009). Risk factors in child maltreatment: A meta-analytic review of the literature. *Aggression and Violent Behavior, 14,* 13-29. doi: 10.1016/j.avb.2006.03.006.

Straus, M. A. (1990). Measuring intrafamily conflict and violence: The Conflict Tactics (CT) Scales. In M. A. Straus & R. J. Gelles (Eds.), *Physical violence in American families: Risk factors and adaptations to violence in 8,145 families* (pp. 29-48). New Brunswick, NJ: Transaction

Straus, M. A., & Paschall, M. J. (2009). Corporal punishment by mothers and development of children's cognitive ability: A longitudinal study of two nationally representative age cohorts. *Journal of Aggression, Maltreatment & Trauma, 18*, 459-483, doi: 10.1080/10926770903035168

Straus, M. A., Hamby, S. L., Finkelhor, D., Moore, D. W., & Runyan, D. (1998). Identification of child maltreatment with the parent-child conflict tactics scales: Development and psychometric data for a national sample of American parents. *Child Abuse and Neglect, 22,* 249-270. doi: www.ncbi.nlm.nih.gov/pubmed/9589178

Sturge-Apple, M. L., Davies, P. T., & Cummings, E. M. (2010). Typologies of family functioning and children's adjustment during the early school years. *Child Development*, *81*, 1320–1335. doi: 10.1111/j.1467-8624.2010.01471.x

Spyridou, A., Schauer, M., & Ruf-Leuschner, M. (2014). Obstetric care providers assessing psychosocial risk factors during pregnancy: validation of a short screening tool - the

KINDEX Spanish Version. *Child and Adolescent Psychiatry and Mental Health*, *8*, 30. doi: 10.1186/s13034-014-0030-7

Tang, C. M. & Sinanan, A. (2015). Change in parenting behaviors from infancy to early childhood: Does change in family income matter? *Journal of Family Social Work, 18*, 327-348. doi: 10.1080/10522158.2015.1080777.

Taylor, C. A., Guterman, N. B., Lee, S. J., & Rathouz, P. J. (2009). Intimate partner violence, maternal stress, nativity, and risk for maternal maltreatment of young children. *American Journal of Public Health*, *99*, 175–183. doi: 10.2105/AJPH.2007.126722.

Thornberry, T. P., Knight, K. E., & Lovegrove, P. J. (2012). Does maltreatment beget maltreatment? A systematic review of the intergenerational literature. *Trauma, Violence, & Abuse, 13*, 135-152. doi: 10.1177/1524838012447697.

Ungar, M. (2016). Varied patterns of family resilience in challenging contexts. *Journal of Marital and Family Therapy, 42,* 19-31. doi: 10.1111/jmft.12124

U.S. Department of Health & Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2018). *Childmaltreatment 2016.* Available from https://www.acf.hhs.gov/sites/default/files/cb/cm2016.pdf

U.S. Department of Health and Human Services. (2019). *Home visiting evidence of effectiveness*. Retrieved from: https://homvee.acf.hhs.gov/

Van Scoyoc, A., Wilen, J. S., Daderko, K., & Miyamoto, S. (2015). Multiple aspects of maltreatment: Moving toward a holistic framework. In D. Daro, A. Cohn Donnelly, L. A. Huang, & B. J. Powell (Eds.), *Advances in child abuse prevention knowledge: The perspective of new leadership* (pp. 21-41). Cham, Switzerland: Springer International. doi: 10.1007/978-3-319-16327-7

Walsh, F. (2010). A family resilience framework for clinical practice: Integrating developmental theory and systemic perspectives. In W. Borden (Ed.), *Reshaping theory in contemporary social work: Toward a critical pluralism in clinical practice* (pp. 146–176). New York, NY: Columbia University.

Walsh, F. (2016) Family resilience: A developmental systems framework, *European Journal of Developmental Psychology, 13*, 313-324, doi: 10.1080/17405629.2016.1154035

West Virginia Legislative Rule §64-4E-5. Retrieved from: http://www.wvlegislature.gov/wvcode/ChapterEntire.cfm?chap=16&art=4E

Whipple E. E., & Webster-Stratton, C. (1991). The role of parental stress in physically abusive families. *Child Abuse & Neglect, 15,* 279-291. doi: www.ncbi.nlm.nih.gov/pubmed/2043979

Wickrama, K.A.S., Lee, T.K., Walker O'Neal, C., & Lorenz, F.O. (2016). *Higher-order growth curves and mixture modeling with Mplus: A practical guide* (multivariate applications series). London: Routledge.

Wildeman, C., & Fallesen, P. (2017). The effect of lowering welfare payment ceilings on children's risk of out-of-home placement. *Children and Youth Services Review*, *72*, 82-90. doi: [10.1016/j.childyouth.2016.10.017](doi)doi: [10.1016/j.childyouth.2016.10.017](doi)

Williford, A. P., Calkins, S. D., & Keane, S. P. (2007). Predicting change in parenting stress across early childhood: Child and maternal factors. *Journal of Abnormal Child Psychology*, *35*, 251-263. doi: 10.1007/s10802-006-9082-3

Woodcock, R. W., & Johnson, M. B. (1989). *Woodcock–Johnson Psycho-Educational Battery-Revised*. Allen, TX: DLM Teaching Resources.