A TYPOLOGY FOR FAMILIES AT RISK FOR CHILD MALTREATMENT

by
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ABSTRACT

Rachel Erin Foster: A Typology for Families At Risk For Child Maltreatment
(Under the direction of Paul R. Smokowski, Ph.D.)

Extensive research has considered the risk factors that predict child maltreatment outcomes, but little, if any, research has examined risk using methods other than those related to the summation of those risk factors. The primary objective of this study is to evaluate common predictors of child maltreatment from a mixture modeling perspective. This quantitative study uses eight risk factors for child maltreatment and associates them with two outcomes: parent perpetration of child maltreatment and parental attitudes toward sensitivity. The study sample consists of 604 biological mothers from four sites of the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN). Risk factor data was used to create latent classes that represent a risk typology. Individual sites from Baltimore (n = 163), Chicago (n = 176), North Carolina (n = 132), and Seattle (n = 133) were compared to see if a similar risk typology was found for the individual sites when compared to the entire sample. A three latent class risk typology emerged from the entire sample and three of the four LONGSCAN sites. The latent class with the most risk emerged as having the highest percentage of child maltreatment outcomes. With these types of outcomes, multiple risk factors coming together should be the strongest hallmark in the assessment of child maltreatment. Maternal history of victimization was also determined to be an important factor in child maltreatment outcomes, therefore, highlighting the importance of the individual nature of risk as it relates to child

maltreatment. In addition, mothers who are younger in age and have low income have lower sensitivity scores. These scores are predictive of less than ideal parenting attitudes. The research presented in this study has been dedicated to taking the popular approach of summing risk factors to a new level of understanding through the use of latent class analysis. These latent classes challenge current thinking on potential risk for children and families. Specifically, mothers with multiple risk factors demonstrate the strongest predictor of child maltreatment outcomes. Also, multiple risk factors need not be present to result in rates of child maltreatment that are higher than what might be expected.

DEDICATION

To Mom and Dad

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Chapter 1

Background and Significance

Child maltreatment is a serious problem in the United States despite the efforts of many policymakers, researchers, social workers, psychologists, and child advocates. As recently as 2004, more than 3.5 million U.S. children were the subject of maltreatment investigations by child protective services agencies (DHHS, 2006); however, the number of children who experienced abuse is likely to be much higher as child maltreatment is considered a grossly underreported crime (Crosson-Tower, 1999; Ewigman et al., 1993). A significant portion of these children have parents that face many challenges including low income, histories of violence as either children or adults, substance abuse, and many other problems that ultimately converge and give way to the abuse. Unfortunately, the negative sequelae of this maltreatment are numerous and can be lifelong for many of the children who must endure these chaotic environments.

Previous research has established that children who experience maltreatment are at increased risk for an array of problems and negative outcomes, including emotional problems (Crittenden, Claussen, & Sugarman, 1994), social difficulties (Dodge, Pettit, & Bates, 1994), drug and alcohol abuse that co-occurs with delinquency (Ryan & Testa, 2005), and health-related problems (Springer et al., 2007). In addition, substantial research has documented that children who are maltreated are more likely to demonstrate insecure or disorganized attachments (Crittenden & Ainsworth, 1989) and are at greater risk for psychopathology (Lieberman & Amaya-Jackson, 2005). To reduce this substantial risk, child maltreatment research efforts that can better inform interventions are needed.

Data from the U.S. Department of Health and Human Services (DHHS, 2007) have revealed that in 2005, an estimated 899,000 children were victims of maltreatment.

Of these victims, 62.8% experienced neglect, 16.6% were physically abused, 9.3% were sexually abused, 7.1% were emotionally maltreated, and 2.0 % were medically neglected. Although the incidence of child maltreatment has fluctuated since the early 1990s, overall there has been a 1.4% increase in maltreatment among child victims over the past decade (DHHS, 2006). Although some might call this a minor increase in reports of maltreatment, other researchers have posited that child maltreatment remains grossly underreported (Crosson-Tower, 1999; Ewigman, Kivlahan, & Land, 1993). However, research conducted by Sedlak and Broadhurst (1996) indicated that out of all cases of child maltreatment, only 40% of abused children, 18% of neglected children, and 26% of children seriously injured by maltreatment were ever investigated by child protective services (CPS). Despite varied estimates of the magnitude of the problem of child maltreatment, indisputable empirical evidence has demonstrated that child maltreatment is a serious problem with many long-term consequences.

Before considering the long-term consequences of child maltreatment, it is important to develop an understanding of the groups most affected by child maltreatment. Among child maltreatment victims in 2005, girls (50.7%) were maltreated at nearly the same rate as boys (47.3%; DHHS, 2007). Moreover, nearly three-quarters (73.1%) of child maltreatment victims were the very young and classified in the age group defined as between birth and 3 years old (DHHS, 2007).

In addition to gender differences, racial differences also exist when comparing child maltreatment rates and children at risk. The racial groups with the highest rates of child maltreatment (reported as number of incidents per 1,000 children) included African American (19.5), American Indian or Alaska Native (16.5), and Pacific Islander (16.1;

DHHS, 2005). The lowest rate of child maltreatment was among Asian children, with 2.5 per 1,000 children, whereas White and Hispanic children had maltreatment rates of approximately 10.8 and 10.7 per 1,000 children, respectively (DHHS, 2005). As a whole, half of the maltreatment victims were White (49.7%), nearly one-fourth (23.1%) were African American, and 17.4% were Hispanic.

When examining the association of race and child maltreatment, there has been considerable debate regarding the overrepresentation of racial and ethnic minorities in the child welfare system; some researchers have associated this overrepresentation with discrimination by both society and child welfare workers (Freisthler, Bruce, & Needell, 2007). Recent research has shown that when adults are sampled independently, the associations between race and maltreatment differed greatly from those in DHHS reports, especially for Asians and Pacific Islanders (Hussey, Chang, & Kotch, 2006). Finally, these researchers suggested that racial/ethnic differences in maltreatment exposure can largely be accounted for by the socioeconomic differences that exist across racial and ethnic groups in America (Hussey et al., 2006).

Regardless of gender and racial differences, maltreated children are vulnerable to a number of problems and oftentimes maltreated children come from homes with multiple risk factors. To better understand maltreatment the key definitions are explained in the following section.

Key Concepts Defined

The historical record provides well-established evidence that children have been exploited, abandoned, beaten, or misused for labor advantages by their parents and others entrusted with their care (English, 1998). Throughout the history of the United States,

child welfare activists have sought to protect children and, in part, their efforts have been to organize and develop definitions that established a threshold—or "line in the sand"—regarding child maltreatment. However, it was not until the later half of the twentieth century that federal legislation was introduced that defined the term *maltreatment* (McCurdy & Daro, 1994). This groundbreaking legislation was the Child Abuse Prevention and Treatment Act (CAPTA) of 1974, which has been amended and reauthorized several times since first enacted.

Child maltreatment is a term used to describe "a broad spectrum of aberrant behaviors that are harmful to children" (Siegel, 1993, p. xi). The definition of child maltreatment encompasses both neglect and abuse and is differentiated into specific categories of physical abuse, emotional abuse, sexual abuse, and neglect.

According to CAPTA, a child is someone who has not reached the age of 18 years or is within the age range specified by other state definition of "child." The following definitions of child maltreatment have been adapted from CAPTA legislation enacted in 2003.

Child physical abuse. The term *child physical abuse* refers to the infliction of physical injury upon a child. This injury may include burning, hitting, punching, shaking, kicking, beating, or otherwise harming a child. Child physical abuse includes acts of omission or commission. *Acts of omission* include the failure of a parent to provide for a child's basic needs (e.g., physical, emotional, medical or education needs). *Acts of commission* are overt actions that could, or do, harm a child. For example, spanking a child is generally not considered physical abuse, but it can be classified as physical abuse if the child is bruised or injured (CAPTA, 2003).

Child emotional abuse. The term *child emotional abuse* includes acts of omission or commission that have caused, or could cause, serious behavioral, cognitive, emotional, or mental disorders. Some examples of child emotional abuse include confinement; verbal abuse to include belittling or rejecting; using derogatory terms to describe the child, or habitual scapegoating or blaming; withholding sleep, food, or shelter; exposing a child to domestic violence; allowing a child to engage in substance abuse or criminal activity; and refusing to provide psychological care (CAPTA, 2003).

Child neglect. The term *child neglect* encompasses the failure to provide for a child's basic needs. Some examples of child neglect include refusal or delay in providing health care, adequate amounts of food, clothing, supervision, or appropriate protection from the weather. Other types of neglect include *educational neglect* and *psychological neglect*. Educational neglect includes the failure to provide either appropriate schooling and special educational services or allowing excessive truancies. Psychological neglect includes the lack of emotional support; lack of attending to the child; caregiver's drug, alcohol, or spouse abuse; and allowing the child to participate in drug and alcohol use (CAPTA, 2003).

Child sexual abuse. *Child sexual abuse* is inappropriate sexual behavior with a child. This type of child maltreatment includes the fondling of genitals, intercourse, incest, rape, sodomy, exhibitionism, sexual exploitation, child pornography, or other forms of sexual acts in which children are used to provide sexual gratification for the perpetrator (CAPTA, 2003).

Although the definitions of child maltreatment still lack exact precision and the breadth to encompass every maltreatment scenario, they do provide some standard of

protection for the children in this country. For the purposes of this paper, *child maltreatment* is defined according to the broad definition referred provided by Siegel (1993), in which child maltreatment is assumed to encompass all the different kinds of child maltreatment explicated in the above section.

Risk Factors Associated with Child Maltreatment

Currently, researchers have yet not identified a single factor or characteristic as the causative agent of child maltreatment (Lee & Goerge, 1999). Therefore, much research has sought to identify and understand all the potential risk factors for child maltreatment. The following paragraphs explain the research that empirically supports the risk factors often associated with child maltreatment.

Income. In various studies, low-income and living in poverty, have been shown to be predictive for child maltreatment (Lee & Goerge, 1999; Paxson & Waldfogel, 1999). For example, when Lee and Goerge (1999) analyzed community poverty rates, while controlling for other sociodemographic variables, they found that poverty was a strong predictor for child maltreatment. Furthermore, findings from Paxson and Waldfogel's (2002) investigation assessing various types of child maltreatment (i.e., neglect, physical, sexual abuse) and its relationship to economic circumstances showed that decreases in state-level welfare benefits resulted in increased out-of-home foster care placement. Similarly, Hussey et al. (2006) found that children living in poverty were maltreated more often than children in homes with greater economic resources. Given this evidence, a number of researchers agree that income is a risk factor for child maltreatment.

Age. Parental age, specifically young age, is another risk factor for child maltreatment. Most of the research evaluating age as a risk factor for child maltreatment

has been conducted with biological mothers. In addition, the age considered to be highest risk varies throughout the literature. For instance, two groups of researchers have evaluated the effect that maternal age had on serious abuse that resulted in death or traumatic brain injury. Phipps, Blume, and Demonner (2002) demonstrated mothers who were age 15 years or younger were associated with higher rates of infant death. In contrast, Keenan et al. (2003) found that mothers who were 21 years and younger were at greatest risk for perpetrating serious child maltreatment that resulted in traumatic brain injury to the child. In addition, Brown and colleagues (1998) demonstrated that mothers 18 years or younger are more likely to commit all three types of abuse (i.e., physical, sexual, neglect) more frequently than their older counterparts. Brown et al.'s findings confirmed the earlier work of Connelly and Straus (1992) who found, after controlling for other factors (e.g., income, race, mother's education, number of minor children, single-parent status), the younger the mother was at the time of the birth of her child, the greater the likelihood that abuse would occur. Although the literature reflects these differences regarding an age threshold for the mothers most at risk of committing child maltreatment, young maternal age is generally considered a well-established risk factor for child maltreatment.

Single-parent status. Caring for children can be challenging enough for two parents, but for single parents the job of caretaking is even more demanding. Given the extent of demands placed on single parents, single-parent status is often identified as a risk factor for child maltreatment. For instance, in a study of 6,000 households, Gelles (1989) found that lone-mother households were more likely to use violence when compared to their dual-caretaker households. Further, Turner and colleagues (2007)

evaluated family structure and child victimization and found that single-parent families were at higher-risk of child victimization as compared to intact families with two biological parents. Last, Berger's (2004) assessment of family structure and maltreatment risk found that employed single-mothers were at greater risk of poor caregiving, which is often associated with maltreatment risk. Clearly, research supports that single-parent status is a risk factor for child maltreatment.

Substance abuse. Parental substance abuse is yet another risk factor for child maltreatment. A large study (N = 8,472) that evaluated parents' use of drugs or alcohol in relation to child maltreatment demonstrated that children whose parents used drugs or alcohol were two times more likely to suffer childhood physical and sexual abuse (Walsh, MacMillan, & Jamieson, 2003). Several other studies have corroborated these findings. For example, Chaffin and colleagues (1996) found that substance abuse disorders were strongly associated with the onset of child neglect and abuse. Similarly, Jaudes et al. (1999) showed that mothers who used drugs during their pregnancy were at higher risk of subsequent child abuse. Finally, a study of parents with a history of substance use disorders found that this risk factor alone increased the potential for child abuse to occur (Ammerman, Kolko, Kirisci, Blackson, & Dawes, 1999). Cumulatively, this evidence strongly suggests that both current and past use of substances is a risk factor for child maltreatment.

Mental health history of depression. Parental depression is yet another risk factor for child maltreatment. Research that assessed characteristics of risk in the neonatal period (Kotch et al., 1999) demonstrated that maternal depression presented a significant risk for later child maltreatment. This link between maternal depression and child abuse

has been reported by other researchers, as well. For example, in a study involving 2,760 families, Berger (2005) found a significant relationship between maternal depression and physical violence toward children. Berger's findings were consistent with those of Chaffin et al. (1996), whose study with 7,103 parents showed that maternal depression was a strong risk factor for child physical abuse.

Researchers have also studied the relationship of varying levels of depression and maltreatment. Surprisingly, researchers have found that moderately depressed, rather than severely depressed, mothers were at risk for child physical abuse (Zuravin, 1989). In this same study, mothers who were moderately or severely depressed were shown to have higher frequencies of verbally abusing their children. In summary, the literature provides strong evidence that depression is a significant risk factor for child maltreatment.

Childhood abuse history. Research suggests that a parent's history of childhood abuse makes the parent more likely to perpetuate abuse. That is, if an adult experienced maltreatment as a child, he or she is more likely to maltreat his or her own children. Although some maltreated children are able to break this cycle of abuse, many maltreated children are unable to interrupt the transmission of abuse, and they continue the intergenerational cycle.

Considerable research supports child maltreatment as a risk factor for further abuse in family systems. For example, a study conducted in the United Kingdom by Dixon and colleagues (2005) compared families in which neither parent had a history of childhood victimization with families in which at least one parent had experienced childhood physical or sexual abuse ($N = 4351$). Their results showed that within 13 months of the birth of a child, 6.7% of the sample that had self-identified as having

experienced childhood maltreatment were referred to authorities for maltreating their infant. In contrast, only .4% of the families without any history of maltreatment were referred for child abuse (Dixon et al., 2005). An earlier two-generational prospective study conducted by Pears and Capaldi (2001) demonstrated that parents who experienced abuse during their childhood were significantly more likely to be abusive when they became parents themselves. Last, Hall and colleagues (1998) studied mothers' potential for child abuse and found that history of childhood abuse was a significant risk factor for abusive parenting. These studies are a few among a considerable body of literature supporting childhood abuse history as a risk factor for child maltreatment (e.g., Egeland, 1993; Egeland, Jacobvitz, & Sroufe, 1988; Hemenway, Solnick, & Carter, 1994; Simons, Whitbeck, Conger, & Wu, 1991; Zaidi, Knutson, & Mehm, 1989).

Domestic violence history. Considerable evidence has also shown that a history of domestic violence is a risk factor for child maltreatment. For instance, Ross (1996) evaluated married households with children in which one or both spouses had a history of violence, and found that marital violence was a significant predictor of child abuse. Other studies have investigated the co-occurrence of domestic violence and child maltreatment. For example, McGuigan and Pratt (2001) examined a sample of 2,544 at-risk mothers and found that domestic violence within 6 months after birth was significantly related to various forms of child maltreatment (i.e., physical, emotional, neglect) in the first 5 years of the child's life. In addition, McKibben and colleagues (1989) found that among the 60% of the women that were abused in their study, the children of these mothers were also abused. In summary, a strong body of evidence supports that domestic violence is a risk factor for child maltreatment.

In summary, this section described the individual risk factors that are often associated with child maltreatment. The following section discusses the cumulative nature of these risk factors and the individual nature of risk.

The Nature of Individual Risk Factors and Cumulative Risk

Understanding the antecedents of risk is no small undertaking because many social and physical environmental characteristics, in addition to organismic processes, are continually operating in a person's life (Evans, 2003). Because of the complex nature of these processes on proximal and distal outcomes the cumulative nature of risk perspective if often used as a way to model risk and outcomes. The cumulative risk perspective, developed by Michael Rutter (1983), is an alternative approach to understanding multiple risk processes in a person's life. This is accomplished by simply summing the risk factors in any given analysis and associating the number of risks to relevant outcomes.

A large body of literature called, Adverse Childhood Experiences (ACE), has largely taken Rutter's cumulative risk perspective of summing risk factors and associated them with child maltreatment outcomes and adverse health consequences over a person's life course (CDC, 2008). For example, this perspective has framed cumulative risk as it relates to both proximal and distal outcomes related to physical health (Anda, et al., 1999; Bader, Schafer, Schenkel, Nissen, & Schwander, 2007), adolescent pregnancy (Hillis, et al., 2004), and mental health (Chapman, Dube, & Anda, 2007; Whitfield, Dube, Felitti, & Anda, 2005). The ACE body of literature has demonstrated the relevance of the cumulative risk perspective in predicting negative outcomes in many fields of study including that of child maltreatment.

Without challenge, it is apparent that the number of risk factors operating in a given person's life influences proximal and distal outcomes. However, is it possible that certain risk factors, or the individual nature of risk, could also influence relevant outcomes? This study challenges current thought in this regard not with the intended goal of debunking current cumulative risk literature, but to allow for the exploration of the individual nature of risk as it relates to the primary outcomes in this study.

In summary, in addition to the risk factors associated with maltreatment as well as the cumulative or individual nature of risk as it relates to child maltreatment, maltreated children are vulnerable to a number of problematic outcomes over the life course. Oftentimes, these problems have long-term negative sequalae such as emotional, behavioral, social, and health-related problems. These problems are described in the following paragraphs.

Negative Consequences of Child Maltreatment for Children

Emotional problems. Child maltreatment produces numerous negative consequences for children's emotional health. Examples of potential emotional problems faced by these children include anxiety, depression, post-traumatic stress disorder, and somatization disorders (see, for example, Brown, Cohen, Johnson, & Smailes, 1999; Collishaw et al., 2007; Lansford et al., 2002). Indeed, various researchers studying the long-term effects of child maltreatment have found that marked emotional difficulties affect maltreated children (Egeland, Yates, Appleyard, & van Dulmen, 2002), and child maltreatment results in problems with emotion regulation (Shields & Cicchetti, 2001).

Further, compelling research has demonstrated that the prevalence of anxiety and depression among maltreated children is significantly greater than that among their

nonmaltreated counterparts (Ethier, Lemelin, & Lacharite, 2004). Other research has indicated that the younger the child's age when he or she experiences maltreatment, the greater the likelihood that he or she will manifest more symptoms of depression and anxiety as the child ages (Kaplow & Widom, 2007).

In addition, the recurrence of child maltreatment, that is, habitual maltreatment over a prolonged period, is another aspect of child maltreatment that has been empirically evaluated and found to have negative sequelae. For example, Ethier and colleagues (2004) studied victims of child maltreatment in both chronic and transitory environments. Results from this study demonstrated that children from chronic maltreatment environments exhibited higher levels of depression and anxiety when compared to their counterparts who were not chronically maltreated. Certainly, children who are maltreated not only experience varied emotional problems, but they also experience behavioral and social problems.

Social and behavioral problems. Children who have been maltreated frequently exhibit social and behavioral problems. Specifically, research has indicated that maltreatment during a child's early years can result in social difficulty relating to peers, which has also been associated with developmental problems in middle childhood, including forming positive relationships (Bolger & Patterson, 2001).

In addition, the chronic nature of maltreatment has been linked to unpopularity with peers (Bolger, Patterson, & Kupersmidt, 1998). For example, Cicchetti and Rogosch (1997) illuminated the social and behavioral problems of maltreated children in a 3-year study of adaptation among maltreated and nonmaltreated schoolchildren. Findings from this study demonstrated that maltreated children exhibited more problems with

externalized and internalized behaviors, decreased positive social behaviors, more depression-related symptomatology, and greater withdrawal behavior. Further, the maltreated children typically exhibited externalizing behaviors as aggressive behavior and attention problems whereas internalizing behaviors usually reflected a pattern of avoiding social contact or depressive symptoms.

Other behavior problems related to child maltreatment include delinquency, antisocial behavior, and drug and alcohol abuse. For example, when evaluating the research on childhood maltreatment and adolescent delinquency, Ryan and Testa (2005) found that children who had experienced at least one act of maltreatment were 47% more likely to engage in delinquency (e.g., burglary, motor vehicle theft, drug abuse, or alcohol violations).

In addition, other research evaluating the specific impact of the types of child maltreatment on later development has shown that physical abuse—but not emotional abuse—resulted in antisocial behavior (Egeland, Yates et al., 2002). In contrast, research by Ireland, Smith, and Thornberry (2002) found that childhood-only maltreatment did not result in delinquency or drug use in adolescence; however, persistent maltreatment or adolescence-only maltreatment did produce delinquency or drug abuse in adolescence. Another example of behavioral impact of child maltreatment on children was shown by Hussey and colleagues (2006) who found that children who had been maltreated showed significantly higher use of drugs and alcohol during their adolescence years than nonmaltreated children. Zingraff, Leiter, Meyers, and Johnson (1993) explained that although the effects of maltreatment may vary, all forms of maltreatment are associated

with varying magnitudes of negative sequelae. However, the magnitude of these negative outcomes has yet to be completely understood, or explained, by the research community.

In addition to drug and alcohol abuse (Ethier et al., 2004), suicide (Felitti et al., 1998; Runyan, Wattam, Ikeda, Hassan, & Ramiro, 2002), is also believed to be a behavioral problem that is a consequence of child maltreatment. For example, when compared to persons who had not been maltreated in childhood, persons who had been maltreated as children were found to be three times more likely of becoming suicidal (Brown et al., 1999).

Academic problems that are frequently experienced by many maltreated children appear to be another sequelae of the constellation of negative consequences of child maltreatment. Shields and Cicchetti (2001) have established that maltreated children experience peer difficulties and victimization (i.e., social problems such as bullying and difficulty relating to peers), and a small body of research has expanded on that work by evaluating the combined affect that child maltreatment and social problems have on academic success. In one study that evaluated children who experienced physical maltreatment, researchers demonstrated that these children had lower scores on standardized tests as well as lower academic grades when compared to their nonmaltreated counterparts (Lansford et al., 2002). Further, in another study that sought to evaluate maltreated children's resilience as this quality related to the children's academic and social outcomes. This study showed that relatively few of the maltreated children demonstrated competence in academic, mental health, or social domains (Jaffee & Gallop, 2007).

Physical health problems. In addition, child maltreatment has both immediate and long-term consequences for the child's physical health. The short-term outcomes are reflected in the effects of child maltreatment that surface during adolescence. Research conducted by Hussey et al. (2006) evaluated the effects of child maltreatment in adolescence, and found that each type of maltreatment (i.e., neglect, physical or sexual abuse) was associated with at least 8 out of 10 health risks. For example, some of these health risks include overweight status, cigarette use, and binge drinking.

Moreover, health risks that occur in adolescence can lead to continued and more serious health consequences in adulthood. In a study that evaluated the long-term physical consequences of childhood physical abuse, Springer, Sheridan, Kuo, and Carnes (2007) found that participants with a history of abuse reported significantly poorer health on all five health scales (i.e., medical diagnoses, physical symptoms, depression, anger, and anxiety). In addition, nearly 40 years after experiencing abuse, adults who had been abused during their childhood reported more medically diagnosed illnesses and physical symptoms than their nonabused counterparts.

Still other research has evaluated specific physical outcomes. For instance, Kendall-Tackett (2002) studied the health consequences among survivors of child maltreatment and found that maltreated children had an increased risk of diabetes, heart disease, cancer, hepatitis, and stroke. In addition, Kendall-Tackett found these children were at risk of developing one or more chronic pain syndromes and were at greater risk for exhibiting high-risk sexual behaviors, which are often associated with additional negative health outcomes.

In summary, the problem of child maltreatment has many long-term negative consequences that stretch across a person's life course. Clearly, child maltreatment affects an individual's emotional, behavioral, social, and physical functioning, and the persistent nature of the negative consequences of maltreatment give support to those research efforts that desire to interrupt this trend for children in this country who are at-risk for maltreatment.

Research Aims and Questions

The aim of this study was to develop an understanding of the risk patterns in an at-risk sample, and how combinations of risk patterns were associated with study outcomes. Risk patterns captured in classes found in the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN) sample were tested to determine if they are associated with child maltreatment outcomes. In addition, it is of interest to evaluate how these same risk factor patterns are associated with parental attitudes toward sensitivity.

It was hypothesized that caregivers with greater numbers of risk factors will demonstrate higher rates of maltreatment and lower parental attitudes toward sensitivity. This information will help prenatal intervention services, Child Protective Services, and other family service agencies to better understand at-risk families and may help these agencies to more effectively triage and target dedicated services to these families.

Research Questions

The research questions that guided this investigation included the following:

1. What are the patterns of risk factor exposure among the mothers from four sites (Baltimore, Chicago, North Carolina, Seattle) in the LONGSCAN sample?

2. Are these patterns of risk the same across the LONGSCAN sites?
3. Regarding the risk typology determined by the first question, does an association exist between this risk typology and parent perpetration of child maltreatment?
4. Does an association exist between this risk typology and parental attitudes toward sensitivity?

How Does the Research From the Current Study Advance the Field?

Although researchers know much about the risk factors related to child maltreatment, they know little about the manner in which multiple risk factors—or more precisely, which combinations of risk factors—contribute to the occurrence of child maltreatment. In addition, an extensive body of empirical literature has demonstrated that the proclivity to perpetrate child maltreatment passes from one generation to the next (Dixon et al., 2005; Egeland, Jacobvitz, & Papatola, 1987; Haapasalo & Aaltonen, 1999; Newcomb & Locke, 2001; Oliver, 1993; Pears & Capaldi, 2001). Despite this evidence, however, not all parents who were maltreated as children subsequently maltreat their own children. Specifically, conservative estimates in the literature have suggested the rate of intergenerational transmission of child maltreatment ranges from 23% (Pears & Capaldi, 2001) to 70% (Egeland et al., 1987) of child maltreatment cases. This broad range of estimates underscores the point that intergenerational abuse is not a certainty.

Current research in this study focuses on understanding the cumulative effect of the previously named risk factors. For example, some studies approach understanding the consequences of this problem through summing the risk factors related to the problem of interest (Anda et al., 1999; Hillis et al., 2004; Whitfield, Dube, Felitti, & Anda, 2005).

Although this approach is helpful and has served social science researchers for many years, newer methods of understanding this population can help researchers understand at-risk families in new ways. For example, with an analytic technique called latent class analysis, latent subpopulation membership can be inferred from the data: in statistics this is known as finite mixture modeling (McLachlan & Peel, 2000 as cited in Muthén & Muthén, 2004). This latent structure allows for the understanding of homogeneity within each latent class within a larger heterogeneous group of people (Walrath et al., 2004; Muthén & Muthén, 2000).

This new approach to understanding populations at-risk can take us a step beyond summing the risk factors in the following ways. The latent approach that determines subpopulation membership is based on the probability that a given person would have membership in a certain class given his or her similarities to others who comprise this class. If a specific risk factor does not make a contribution to a class, it is apparent. For example, the probabilities of the risk factors distributed across classes that are provided as output make it clear what combinations of risk factors are most associated with class membership. In addition, when researchers link the classes to outcomes of interest, even more can be understood about the combinations of risk factors. That is, examining the relationship of class membership to outcomes is a way to validate the typology as well as the theory underlying the typology. Once a typology is validated, it can be considered a useful tool for tailoring prevention and intervention services. Given this information, and this new way of handling the data, assessments and interventions can be modified to provide families with tailored prevention and intervention services. The proposed research in this paper contributes to the existing body of literature in this manner.

Chapter 2

Theoretical Conceptualizations

A theory is a way to comprehend some derived outcome. Attachment theory and the intergenerational transmission of child maltreatment are coexisting theories that provide a framework for understanding child maltreatment. The relationship between attachment theory and the cycle of child maltreatment is explained by the fact that often parents who abuse their children were maltreated themselves. Estimates of the prevalence of this abuse cycle fall in a broad range of 23% to 70% (Pears & Capaldi, 2001; Egeland et al., 1987). However, many researchers hold that the problem of child maltreatment is chronically underreported (Crosson-Tower, 1999; Ewigman et al., 1993) and unsubstantiated (English, Marshall, Coghlan, Brummel, & Orme, 2002; Sedlak & Broadhurst, 1996; Winefield & Bradley, 1992); therefore, despite these broad estimates, the actual number of children who are maltreated is unknown to the scientific community.

Most children who are maltreated have disordered attachment relationships (Carlson et al., 1989); moreover, research has shown that in most cases, a child's attachment type mirrors the attachment type of their primary caregiver (van IJzendoorn, 1995). The attachment relationship between a child and a caregiver largely depends upon a caregiver's level of sensitivity to the child. That is, children whose parents are sensitive in their caregiving are more likely to be secure in their attachment type and, thus, have increased positive psychosocial outcomes over the life course (Sroufe et al., 2005). In contrast, children whose parents are insensitive in their caregiving are more likely to develop insecure attachments, and are more likely to have less positive psychosocial outcomes over the life course. Therefore, attachment theory and the intergenerational transmission of attachment are theoretical perspectives that I have chosen for the framework of this study.

The following section of this study explains the theoretical perspectives in the order given. First, I provide an overview of attachment theory, and then examine attachment theory and supporting research in the area of child maltreatment and how it is related to parental attitudes toward sensitivity. Second, I focus on the sub-theory of the intergenerational transmission of child maltreatment to further explore, understand, and conceptualize the complex problem of child maltreatment.

Attachment Theory Overview

Attachment theory focuses on the relationship between an infant and his or her primary caregiver. This early attachment relationship that forms creates an internal working model that is based upon the infant's experiences from his or her daily life. The concept of an internal working model is largely Freudian in its origin, and Freud described these models as the inner world that later guides individual human behavior (Freud, 1940, as cited in Bretherton & Munholland, 1999). For example, if a parent who is supportive, caring, and emotionally available is an infant's primary caregiver, the child's internal model becomes that of competence and value. Conversely, if a parent who is rejecting, devaluing, or limits the child's exploration, is the primary caregiver, the child's internal working model of the self is one of unworthiness and incompetence (Bretherton & Munholland, 1999).

Internal working models endure into adulthood, and are thought to be acted out in adult romantic relationships as well as parent-child relationships. For example, if an adult has a self-concept of being valued and competent, then, when a conflict arises with another adult or a child, he or she is more likely to work through that conflict in a healthy and supportive manner. However, if an adult's self-image is one of being incompetent

and unworthy, he or she is likely to either avoid conflict or be unable to successfully work through conflict encountered in adult relationships.

Bowlby (1969) argued that the quality of the attachment between an infant and caregiver was largely shaped by how the caregiver responds to the infant's seeking signals. Mary Ainsworth and her colleagues (1978) conducted research on Bowlby's theory and developed the Strange Situation to test the type or style of a child's attachment to his or her primary caregiver. Three primary classifications of attachment were posited by Ainsworth's research team: secure, avoidant, and resistant or ambivalent (Ainsworth et al., 1978). Later work by Main and Solomon (1990) yielded a fourth attachment classification of disorganized. This early work showed there were three types of insecure attachment (avoidant, resistant, and disorganized). Today, the four primary infant attachment classifications are labeled secure, insecure-ambivalent, insecure-avoidant, and disorganized. Typically, these classifications are generally found in a sampled population in the following distribution pattern: (a) insecure-avoidant, 23%; (b) secure, 55%; (c) insecure-ambivalent, 8%; and (d) disorganized, 15% (Howe, Brandon, Hinings, & Schofield, 1999).

Infants who are securely attached simultaneously seek contact with their caregiver and engage in exploratory behavior (this exploratory behavior happens at a later stage, after trust is developed, and not until the child becomes mobile). However, while exploring their environment, these infants maintain awareness of where their caregiver is in the context of the situation. Similarly, the caregivers of these infants are responsive and sensitive to meeting their infant's needs appropriately and promptly, especially as related to the infant's signals, communication, and attitude toward proximity and seeking

bodily contact (Ainsworth, 1983). For example, as a toddler explores his or her environment, he/she will run back to the mother to obtain reassurance prior to returning to explore. The mother, in these instances, watches and listens for the child, and stays in close proximity giving the child reassurance. In contrast, infants who form insecure-ambivalent attachments tend to demonstrate both rejecting and angry behavior toward their caregiver (Ainsworth & Bell, 1970). Further, although their behavior seems self-contradictory, insecure-ambivalent children seek continued contact with their caregiver despite their resistance or ambivalence about the contact once it is received. The caregivers of these infants tend to be inconsistent in their responsiveness to their infant's signals, and seem unable to infer the child's needs from the child's signals (Ainsworth, 1983).

Somewhat similar are those infants who form insecure-avoidant attachments, and demonstrate behaviors of not wanting contact with their caregiver. This avoidance is the result of the infant's experience that seeking contact does not work—the caregiver is unresponsive. Furthermore, the caregivers of insecure-avoidant infants themselves appear to be contact aversive (Ainsworth, 1983); that is, they do not enjoy contact with their infant. The last attachment classification describes those infants with a disorganized attachment who demonstrate behaviors of a confusing or contradictory nature. For example, one moment the infant might be crying, and then suddenly appear frozen and display a slowing of movements (Solomon & George, 1999). The caregivers of disorganized attachment infants frequently behave in a frightening manner (e.g., mocking or teasing the child or not offering comfort when the child is distressed), or actually hurt the infant. Furthermore, these caregivers seem unable to comprehend that such behavior

is distressing to their infant, and therefore, these caregivers are unable to provide a corrective experience for their infants (Solomon & George, 1999).

Many studies have used the attachment framework to explain and understand the significance and role of attachment in later adaptation. The most notable application and study of the attachment framework has been the Minnesota Longitudinal Study of Parents and Children (Sroufe, Egeland, Carlson, & Collins, 2005). For over thirty years this study has evaluated the relationship between risk and adaptation with a specific focus on the role of maltreatment and its relationship to attachment. Specific research studies that have come from the Minnesota Study are numerous. A few of these studies are discussed here to explain the role of maltreatment and its relationship to attachment.

Egeland and colleagues (1983) evaluated the developmental consequences of maltreatment with 267 high risk families. Of the 267, 86 had been identified for maltreatment. In addition, a small control group (n = 85) of mothers who provided adequate care to their children were selected as a comparison group. First, using the Strange Situation Laboratory procedure infants were compared at 12 and 18 months. The infants who maltreated were shown to have anxious attachments in the majority of the sample. Over time, at both 42 months and 56 months of age, the children were observed in preschool interactions. Results showed that the maltreated children demonstrated maladaptive patterns of distractibility, avoidance, anger, noncompliance, as well as a lack of agency and self-esteem.

Other research from the Minnesota Study evaluated the role of early attachment on child and adolescent anxiety disorders. Warren and colleagues (1997) studied 164 children from the Minnesota Study. Twenty-six of these children demonstrated

diagnosable anxiety disorder at 17 years old. After controlling for maternal anxiety disorders, the anxious attachment classification of the infants at 12 and 18 months of age were shown to predict the development of the anxiety disorders.

Finally, in another study using data from the Minnesota study the role of early attachment on later adolescent social competence was evaluated. Specifically, children from the study were selected to participate in summer camp at 4 and 10 years old. At age 15 these same children were invited to participate in a summer camp reunion session. Children were evaluated on social competence, enjoyment, involvement, leadership, and self-confidence. These ratings were compared to Strange Situation laboratory procedures which were dichotomized into secure and insecure groupings. Results from the analysis showed that the secure children had significantly higher mean scores on all of the evaluations except enjoyment; therefore, they demonstrated higher rates of social competence, involvement, leadership, and self-confidence.

In summary, the development of the attachment relationship between an infant and primary caregiver has significant and long-term effects. This parent-child relationship serves as the basis for the development of the infant's internal working models which influences later psychosocial development across the life course. In addition, child maltreatment can significantly impede the development of a healthy parent-child attachment relationship. Building on this discussion, the relationship between attachment theory and child maltreatment is the focus of the next section.

Attachment Theory and Child Maltreatment

Forming a close attachment to another person is part of a basic system of human survival (Bowlby, 1969). That is, humans require proximity to a primary caregiver, or

attachment figure, for normal human development to occur. This need was elucidated by Harlow's (1974) research, in which he demonstrated that monkeys that were deprived or separated from their mothers as infants, later showed varying degrees of antisocial behavior. The human need for attachment is further evidenced by studies that have evaluated nonorganic failure to thrive, in which infants who were either deprived of regular human contact or had unresponsive mothers, demonstrated poor survival skills (i.e., a lack of interest in eating; Iwaniec & Sneddon, 2001), or varying degrees of odd social behaviors (Tizard & Hodges, 1978).

Given that developmental research has established that humans not only desire attachments but also flourish in environments that are supportive, it is therefore important to consider what happens to humans who have experiences that are other than the ideal. In other words, what does the theory of attachment say about child maltreatment?

When faced with a stressful situation, children who are maltreated by their primary caregiver may become insecure or disorganized—as is seen in the Strange Situation laboratory procedure. The Strange Situation laboratory procedure is designed to incrementally induce low levels of stress in the infant (Ainsworth et al., 1978).

In a laboratory setting using Ainsworth's Strange Situation to test children's attachment styles, Carlson et al. (1989) found that more than 80% of maltreated children demonstrated disorganized attachment types. In addition, in a meta-analytic review of 13 research studies on attachment and child maltreatment, Morton and Browne (1998) found that in the majority of studies (11 of 13) the maltreated infants displayed significantly more insecure attachments (e.g., insecure-avoidant, insecure-ambivalent, or disorganized).

These findings are reasonable and consistent if consideration is given to the influence and importance of an early caregiving relationship on later development.

In summary, this overview introduces the way attachment theory and attachment theorists explain the relationship of attachment to child maltreatment—or more specifically, the role maltreatment has in the development of attachment. Building from this framework, a review of how a specific aspect of attachment, caregiver sensitivity, and child maltreatment are related is discussed.

Caregiver Sensitivity and Child Maltreatment

Caregiver sensitivity plays a significant role in establishing the attachment relationship between a child and his or her primary caregiver. In fact, research by van IJzendoorn (1995) clearly demonstrated that maternal sensitivity is a major factor in the development of secure attachments. This study showed that 75% of children had attachment types that mirrored their caregivers. Although the secure transmission of attachment is usually considered a positive factor, in negative circumstances this intergenerational transfer often creates a legacy of psychosocial problems and the potential for child maltreatment in each successive generation.

Attachment quality is significant for a variety of reasons. First, a considerable body of research has been conducted on the prevalence of child maltreatment and has established that approximately 80% of children with disorganized attachments have been maltreated by their parents (Carlson, Cicchetti, Barnett, & Braunwald, 1989). Second, research has also established that some parents of these maltreated children were themselves maltreated in childhood (Dixon, Browne, & Hamilton-Giachritsis, 2005), in a cycle called the *intergenerational transmission of maltreatment*. Last, attachments that

are not secure also have a lasting influence that can result in many negative outcomes. Specifically, children lacking a secure attachment have demonstrated psychological distress and poor sense of self-worth (Allen, Hauser, & Borman-Spurrell, 1996; Sroufe, et al., 2005). In addition, Allen and colleagues (1996) found that attachment quality was associated with criminal behavior and hard drug use in young adulthood.

Research has demonstrated that the sensitivity of a caregiver is a significant factor that determines the parent-child relationship. Sensitivity itself refers to a caregiver's ability to accurately respond to and understand a child's communication (Ainsworth, 1973). A sensitive caregiver responds to the subtlest of cues from his or her child, and interprets these cues accurately. Based on attachment theory—which holds that the key determinant of the attachment relationship is based on the sensitivity and responsiveness of a caregiver—children who have caregivers that are sensitive and empathetic mature into adolescents and adults who feel secure and perceive the world around them as reliable and trustworthy (Bretherton & Munholland, 1999). In contrast, children whose caregivers are insensitive, that is non-empathic and unreliable, grow into adults who feel the world around them is untrustworthy (Bretherton & Munholland, 1999). The role of maternal sensitivity was the focus of a meta-analysis van IJzendoorn (1995) conducted of 18 attachment related studies ($N = 854$) in which he found that maternal sensitivity was a primary factor in the intergenerational transmission of attachment.

This research relating the significance of caregiver sensitivity and attachment, then begs the question of how caregiver sensitivity relates to child maltreatment, if at all. Various research efforts have evaluated the role of caregiver sensitivity and its impact on children. For example, qualitative interviews conducted with drug-addicted mothers

participating in a parenting group reported that after parenting group sessions these mothers learned how to recognize and consider their children's feelings (Polansky, Lauterbach, Litzke, Coulter, & Sommers, 2006). In addition, in a study conducted by Lemelin and colleagues (2006) with a mixed sample of 27 low-risk (i.e., adult) mothers and 62 high-risk (i.e., adolescent) mothers, the researchers found that maternal sensitivity, infant temperament, and psychosocial risk contributed to differences in cognitive functioning between the two groups. Further, a study conducted by van den Boom (1994), which used a Solomon four-group design, intervened with low-income mothers of irritable infants by experimentally manipulating the sensitive responsiveness of the mothers. His research showed that the intervention infants cried less and had higher scores on measures of sociability, self-soothing, and exploration. Finally, in an intervention study with a sample of maltreating families (n = 137) and nonmaltreating families (n = 52), participants' baseline scores on the Maternal Behavior Q-Set and scores for Bavolek's (1984) Adult-Adolescent Parenting Inventory were significantly different between the maltreating and non-maltreating parents (Cicchetti, Rogosch, & Toth, 2006). Although none of the research reviewed here has specifically evaluated the function of risk factors for maltreatment as they relate to caregiver sensitivity, the cumulative findings form the basis from which the current study seeks to further explore this relationship.

In summary, this section has provided a brief overview of the relationship between caregiver sensitivity and child maltreatment. The following section addresses another theoretical perspective, the intergenerational transmission of child maltreatment.

Intergenerational Transmission of Child Maltreatment

The intergenerational transmission of child maltreatment perspective suggests that an inclination toward child maltreatment is passed down from one generation to the next. That is, if an adult experienced maltreatment as a child, he or she in turn, is more likely to maltreat his or her own children. Certainly, some children who are maltreated break the cycle of abuse; however, other maltreated children are not able to interrupt the transmission of abuse, and they perpetuate the intergenerational cycle.

The theory of intergenerational transmission is substantiated by a body of empirical literature that supports that proneness or inclination toward child maltreatment passes from one generation to the next (Egeland, 1993; Egeland, Jacobvitz, & Sroufe, 1988; Hemenway, Solnick, & Carter, 1994; Simons, Whitbeck, Conger, & Wu, 1991; Zaidi, Knutson, & Mehm, 1989). Despite this evidence, not all parents who were maltreated subsequently maltreat their own children. Specifically, the literature has suggested that the intergenerational transmission of child maltreatment ranges from 23% (Pears & Capaldi, 2001) to 70% (Egeland et al., 1987) of child maltreatment cases.

Dixon and colleagues (2005) evaluated the intergenerational cycle of child maltreatment by comparing families in which neither parent had a history of childhood victimization with families in which at least one parent had experienced childhood physical or sexual abuse. Using a large sample ($N = 4351$) of cases from health service reports, Dixon et al. determined that 6.7% of the sample who self-identified as having a personal history of maltreatment also maltreated their own children. Only .4% of the families that did not have a history of abuse had been referred for child abuse. Furthermore, for the participants in this study, the researchers identified three partial mediators for the relationship between history of child maltreatment and perpetration of

child maltreatment: (a) parents under 21 years of age, (b) having a history of mental illness or depression, and (c) residing with a violent adult.

Other studies that have assessed mothers' history of childhood abuse have also confirmed these findings regarding intergenerational transmission. Haapasalo and Aaltonen (1999) evaluated 50 mothers, all of whom had suffered some extent of childhood maltreatment. At the time of the study, 25 of the mothers were involved with child protective services (CPS), and 25 had no involvement with CPS. Upon closer review, the authors found that the CPS-involved mothers had endured more severe levels of psychological abuse in terms of a *punitiveness* measure, which was assessed using a measure that evaluated 14 physical and psychological methods of punishment. Haapasalo and Aaltonen's results also showed there were no differences between the groups in the mothers' reports of abuse of their own children. Thus, both groups had maltreated their children even if they were not currently involved with CPS, further demonstrating the intergenerational transmission of child maltreatment.

There are numerous explanations for the broad range of rates for child maltreatment transmission. For example, some studies used different methodologies (e.g., self-reports versus case records; Egeland, Bosquet, & Chung, 2002; Haapasalo & Aaltonen, 1999) or do not have a control group (Widom, 1989). Similarly, other studies have serious limitations that are the result of memory biases because the study used a retrospective rather than a prospective design (Pears & Capaldi, 2001); amnesia to childhood abuse (Haapasalo & Aaltonen, 1999); poorly specified definitions of maltreatment (Oliver, 1993); and a lack of awareness among study participants that what they experienced in childhood was abuse (Zeanah & Zeanah, 1989).

In summary, this literature demonstrates the significance of transmission issues related to child maltreatment. Although researchers cannot demonstrate that every maltreated parent will maltreat his/her own child, a significant proportion of parents who experienced maltreatment will maltreat their own children. From a research perspective, much can be learned from families that continue the cycle of abuse as well as from those families that break the cycle of abuse.

Chapter 3

Methods

This paper presents a secondary data analysis of the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN) data. LONGSCAN research is funded through the National Center on Child Abuse and Neglect, which seeks to increase understanding of the antecedents and impact of child maltreatment. The secondary data analysis presented in this paper has been approved by the University of North Carolina at Chapel Hill Academic Affairs Institutional Review Board.

Longitudinal Studies of Child Abuse and Neglect

Study Design. LONGSCAN is a longitudinal, prospective, nonprobability sample of U.S. children and their families. The LONGSCAN project encompasses five regional sites: Baltimore (hereafter referred to as the Eastern site); Chicago (Midwestern); North Carolina (Southern); San Diego (Southwestern); and Seattle (Northwestern). The original site in North Carolina started data collection in 1985 (Kotch, 2000), but the current consortium of the fives sites was formed between 1989 and 1991 (Runyan et al., 1998) and is housed at the University of North Carolina at Chapel Hill. All LONGSCAN sites have concurred on objectives concerning the collection and coordination of the data. The entire LONGSCAN sample comprises a cohort of 1,354 children and their biological parents (mothers and fathers), stepmothers, stepfathers, foster parents, or relatives. In addition, LONGSCAN researchers also collect data from the children's teachers. LONGSCAN data are supplemented with data regarding maltreatment that are collected every two years from a review of records from county Child Protective Services.

The LONGSCAN sample consists of children and their families beginning at age 4 and proceeds with regularly scheduled intervals (i.e., at ages 4, 6, 8, 12, 14, 16,18). Participants were chosen for LONGSCAN inclusion based upon their varying levels of

risk or exposure to maltreatment. The 282 children at the Eastern site were selected from three pediatric clinics that serve high-risk families. About 40% of these children (n = 116) were selected as a comparison group because these children presented only a single overt risk factor—poverty—while others presented multiple risk factors. The Midwestern sample consists of 245 children. Two-thirds of the children in the sample (n = 145) were selected from substantiated Child Protective Services (CPS) reports; the remaining children are nonmaltreated neighborhood controls that were matched on children's age, ethnicity, and socioeconomic status.

The Southern sample included 243 children, all of whom were identified at birth as being at high risk for child maltreatment. Of these 243 children, nearly 70% (n = 169) had not been referred to CPS by age 4, and they serve as controls for the Southern site. The Southwestern site sample is comprised of 330 maltreated children, all of whom are in an out-of-home placement with either a relative or foster family. The Northwestern site sample is composed of 254, all with CPS reports from ages 0-4, who were deemed as being at moderate risk for future maltreatment. Approximately 60% of these reports were later substantiated.

Data collection procedures. Comprehensive assessments of children, their parents, and their teachers were scheduled at each data collection interval. Researchers conducted face-to-face interviews with children and their caregivers and collected written teachers reports; these data were collected on paper and then entered into a data management system. In the years between face-to-face interviews, a brief telephone interview was conducted, which allowed researchers to track families and assess yearly service utilization and life events. Maltreatment data were collected from multiple sources,

including record reviews, at least every two years; these data were abstracted and coded from official county Child Protective Services Agency narratives. In-person child assent and caregiver consent procedures were developed prior to the administration of LONGSCAN protocols and were approved by local Institutional Review Boards (IRB).

Sample characteristics. This study used a subset of the LONGSCAN sample; biological mothers. Biological mother data are the sole data used in this analysis because child maltreatment transmission was only maintained with biological mothers from the LONGSCAN study. This decreased the sample by 165 cases. The drug use inventory was not given to 148 participants in the study; therefore, these cases were also deleted from the total sample.

Members of the Southwestern site (n = 330) were excluded from this study because that site did not administer the Victimization of Caregiver inventory. Significant questions from this inventory are needed to measure the proposed variables. In addition, because this study utilized Time 4 data and no other data prior to this date another 107 were subtracted from the original sample of 1354. Therefore, the final sample for this study consisted of 604 biological mothers. Table 1 is an overview of the sample characteristics of the LONGSCAN sample. The sample characteristics are based on baseline sample at recruitment and the adjusted sample that will be used for this study. A two-sample t-test between percents was conducted to determine if there were differences between the baseline and adjusted sample and no significant differences were found (p > .05).

Because the sample is a nonprobability sample, the results from this analysis cannot be generalized beyond the current sample. However, these sample participants can

be generalized to the baseline sample at each LONGSCAN site used in this analysis. The results from this analysis can be utilized to better understand and assess high-risk families, and to tailor effective interventions to meet the needs of especially high-risk families in this country.

Missing data

To determine the best missing data model for this study, a missing data analysis was conducted using Little's Test of MCAR (missing completely at random) in SPSS 14.0 (SPSS, 2005). Conducting this test will determine whether the data are MCAR or not MCAR. A significant *p*-value from this test indicates that the data are not MCAR; a non-significant *p*-value indicates the data are MCAR. The test resulted in a significant *p*-value; therefore, the data in this study were not MCAR. Consequently, listwise deletion cannot be the data management strategy used in this analysis.

Because the data in this study are not MCAR, it can be assumed that the data are missing at random (MAR) or not missing at random (NMAR) (Schafer, 1997). Full Information Maximum Likelihood (FIML) is an optimal strategy to manage missing data. In addition, FIML is especially adept at handling MAR and NMAR data (Allison, 2002). FIML is a missing data option within Mplus software (Muthén & Muthén, 2006). FIML, which is also known in the literature as *direct fitting*, ignores the presence of missing values; thus, this software fits the model to the nonmissing values for each observation (Widaman, 2006). In other words, the model is fit to the non-missing data by ignoring the missing values.

Test of Collinearity

Collinearity can cause problems in model outcomes. To detect and eliminate such problems, a test of collinearity using all of the variables in the analysis was conducted in SPSS 14.0 (SPSS, 2005). A variance inflation factor (VIF) score approaching 10 signifies that collinearity is present in the model. A test of collinearity in this model resulted in VIF scores of less than 5, meaning that collinearity is not a problem for this analysis.

Measures - Parent Risk Factors

Income. Information about participants' income was gathered through the administration of the Time 4 Caregiver Demographics inventory, which asks participants about the family's total income after deductions. Possible responses were listed in $5,000 increments (e.g., less than $5,000 per year, $5,000 to $10,000 per year, $10,000 to $15,000 per year, and so on). This variable was recoded into a dichotomous variable, with participants earning $20,000 per year or less placed in the high-risk category. Income higher than $20,000 will be considered a non-risk category. This recoding focuses on the range of income that is of most concern in this study and is reflective of 1995 federal poverty rates for a family of four (DHHS, 1995). In addition, this coding structure mirrors the other variables in this analysis, most of which are dichotomous.

Maternal age. The age of the biological mothers in the study was collected using the Caregiver Demographics inventory, in which participants were asked to state their date of birth. Maternal age is treated as a continuous variable in this study based on time in years from birth date to data collection date at Time 4.

Single-parent status. Participants' marital status was obtained from the Caregiver Demographics inventory at Time 4 data collection date. Participants were asked, "What is your current legal marital status?" Answers to this question include (a) married, (b)

single; never married, (c) separated, (d) divorced, and (e) widowed. All answers to this question other than *married* were recoded into a dichotomous variable for single-parent status.

Alcoholism. The CAGE questionnaire (an acronym for *C*ut down, *A*nnoy, *G*uilty, and "*E*ye-opener") is a short screener used to detect alcoholism (Ewing, 1984). This questionnaire was given at data point Time 4. CAGE consists of four questions:

Have you ever:

(a) felt you ought to cut down on your drinking?

(b) felt annoyed by people criticizing your drinking?

(c) felt bad or guilty about drinking?

(d) had a drink first thing in the morning?

Scores range from 0 to 4, with higher scores indicating a greater likelihood of alcoholism. The reliability of the CAGE was tested in a previous study with 703 drinkers over the age of 18. Results demonstrated good internal reliability and factor loadings of .55 to .92 (Smart, Adlaf, & Knoke, 1991). The reliability of the CAGE for the current sample was ($\alpha = .76$). Various studies have evaluated the effectiveness of the CAGE to identify alcoholics and found that scores of 2 or higher indicate alcoholism (Mayfield, McLeod, & Hall, 1974; Beresford, Low, Adduci, & Goggans, 1982; Ewing, 1984; Bush, Shaw, Cleary, Delbanco. & Aronson, 1987). Therefore, the CAGE was recoded into a dichotomous variable with scores of 2 or higher indicating a presence of alcoholism.

Drug use. The Caregiver Substance Use (CSA) inventory was used to determine participant's use of alcohol and illegal drugs (i.e., marijuana, cocaine, PCP, LSD, methadone, speed, and tranquilizers). The CSA inventory was given at data point Time 8.

The questions about specific alcohol or drug use were asked in a *yes/no* format followed by specific probes if the participant's response was *yes*:

(a) How old were you when you started?

(b) How often do you use it?

(c) How old were you when you stopped?

(d) What was the most often you ever used it?

Participants can then report their frequency of use of reported substances by selecting among the following:

(a) 1-2 times per month (or less)

(b) 3-5 times per month

(c) more than 5 times per month

(d) daily

(e) don't know

(f) refused/no response

This substance use measure was recoded into a dichotomous variable with those indicating any past or current frequency of drug use (i.e., 1-2 times per month or more) as having substance abuse. Alcohol use was not counted in this category. Coding for this variable proceeded as follows: any use (i.e., *yes* to any drug) = 1, and *no* to all drugs = 0. Responses of *don't know* or *refused/no response* were coded as *no*.

Mental health history. The mental health measure included in the LONGSCAN data set is the Center for Epidemiologic Studies-Depression Scale (CES-D), a self-report measure designed to identify depression (Radloff, 1977). This data was based on Time 4 data. Higher scores indicate a greater degree of depression in the respondent, and the

score of 16 is often used as a cut-point to indicate depression (English, Marshall, & Stewart, 2003). Respondents indicate how often during the previous week they experienced various depression symptoms, using the following 5-point scale:

0 = rarely or none of the time (i.e., less than 1 day during the week)

1 = some or a little of the time (i.e., 1-2 days)

2 = occasionally or a moderate amount of time (i.e., 3-4 days)

3 = most or all of the time (i.e., 5-7 days)

-- = no response.

Some of the 20 items are:

(a) I felt depressed.

(b) I felt hopeless.

(c) My sleep was restless.

(d) I did not feel like eating; my appetite was poor.

This depression measure was recoded into a dichotomous variable with scores of 16 or higher indicating depression. Radloff (1977) reported internal consistency of the CES-D as .85 for the general population and .90 for a clinical population. The internal consistency of the CES-D for this sample was ($\alpha = .79$).

Childhood abuse history – physical and sexual abuse. The History of Loss and Victimization (VICA), collected at Time 4, is a self-report measure that inquires about participants' history of childhood abuse. Physical abuse history questions include:

When you were a child or teenager:

(a) Were you ever physically hurt by a parent or someone else (like hit, slapped, beaten, shaken, burned, or anything like that)?

(b) Were you ever punished or disciplined by someone in such a way that you

were bruised or physically injured?

These *yes/no* questions are followed by a question regarding who perpetrated the abuse: (a) parent, (b) other family, or (c) nonfamily.

The VICA also inquires about the history of sexual abuse by asking:

Before age 13:

(a) Did anyone older than you ever try or succeed in touching your breasts or genitals?

(b) Did anyone older than you ever try or succeed in getting you to touch their genitals?

(c) Did anyone ever try or succeed in having any kind of sexual intercourse with you?

In addition, the form asks:

When you were a teen:

(a) Did anyone ever touch your breasts or genitals, against your wishes?

(b) Did anyone ever force you to touch their genitals, against your wishes?

(c) Did anyone ever force you to have any kind of sexual intercourse, against your wishes?

These *yes/no* questions, collected at Time 4, have a follow-up question regarding who committed the abuse: (a) parent, (b) other family, or (c) nonfamily. The parents' child abuse history measure was recoded into a dichotomous variable with any response of *yes* to a question about having experienced physical or sexual abuse as a child or adolescent indicating a history of abuse. Only those who responded that the abuser was a parent were included in the current analysis.

The LONGSCAN study does not inquire about the history of emotional abuse or neglect of the caregiver; therefore, these aspects of childhood history of abuse cannot be determined from this sample.

Domestic violence history. The VICA also inquires about domestic violence by asking:

> Since you've been an adult:
>
> (a) Have you ever been hit, slapped, beaten, or pushed around by someone?
>
> (b) Have you been physically hurt or physically threatened by someone in any other way?
>
> (c) Has anyone ever sexually assaulted you?

These *yes/no* questions have a follow-up question regarding who committed the abuse: (a) husband/partner, (b) other family member, (c) acquaintance, or (d) stranger. The domestic violence history measure was recoded into a dichotomous variable with those responding *yes* to any question about domestic violence by a husband/partner coded as having a history of domestic violence.

Measures - Outcomes

Parent perpetration of maltreatment. In this analysis, parent perpetration of maltreatment is defined as any report of child maltreatment to Child Protective Services (CPS). Research has shown that children who have unsubstantiated reports of abuse are as likely to have negative outcomes as children with substantiated reports (Hussey et al., 2005; Leiter, Myers & Zingraff, 1994). Although in some cases reports to CPS come from homes where no abuse actually occurred, it is more likely that maltreatment occurred but did not meet a definitional threshold of abuse based on decisions made by assigned caseworkers (English et al., 2002; Winefield & Bradley, 1992). Therefore, this

analysis uses all reported cases of abuse, including unsubstantiated as well as substantiated cases of child maltreatment (i.e., physical, emotional, sexual abuse and neglect). Parent perpetration of maltreatment was determined by reviews of participants' CPS case records, which LONGSCAN collects every two years through record review. Therefore, maltreatment data from age 0 to age 6 was used for this study. The parent perpetration of maltreatment is a dichotomous variable; the presence of any report of child maltreatment (substantiated or not) was coded *yes*, and an absence of CPS reports was coded *no*. The maltreatment reports used in this study were collected after the risk factor data.

Parental Attitudes Toward Sensitivity. The Adolescent-Adult Parenting Inventory (AAPI), collected at Time 4, is a 32-item measure designed to assess parenting and child rearing attitudes (Bavolek, 1984). Higher scores reflect more appropriate attitudes and lower scores are reflective of some deficiencies in parenting attitudes. The inventory can be used with both adolescents (12 to 19 years) and adults (20 years and older).

The inventory has four scales, but for the purposes of this study only the 8-item Lack of Empathy Towards Children's Needs scale was used. Participants are asked to indicate their level of agreement to statements using a 5-point Likert scale; responses range from *strongly agree* to *strongly disagree*. Items include the following:

(a) Parents will spoil their children by picking them up and comforting them when they cry.

(b) Young children who feel secure often grow up expecting too much.

(c) Parents who are sensitive to their children's feelings and moods often spoil their children.

(d) Children whose needs are left unattended will often grow up to be more independent.

(e) Parents who encourage communication with their children only end up listening to complaints.

(f) Children will quit crying faster if they are ignored.

(g) Children who are given too much love by their parents will grow up to be stubborn and spoiled.

(h) Young children who are hugged and kissed often will grow up to be "sissies."

Raw scores were used to determine a participant's final score. Bavolek (1984) reported acceptable internal consistency of the Lack of Empathy scale ($\alpha = .82$). In the current sample, Chronbach's alpha was .83. This variable was utilized as a continuous variable.

Data analysis plan

Mixture modeling with Mplus 4.2 (Muthén & Muthén, 2006) was used to identify a risk typology for participants at each of the four LONGSCAN sites used in this study (i.e., Eastern, Midwestern, Southern, and Northwestern) as well as for the full sample of all the biological mothers ($N = 604$). Mixture modeling is an analytic approach in which subpopulation membership is inferred from the data (Muthén & Muthén, 2004). Subpopulation membership takes otherwise heterogeneous groups of people and assumes homogeneity within the classes based upon the scores of the people on the variables in the analysis (Muthén & Muthén, 2004). The type of mixture modeling utilized in this study is called Latent Class Analysis (LCA). The goal of LCA is to find the smallest number of classes that adequately explain the associations of the observed variables (Bowen, Lee, & Weller, 2007).

Figure 1 depicts the analytic relationship between the risk factors and outcomes in the analysis.

When utilizing the LCA procedure, various analytic decisions regarding the data need to be made. First, a determination of the best solution of classes is sought. Nylund, Asparouhov, and Muthén (2006) have explained that consensus for the best criteria for class size does not exist. However, some authors have proposed certain criteria. Muthén and Muthén (2000) cautioned against using class sizes smaller than 50 participants or containing less than 5% of the sample—but they also suggested the importance of considering interpretability, theoretical validity, and utility. In deference to the importance of theoretical validity, a recent paper using mixture modeling that resulted in classes of less than 50 participants was deemed acceptable because theoretically some classes were expected to be small (Bowen et al., 2007).

Other decision-making criteria for class enumeration involve the suggested statistical criteria of the Bayesian Information Criteria (BIC), the bootstrap Likelihood Ratio Test (BLRT) (Nylund et al., 2006), and the log-likelihood (LL) statistic. Lower BIC values are considered better, whereas a significant BLRT *p*-value indicates that the number of classes in the current analysis is a better fit than the next lowest possible number of classes (Muthén & Muthén, 2004). In addition, higher log-likelihood values are considered better.

Classification quality is utilized as another determination for class enumeration. Classification quality is determined when high values are present on the diagonal elements of the average latent class probabilities matrix and low values are present on the off-diagonal elements (Muthén & Muthén, 2000). High values on the diagonal indicate the probability that the members of the class are in a given class versus another class. Probabilities of .90 or higher are preferred (Bowen et al., 2007; Oxford et al., 2005), but

probabilities of .80 are acceptable (Weden & Zabin, 2005). Probabilities of .80 were sought for the current analysis.

The LCA risk typology for this study focused solely on female biological mothers in the full sample and was tested with the adjusted LONGSCAN sample (N = 604) based upon predominant child maltreatment risk factors found in the literature. Typically, the process for conducting a LCA starts with the goal of finding the smallest number of classes that best explains the relationship among observed indicator variables. Therefore, LCA begins with a one- or two-class solution and adds classes until a final best solution is achieved. This final solution is also considered to be the measurement model. These steps were followed for the adjusted sample of 604.

These steps were then repeated for each of the four sites. Sample sizes for the separate analyses were (a) Eastern n = 163; (b) Midwestern n = 176; (c) Southern n = 132; and (d) Northwestern n = 133; these separate analyses were based on the same predominant risk factors as those used with the full adjusted sample. The separate analyses indicated whether the same risk typology applied to each site. Each site followed the steps of achieving a best solution as described in the previous paragraph. These separate analyses allowed for the final solution of the measurement model to be compared to that of the individual sites.

After the best solution from the measurement model was achieved, a covariate model was tested. Covariate choice is driven by the primary research questions addressed in a given study. Therefore, starting with a one- or two-class solution classes were added until a final best solution was achieved. Also, each covariate was regressed on each latent class to determine the significance of each covariate (CR>1.965). Next, the BIC of the

final measurement model was compared to the BIC of the covariate models. A lower BIC signifies a better model. Another criterion, the likelihood ratio chi-squared statistic (ΔL^2), is appropriate to use when comparing models with the same number of classes to determine the significance between competing models (Weden & Zabin, 2005). Log odds ratios were then hand-calculated to generate the probability of class membership for each site (see Muthén, 2004, chapter 13).

Finally, each simple member from the best model, either measurement or covariate, was assigned membership to one class based on probabilities generated by the program. The relationship of the variables in the analysis was associated with two outcome variables: parent perpetration of child maltreatment and parental attitudes toward sensitivity. Parent perpetration of child maltreatment was based on available data from age 0 through age 6. The associations of the risk typology to these outcomes were conducted through chi-square tests and ANOVA procedures.

Covariates

The four LONGCAN sites used in this study (i.e., Eastern, Midwestern, Southern, and Northwestern) were treated as covariates in the model. Effects coding was used for site variables where the Eastern site was treated as the reference variable.

Chapter 4

Results

Prevalence of Risk Variables by Site

As shown in Table 2, the prevalence of risk factors across the four sites in the sample demonstrates the risk exposure of families in this study. Based on guidelines ranging from high (≥60%), moderate (30-59%), and low (≤29%) rates of risk factors, the women from the Northwestern site experienced high rates of four of seven risk indicators: single-parent status, history of domestic violence, drug use, and low income. The Northwestern site women had moderate rates of two risk indicators—history of depression and history of childhood victimization—and low rates of the risk indicator of alcoholism. This site also had the oldest group of mothers, when compared to the other sites, indicating decreased risk, as low age is associated with higher risk for child maltreatment.

The women from the Midwestern site had high rates of two risk indicators: single-parent status and low income. The women from this site had moderate rates of history of depression, history of domestic violence, and drug use, and low rates of alcoholism and history of childhood victimization. The women from the Eastern site had high rates of single-parent status and low income; moderate rates of history of depression, history of domestic violence, and drug use; and low rates of alcoholism and history of childhood victimization. Last, the women from the Southern site had high rates of single-parent status and low income; moderate rates of history of depression, history of domestic violence, and drug use; and low rates of alcoholism and history of child victimization. In addition, the women from this site had the lowest average age among the four classes, indicating higher risk.

Measurement Model

The Latent Class Analysis (LCA) with the full adjusted sample of 604 biological mothers showed that a 3-class solution emerged as the best model. Table 3 provides an overview of the class solution progression. Based upon the Bayesian Information Criteria (BIC) alone, the 3-class solution is optimal. Although the lowest average class probability is slightly lower (.795) when compared to the 2-class solution (.804), the 3-class solution is more substantively meaningful and allowed for more variation in interpreting the similarities and differences of participants in the sample.

As shown in Table 4, members of the third class, Single and Young (49.8%, n = 205), represent a group that would be considered to have the lowest risk of the three classes if the risk indicator probabilities were summed. Compared to the other two classes, this class has the lowest rates of alcoholism, drug use, history of depression, history of child victimization, and history of domestic violence. However, this class is by far the youngest, on average, of the three classes and has the highest percentage of single parents. Overall this class is considered to be at Lowest Risk when compared to the other classes in the model.

The first class in the model, Some Risk, but Married with Economic Resources (16.2%, n = 98), falls in the middle of the three classes in its rates of risk on six of the eight indicators: alcoholism, drug use, age, history of depression, history of child victimization, and history of domestic violence, but its members are married and are the least likely to have low income among the three classes. Overall this class is considered to be at Moderate Risk when compared to the other classes in the model.

The second class, High Risk Except Age (33.9%, n = 301), has the highest rates among the three classes on six out of the eight risk categories: alcoholism, drug use, low

income, history of depression, history of child victimization, and history of domestic violence. This class falls in the middle of the three classes in its rate of single-parent status. The women in this group are the oldest in the sample, making them the lowest-risk of the three groups in the category of age. This class, based upon probabilities alone, has the Highest Risk of the three classes.

Four Sites Model

A LCA, using the same risk factor profile that was used with the adjusted LONGSCAN sample, was conducted with each site.

Eastern. Results from the analysis (n = 163) demonstrated that a 3-class solution was the best solution. Although the BIC (see Table 5) is slightly better with the 2-class solution, both the log-likelihood (LL) statistic and bootstrap Likelihood Ratio Test (BLRT) demonstrate that the 3-class solution is the optimal solution. As well, the 3-class solution is more interpretable and yields substantively meaningful patterns of differences on the risk indicators.

As shown in Table 6, members of the first class, Low Depression and Alcoholism (36.8%, n = 60), have the lowest probability of overall risk among the three classes in the sample. Although this class ranks second among the three classes in its rates of drug use, its members have zero probability of having alcoholism or a history of domestic violence. In addition, this class has the lowest rates of the four other risk indicators: single-parent status, low income, history of depression, and history of childhood victimization. Overall compared to the other classes at the Eastern site this class is considered the Lowest Risk

The third class, Mostly Single and Poor (38.7%, n = 63), has the highest probability of the three classes to be single and young, but its members have zero

probability of drug use. This class ranks second among the three classes in rates of alcoholism, low income, history of depression, history of child victimization, and history of domestic violence. Overall compared to the other classes at the Eastern site this class is considered Moderate Risk

The second class in this sample, Many Risk Factors (24.5%, $n = 40$), has the highest rates among the three classes on six of eight risk indicators: alcoholism, drug use, low income, history of depression, history of child victimization, and history of domestic violence. Also, this class ranks second among the three classes in its rate of single-parent status. This class has the lowest risk in only one category, that of age, as this class has the oldest mean age among the three classes. This is very similar to the typology found for the full sample. Overall this class from the Eastern site is considered to be Highest Risk.

Midwestern. The Midwestern site ($n = 176$) also revealed that a 3-class solution is the best solution. Table 7 shows the results for this site. Although the BIC is slightly higher than the 2-class solution, the BLRT revealed a significant *p*-value for the 3-class solution, suggesting that a 3-class solution is optimal compared to the 2-class model. In addition, the LL continued to improve with the 3-class model. Finally, even though the BIC was marginally worse than that of the others classes, the 3-class solution is more interpretable, thus making it the final solution.

Members of the third class, Low Depression and Alcoholism (32.4%, $n = 57$; see Table 8), have the lowest average age of the three groups, but have the lowest rates among the three classes of history of depression, history of child victimization, and history of domestic violence. This group also has zero probability of alcoholism. This group ranks second among the three classes in rates of low income, single-parent status,

and drug use. Overall compared to the other classes at the Midwestern site this class is considered the Lowest Risk.

The second class, Mostly Single and Poor (10.8%, *n* = 19), has the highest rates among the three classes of history of depression, history of child victimization, and history of domestic violence. This class also has a rather high incidence of drug use; it is tied with the first class in its rate of drug use. This class ranks second among the groups in its rates of alcoholism and maternal age, and has the lowest rates of single-parent status and low income of the three groups. Overall compared to the other classes at the Midwestern site this class is considered Moderate Risk.

The first class, Many Risk Factors (56.8%, *n* = 100), ranks highest among the three groups in its rates of single-parent status and low income and also has the highest rates of alcoholism. This class is tied with the second class in its rates of drug use, which are rather high, and ranks second among the three classes in its rates of history of depression, history of child victimization, and history of domestic violence. Only in the category of age does this group have the lowest risk among the three classes, as its members have the highest average age. These factors combine to make this the class the Highest Risk class overall. This is also very similar to the typology found for the full model.

Southern. The Southern site (*n* = 132) also demonstrated a 3-class solution. Similar to the Midwestern site, the BLRT (see Table 9) was significant with the 3-class solution, suggesting that a 3-class solution is better than a 2-class solution. As well, although the BIC itself worsened marginally, the 3-class solution is more interpretable. It is important to note that one of the average class probability cells dropped to only 11

participants per class making the class proportion 8%. Because this proportion did not fall below the suggested threshold of less than 5% of the sample, this low average class probability was not considered unacceptable.

As shown in Table 10, the third class, Low Depression and Alcoholism (25.8%, *n* = 34), has the lowest rates among the three classes of five of the eight risk indicators: single-parent status, alcoholism, history of depression, drug use, and low income. This class, however, has the highest rates of history of child victimization and domestic violence, and falls in the middle of the three classes in age. Overall compared to the other classes at the Southern site this class is considered the Lowest Risk.

The first class, Mostly Single and Poor (65.9%, *n* = 87), ranks second among the three classes in its rates of five of the eight risk indicators: single-parent status, alcoholism, history of depression, drug use, and low income. This class has the lowest average age (representing highest probability of risk in this category) and the lowest rates of history of victimization (i.e., child victimization and domestic violence). Overall compared to the other classes at the Southern site this class is considered Moderate Risk.

Many Risk Factors (8.3%, *n* = 11), is the second class in the Southern sample. These participants have the highest rates of five out of eight risk indicators: single-parent status, alcoholism, drug use, low income, and history of depression. This class ranks second among the three classes in history of victimization (i.e., history of child victimization and domestic violence). These factors combine to make this the class with the Highest Risk overall. This is also largely similar to the typology found for the full model.

Northwestern. Results from the Northwestern site support a 2-class solution. Table 11 details these results. For starters, not only is the BIC higher when more classes are added, but the BLRT also demonstrates that the 2-class solution is better than the 3-class solution. As well, the average class probabilities fall well below the .80 cutoff with the 3-class solution, further suggesting that the 2-class solution is optimal.

Possible reasons for the 2-class solution can be attributed to sampling. The Northwestern sample was recruited differently than other sites in that all sample participants had been reported for child maltreatment at the time of entry into the study. As well, this sample has the highest percentage of risk when compared to the other sites in the study.

The first class (see Table 12), Mostly Married (15%, $n = 20$), ranks lower among the two groups in seven of the eight risk indicators: single-parent status, alcoholism, drug use, low income, age, history of domestic violence, and history of child victimization. The class ranks higher in only one risk category, history of depression. Overall compared to the other class at the Northwestern site this class is considered Moderate Risk.

The second class, Many Risk Factors (84.9%, $n = 113$), has a slightly lower incidence of history of depression when compared to the first class, but has higher rates of the remaining seven risk indicators: single-parent status, alcoholism, drug use, low income, age, history of child victimization, and history of domestic violence. Overall this class from the Northwestern site is considered to be Highest Risk.

Covariate Model

The covariate model used the risk factors from the measurement model, but incorporated the sites as covariates. As shown in Table 13, when the best class solution (3

classes) of the measurement model is compared to the best class solution of the covariate model (3 classes), the BIC and LL are best for the covariate model. In addition, the lowest average class probability of the measurement model, .80, improved slightly in the covariate model to .81. These model statistics indicate that the covariate model is preferable. As well, the covariate model is more interpretable. Finally, consideration given to model quality, based upon the percent of the lowest average class probability, demonstrated that it did not fall below 5% of the sample.

Table 14 details the characteristics of the latent class and the distribution of the latent class total sample. In addition, it also shows the distribution by site across the latent classes. The best fit, based on the BIC, was achieved with a 3-class solution, and the external covariates of the sites also demonstrated that the covariate model is better for the data compared to the measurement model ($\Delta L^2 = 4247.998 - 4192.018$, Δdegrees of freedom = 6, $p = 0.000$).

In the 3-class model, sample members from the Northwestern site were the most likely to be in Class 1. This class also had the highest rates among the three classes of six out of eight risk indicators in the study. The Northwestern site was comprised solely of families who had already been referred to CPS, so this result is not surprising.

Class 2 had the highest probability of class membership from the Southern site, but had the lowest probability of most on the risk indicators from the analysis. Finally, Class 3 had the highest probability of membership from the Eastern site; however, both the Midwestern and Southern sites also had a high probability to comprise this class. This class ranks second among the three classes on the risk indicators.

The level of significance for each site in the sample was assessed. This analysis revealed that the Southern site was different from the reference group (i.e., Eastern) in Class 2 (CR = 2.701). In addition, it also demonstrated that the Midwestern and Northeastern sites are not different from the reference group. Substantively this means that the 3-class typology solution works across these sites, except for Southern site when compared to the Eastern site on Class 2. Specifically, when comparing the probability of class measurement to the measurement model these differences are indicative of some variation in participants in the Southern site based upon their percentage of risk in a given risk category. In fact, the Eastern site is more similar to the full sample model which is expected. However, the Southern site has mothers who have higher rates of alcoholism, higher rates of domestic violence, and much lower rates of drug use.

When evaluating class membership of the covariate model (see Table 15), the second class, Some Victimization (14.9%, $n = 90$), ranked lowest among the three classes in rates of five out of the eight risk indicators: single-parent status, alcoholism, history of depression, drug use, and low income. Also, this class ranked second of the three remaining risk indicators: age, history of child victimization, and history of domestic violence. Overall this class is considered to be Lowest Risk when compared to the other classes in the model.

The third class, Younger and Poor (45.7%, $n = 276$), had the highest rates of two of the eight risk indicators: low income and age. This class ranked second among the three classes on its rates of single-parent status, alcoholism, history of depression, and drug use. Finally, this class had the lowest rates of history of child victimization and

history of domestic violence. Overall this class is considered to be at Moderate Risk when compared to the other classes in the model.

The first class, Multiple Categories of Risk (39.4%, *n* = 238), encompass a group of participants that have the highest probability of risk on single- parent status, alcoholism, drug use, history of depression, history of child victimization, and history of domestic violence. This class also ranks second on the risk indicator low income and has the lowest probability of risk on age. Overall this class is considered to be Highest Risk when compared to the other classes in the model.

Model Classes – Predictive Validity

The final typology was validated using class assignments for individuals based on the covariate model derived with the adjusted sample of 604 from the analysis. The association of class membership with two outcome variables was examined. The first outcome variable, parent perpetration of child maltreatment, demonstrated that all three classes in the analysis (i.e., Some Victimization, Younger and Poor, and Multiple Categories of Risk) had a significant *p*-value (p = .000), thus making this association significant. Given the literature on intergenerational transmission of maltreatment, as well as the literature that pertains to the common risk factors associated with maltreatment, one would expect this significant association. Figure 2 provides an overview of the percentages of parent perpetration of child maltreatment by class.

Twenty percent of the participants from the Some Victimization class (Class 2) perpetrated abuse. The Younger and Poor participants (Class 3) had a slightly lower percentage of perpetration (19.2 %). Members of the Class 1, Multiple Categories of Risk,

had the highest percentage of perpetration at 67.2%. This class also had the highest rates of six out of eight risk indicators, including parent history of child victimization.

A one-way ANOVA was conducted to evaluate the relationship between the latent classes and parental attitudes toward sensitivity showed significant results, $F(2, 681) = 24.16$, $p < .001$. Tukey post-hoc comparisons showed no significant differences between Class 1 and Class 2, but significant differences between Classes 2 and 3 and Classes 1 and 3. Figure 3 shows the average parental attitudes toward sensitivity score for each class.

Members of Class 2, Some Victimization, had a mean score on parental attitudes toward sensitivity of 31.92. This class had the lowest rates among the three classes of five out of eight risk indicators. Members of Class 3, Younger and Poor, had a mean score on parental attitudes toward sensitivity of 28.08. This class was shown to have the second highest ranking of risk on several risk indicators along with a 19.2% rate of perpetration of maltreatment. Members of Class 1, Multiple Categories of Risk, had a raw mean score on parental attitudes toward sensitivity of 30.62. Although this class had the highest percentage of perpetration of maltreatment (67.2%), its members are shown to have an average amount of sensitivity.

In summary, a consistent pattern of risk for the highest-risk classes across three out of four sites in the analysis. In addition, this same pattern of the typology was consistent for the final covariate model. Another important finding showed that even the lowest-risk class for the final covariate model had a nearly equal percentage of child maltreatment outcomes when compared to the moderate-risk class. Last, the typology from the covariate model was shown to be significantly related to both of the outcomes in

the study – parent perpetration of child maltreatment and parental attitudes toward sensitivity. The significance of the results is discussed in the following chapter.

Chapter 5

Discussion and Conclusion

The risk factor data available from the LONGSCAN study provided an opportunity to examine risk, and the impact of risk, from a probabilities-based perspective. Classes of participants in the study were identified through a mixture modeling procedure, identifying commonalities of risk within each class amid otherwise heterogeneous groups of individuals. The current study evaluated how risk factors identified in the literature were associated with two primary outcomes—parent perpetration of maltreatment and parental attitudes toward sensitivity. The availability of this large, high-risk sample has made it possible to test for latent class differences across four sites—Eastern, Midwestern, Southern, and Northwestern.

Latent Classes Based on Risk Factor Combinations

Based on the final covariate model, a 3-class typology that speaks to the nature of family risk in this sample was obtained. The sections below describe the noteworthy features of these classes and how they are connected with parental attitudes toward sensitivity and child maltreatment.

Latent Class 2 – Some Victimization

One class in this typology, Some Victimization, with highly specific features and characteristics, showed that members of this latent class are married and have more economic advantages. Two-parent homes have been shown to have the lowest rates of poverty (Morrison & Ritualo, 2000; U.S. Census Bureau, 2004) and households headed by two parents are better off financially than single-parent families (Thomas & Sawhill, 2005). Despite these advantages this group still has a moderate rate of child maltreatment outcomes at 20%, which is higher than the expected rate for a group with few risk factors.

Despite having known protective factors against child maltreatment (i.e., more income and having two parents; Mrazek & Mrazek, 1987) the Some Victimization latent class had other risks. Specifically, it had higher rates of two major risk factors—history of child victimization and history of domestic violence. The power and strength of these risk factors connected with a maltreatment rate of 20% suggests how powerful these risk factors are in making child maltreatment outcomes. This typology suggests that the protective factors of age, marriage, and relative economic security may not be enough to counterbalance risk presented by a history of victimization that may lead to a cycle of abuse with children.

Past maternal victimization alone can be an important factor in child maltreatment. That is, multiple risk factors need not be present to get maltreatment that is higher than what might be expected. Research has often associated a history of maltreatment victimization among parents as a strong predictor of their child's maltreatment risk. For example, much research on the intergenerational transmission of child maltreatment has demonstrated that in many instances a history of child abuse is often associated with child maltreatment perpetration (Dixon et al., 2005; Egeland et al., 1987; Haapasalo & Aaltonen,1999; Pears & Capaldi, 2001). Other research has also shown the history of domestic violence to be a predictor for child maltreatment (Berger, 2005; Dubowitz et al., 2001; Hazen, Connelly, Kelleher, Landsverk, & Barth, 2004; Kohl, Edleson, English, & Barth, 2005).

Finally, parental attitudes toward sensitivity in this latent class, however, was the highest of the three latent classes, as might be expected. Although the victimization risk factors suggest potential for child maltreatment, they are not necessarily a barrier to the

development of parental attitudes toward sensitivity. In this latent class, parental attitudes toward sensitivity was an average score of 31.92.

Latent Class 3 – Younger and Poor

Another class in the typology is representative of a relatively younger group of mothers based on the fact that the average age of first childbearing in the U.S. is 25.1 years (CDC, 2007). These mothers also have very low income. From the literature, it is well-known that poverty and younger parent age are risk factors for a variety of negative outcomes for children (i.e., poor health, poor mental health, low school achievement; Brooks-Gunn & Duncan, 1997), in addition to potential child maltreatment (Garbarino, 1976). Past research would suggest that these risk factors would place individuals at-risk for child maltreatment. A closer evaluation of this Younger and Poor latent class revealed that these mothers had the lowest rates of two risk factors in the study (i.e., history of child victimization and history of domestic violence) and moderate rates of risk on other categories such as single-parent status, alcoholism, history of depression, and drug use.

Mothers in this latent class perpetrated maltreatment at nearly identical rates (19.2%) as mothers in the Some Victimization latent class (20%). This similarity between these classes is suggestive of the notion that the commonly cited and referenced risk factors of low income and young age may not be as influential in child maltreatment outcomes as previously thought. Being young and disadvantaged may be as powerful as victimization history in potentiating maltreatment. Interestingly, this highlights the idea that there are multiple equivalent pathways for families to experience on the road to child maltreatment. Having established alternative combinations of risk factors leading to equal rates of perpetration of child maltreatment has clear implications for future methodology

used in studies of child maltreatment. Current literature on risk for maltreatment focuses on summing risk factors, or the cumulative nature of risk. The weighting of risk factors, or the individual nature of risk, in alternative combinations or bundles is scarce in the literature. More emphasis on distinguishing the relative weights of different combinations of risk factors is warranted based upon the finding that the Some Victimization and the Younger and Poor Classes manifest equivalent rates of child maltreatment.

Under the moderate-risk conditions found in this Younger and Poor latent class, this Class's parental attitudes toward sensitivity score was 28.08, significantly lower than either of the other Classes. Members of this Class were younger and impoverished, therefore, they might have had less time and ability to learn about successful parenting strategies that are indicative of sensitive parents. Without environmental resources or life experience, members of this Class may be developmentally immature in their opinions of what constitutes sensitive parenting.

Latent Class 1 – Multiple Categories of Risk

Other patterns of risk exposure emerged into a third class, Multiple Categories of Risk. This class is indicative of families considered "highest-risk" in that it has the highest rates among the classes of nearly all risk indicators. This class pattern is representative of the cumulative risk that some individuals and families face. This multiple risk class is in line with the cumulative disadvantage literature (e.g., Merton, 1973) that discusses how deleterious multiple risk factors can lead to serious difficulties across the life course (Appleyard, Egeland, van Dulmen, & Sroufe, 2005; Forehand, Biggar, & Kotchick, 1998; Jaffee, Caspi, Moffitt, Polo-Tomas, & Taylor, 2007).

Following the current thinking on cumulative disadvantage, much research has shown that multiple risk factors put children at greater risk for child maltreatment. Research by Wekerle and colleagues (2007) assessed the effect of caregiver vulnerabilities (i.e., low income, history of child maltreatment, involvement in partner violence, substance abuse, criminal activities, mental health problems, lack of social support, and physical problems) and found that cumulative risk, or total number of caregiver vulnerabilities, was the best predictor of child physical abuse and neglect. Other research has demonstrated similar findings. Kotch et al. (1995) demonstrated that maternal education, number of other dependent children in the home, receipt of medicaid, maternal depression, and whether the maternal participant lived with her mother at age 14 was predictive of child maltreatment outcomes.

Hypothesis 1 - Biological mothers with greater numbers of risk factors will demonstrate higher rates of maltreatment. This cumulative risk found in the latent class typology follows past literature in that it had by far the highest maltreatment rates of 67%; therefore, hypothesis one was confirmed in the study. With these types of outcomes, multiple risk factors coming together should be the strongest hallmark in the assessment for child maltreatment

Hypothesis 2 - Biological mothers with greater numbers of risk factors will demonstrate lower rates of parental attitudes toward sensitivity. Under the stress of cumulative risk, the data does not show that parental attitudes toward sensitivity is unusually low. It might be the case that in the context of maltreatment risk parental attitudes toward sensitivity may not be about a chronic lack of sensitivity. It may be related to the realities of current circumstances. For example, perhaps mothers reach a

breaking point under so much stress, as opposed to a chronic insensitivity to their children.

Related Patterns of Risk Across the Four Sites

The multiple risk factors generalized across the four sites in the analysis. The only significant difference was in relation to the Northwestern site, which resulted in a two-class typology. The primary reason for this difference can be attributed to sampling of participants. The Northwestern sample only included participants who were suspected of child maltreatment, making that site more likely to have higher-risk participants. Finally, site differences were controlled for in the final covariate model. Because the Southern and Eastern sites did vary on the latent class structure it would be important to keep in mind the importance of context for future explorations of risk and maltreatment.

Limitations

As is true for all research, this study has limitations. First, the LONGSCAN sample is a nonprobability sample; therefore, the findings from this study may not generalize beyond the entire sample. In addition, relying on retrospective data is not ideal in research. Although the perpetration of child maltreatment is based on prospective reports, parents' victimization is based on retrospective self-report in this study. Retrospective data requires the reliance upon human memory, which can be inaccurate (Giele & Elder, 1998). In addition, the cross-sectional nature of the risk factor and parental attitudes toward sensitivity data preclude analyses of causality.

Other limitations of the study involve the fact that other incidents of trauma (for example, a child having been physically abused by someone outside the family) are not included in this study. Further, the Lack of Empathy construct has not been used in

previous research as a measure of parental attitudes toward sensitivity. It might be limited in assessing parental attitudes toward sensitivity. Finally, an assessment of parental attitudes regarding sensitivity that relies completely on self-report is never a substitute for observing the parent-child dynamic (Levanthal et al., 2004). Thus, the lack of direct parent-child observations of parental sensitivity is another limitation of this study.

Practice Implications

Findings from the current study support various practice implications. First, the study demonstrated the relative risk of history of child maltreatment and history of domestic violence on child maltreatment outcomes. Because of this relative risk, appropriate treatment for mothers who have a history of victimization is warranted for the prevention of child maltreatment.

Another important practice implication relates to younger mothers who are poor. In this study, young impoverished mothers demonstrated marginal scores on parental attitudes toward sensitivity. Sensitive caregiving is a significant parental attribute. Because of this, training provided to young impoverished mothers is necessary so that these young mothers can acquire the knowledge and skill needed to become effective parents.

Last, results from this study support the idea that the amount of risk matters and that the nature of risk is important as well; therefore both the amount and nature of risk should be a part of any assessment process. Early assessments by social workers that evaluate families based on the amount and nature of risk will hopefully foster primary prevention efforts to reduce child maltreatment in this country.

Most often, social workers are first responders to allegations of child maltreatment. In fact, in most states reporting child maltreatment occurs through state or local social work agencies such as child protective service agencies (DHHS, 2006), or other similarly named state agencies (e.g., Family Independence Agency in Michigan, or Department of Human Services in other states). A social worker filling a specific role as a social work case manager, and whose training is different from that of a social work clinician, responds to reports of child maltreatment. One criticism of this role is that the response of the social work case manager is a tertiary response. After a social work case manager responds he or she then refers the family to treatment services that are often provided by a social work clinician. This treatment provided by a social work clinician is also a tertiary response.

Primary, secondary, and tertiary prevention are commonly used terms in medicine related to health promotion (Leavell & Clark, 1965). Primary responses include efforts seeking to prevent, or avoid, a problem from ever occurring (Baldwin & Conger, 2001). Secondary responses include efforts aimed at the early detection of a problem, and continued efforts to ensure that the problem does not progress (Baldwin & Conger, 2001). Tertiary efforts are those that take place in response to an occurrence of a problem, and are focused on preventing a repeated occurrence (Baldwin & Conger, 2001). Thus, the timing of the social work tertiary response, although important, is undesirably late.

Although some social work responses are late others are representative of primary and secondary prevention. For example, some current prevention programs that target high risk families are delivered by social workers who are clinically trained (for a review, see Circle of Security, 2006; Healthy Families America, 2007). The problem with

these prevention programs is that they are not available in every community across the United States. As a result, many families who meet the criteria for these prevention services are not receiving them and these families in many instances are vulnerable to child maltreatment. Given this knowledge, communities that are invested in the prevention of child maltreatment need to ensure the adequate assessment of families for multiple risk factors, but also the individual nature of risk as it relates to the history of victimization.

Future Research

The risk model developed in this study tested the relationship of patterns of risk factors with child maltreatment. Because of the sample structure (i.e., LONGSCAN was a nonprobability sample), future research with a probability sample would allow for these results to be corroborated and would be generalizable beyond the current sample.

The inclusion of prospective data would also strengthen future research. The current study utilized some retrospective data (i.e., parent history of child victimization as well as history of domestic violence and drug use) and some prospective data (i.e., child maltreatment outcomes). The development and utilization of prospective data would bolster the existing retrospective data, which would provide richer and more nuanced information for researchers. Future research could also benefit from evaluating the role of other caregivers in the home including biological fathers, stepfathers, stepmothers, foster parents, and relatives.

The current study did not look at the connection of parental attitudes toward sensitivity and child maltreatment outcomes. This would be useful for future research

because the role of the sensitivity of a parent is thought to be central to child maltreatment outcomes; therefore, these relationships deserve more in-depth exploration.

Finally, as reported in this study approximately one-third of the sample members who had the highest probability of risk did not abuse their children, despite all the cumulative risk operating in their lives. Studying these families that not only break the cycle of abuse but also refrain from abuse amid difficult circumstances, would be beneficial for future research.

Conclusion

The research presented in this paper has been dedicated to taking the popular approach of summing risk factors to a new level of understanding. This was accomplished by performing a LCA. The LCA in this study identified three different latent class groups: (a) Some Victimization, (b) Younger and Poor, and (c) Multiple Categories of Risk. These latent classes challenged current thinking on potential risk for children and families.

Specifically, mothers with multiple risk factors demonstrate the strongest predictor of child maltreatment outcomes. Also, families that are younger in age, on average, and have a low income have lower parental attitudes toward sensitivity. These scores are predictive of less than ideal parenting attitudes. Finally, the latent class with a history of victimization, but relatively low amounts of risk on other variables had 20% perpetration of child maltreatment. This suggests that the role of victimization has some bearing on child maltreatment outcomes and may be sufficient enough risk to bring attention to practitioners who treat these families. The findings from this study will hopefully inspire future studies to evaluate child maltreatment risk from a probabilities-

based perspective. In addition, the results from this study can inform assessments and interventions to help address child maltreatment in this country

APPENDIX A

Appendix A: Correlation Matrix of Risk Factors and Classes

Variable	Single-Parent Status	Alcoholism	History of Depression	History of Child Victimization	History of Domestic Violence	Drug Use	Low Income	Age	Perpetration of Child Maltreatment	Caregiver Sensitivity
Single-Parent Status	1.000									
Alcoholism	.069	1.000								
History of Depression	.049	.181 **	1.000							
History of Child Victimization	-.085 *	.033	.128 **	1.000						
History of Domestic Violence	.055	.136 **	.149 **	.193 **	1.000					
Drug Use	.078 *	.076	.025	.148 **	.199 **	1.000				
Low Income	.361 **	.106 *	.082 *	-.013	.031	.044	1.000			
Age	-.094 *	.175 **	.042	-.009	.123 **	.182 **	.006 **	1.000		
Perpetration of Child Maltreatment	.085 *	.163 **	.098 *	.297 **	.235 **	.237 **	.145 **	.157 **	1.000	
Caregiver Sensitivity	-.196 **	-.050	-.119 **	.208 **	.143 **	.149 **	-.106 **	.023	.323 **	1.000

Note: * Correlation is significant at the .05 level (2-tailed) ** Correlation is significant at the 0.01 level (2-tailed)

Appendix B

Table 1 through Table 15

Table 1: LONGSCAN Sample at Baseline and the Adjusted Sample

		Eastern (B)	Eastern (AS)	Two-tailed Probability	Midwestern (B)	Midwestern (AS)	Two-tailed Probability	Southern (B)	Southern (AS)	Two-tailed Probability	Northwestern (B)	Northwestern (AS)	Two-tailed Probability
Baseline (B)	1,354	282			245			243			254		
Adjusted Sample (AS)	604		163			176			132			133	
Characteristic		%	%		%	%		%	%		%	%	
Child's Gender													
Male	297	52.1	51.5	.903	46.9	46.6	.952	45.3	44.7	.911	50.8	54.1	.538
Female	307	47.9	48.5	.903	53.1	53.4	.952	54.7	55.3	.911	49.2	45.9	.538
Child's Race													
Caucasian	153	5.0	3.7	.525	13.1	13.1	1.00	35.8	36.4	.908	50.0	57.1	.185
African American	357	92.9	93.3	.873	53.5	56.3	.570	63.0	62.1	.864	20.5	18.0	.557
Hispanic	32	0.4	0.6	.767	13.9	14.2	.930	0.0	0.0	1.00	2.8	4.5	.380
Mixed	55	1.1	1.2	.924	17.1	14.8	.527	1.2	1.5	.807	24.0	18.8	.243
Other*	7	0.7	1.2	.587	2.4	1.7	.622	0.0	0.0	1.00	2.8	1.6	.463
Marital Status													
Married	145	16.4	14.7	.636	21.2	21.0	.961	38.7	38.6	.985	30.7	24.8	.224
Single (never married)	356	68.2	73.6	.231	67.3	66.5	.863	44.0	47.0	.577	42.1	42.9	.880
Separated	40	7.5	6.1	.577	2.4	2.8	.798	8.6	9.8	.699	9.1	9.0	.974
Divorced	59	5.7	4.9	.719	8.2	8.5	.913	7.8	4.5	.221	17.7	22.6	.248
Widowed	2.0	2.1	0.0	.063	0.8	0.6	.810	0.8	0.0	.304	0.4	0.8	.610

Note : *Other race includes Asian, Native American, and Pacific Islander

Note : Two-tailed probability are significance values; all values are $p > .05$

Table 2: Prevalence of Risk Factors by Sites, LONGSCAN data

Indicators and pattern	Longitudinal Studies of Child Abuse and Neglect			
	Eastern %	Midwestern %	Southern %	Northwestern %
Risk behaviors:				
Single-Parent Status	84.7	78.4	61.4	75.2
Alcoholism	7.4	13.6	12.9	21.1
History of Depression	35.0	33.5	30.3	36.1
story of Childhood Victimization	13.5	25.6	22.7	58.6
History of Domestic Violence	31.3	36.9	35.6	68.4
Drug Use	52.8	58.0	41.7	76.7
Low Income (< 20,000)	84.0	78.4	71.2	77.4
Means:				
Mother's Age	24.5	24.2	21.0	25.1
Sample Size for Each Site	163	176	132	133

Table 3: Measurement Model - Adjusted LONGSCAN Sample (N = 604)

Class	BIC	Log likelihood	Average Class Probability	Lowest Class Proportion	BLRT
One	8742.497	-4342.433	1	1.00	*
Two	8690.012	-4287.374	.846 (314), .804 (290)	0.48	p = .000
Three (final)	**8668.893**	**-4247.998**	**.795 (98), .830 (301), .802 (205)**	**0.16**	**p = .000**
Four	8679.058	-4224.265	.788 (177), .818 (238), .803 (127), .778 (62)	0.10	p = .000
Five	8704.352	-4208.095	.779 (106), .812 (185), .726 (51), .720 (167), .816 (95)	0.08	p = .000

Note : BLRT could not be estimated for one class

Table 4: Probability and Mean Scores for Measurement Model (N = 604)

Latent Class	(3) Lowest Risk	(1) Moderate Risk	(2) Highest Risk
Name	Single and Young	Some Risk, but Married with Economic Resources	High Risk Except Age
Class Probability (N)	.802 (205)	.795 (98)	.830 (301)
Percentage of Sample	49.8%	16.2%	33.9%
Categorical Variables			
Single-Parent Status			
No	9.9%	100.0%	11.2%
Yes	90.1%	0.0%	88.8%
Alcoholism			
No	95.9%	91.5%	67.6%
Yes	4.1%	8.5%	32.4%
History of Depression			
No	80.7%	74.2%	52.5%
Yes	19.3%	25.8%	47.5%
History of Child Victimization			
No	86.2%	65.3%	61.3%
Yes	13.8%	34.7%	38.7%
History of Domestic Violence			
No	84.7%	68.2%	34.8%
Yes	15.3%	31.8%	65.2%
Drug Use			
No	63.8%	53.5%	23.1%
Yes	36.2%	46.5%	76.9%
Income			
Category 1 = > $20,000	15.6%	67.5%	10.7%
Category 2 = $0 to $20,000	84.4%	32.5%	89.3%
Continuous Variables			
Mother's Age			
Mean	20.8	25.2	25.5

Table 5: Eastern LONGSCAN Sample (n = 163)

Class	BIC	Log likelihood	Avgerage Class Probability	Lowest Class Proportion	BLRT
One	2183.126	-1068.641	1	1	*
Two	2165.200	-1036.756	.999 (52), .930 (111)	0.40	p = .000
Three (final)	**2173.249**	**-1017.859**	**.902 (60), .989 (40), .872 (63)**	**0.25**	**p = .000**
Four	2197.779	-1007.202	.957 (77), .925 (12), .899 (66), .980 (8)	0.05	p = .1053
Five	2216.994	-993.888	.886 (53), .927 (29), .856 (40), .928 (15), .838 (26)	0.09	p = .03

Note : BLRT could not be estimated for one class

Table 6: Probability and Mean Scores for Eastern Site (n = 163)

Latent Class	(1) Lowest risk	(3) Moderate risk	(2) Highest Risk
Name	Low Depression and Alcoholism	Mostly Single and Poor	Many Risk Factors
Class Probability (N)	.902 (60)	.872 (63)	.989 (40)
Percentage of Sample	36.8%	38.7%	24.5%
Categorical Variables			
Single-Parent Status			
No	33.5%	0.0%	7.4%
Yes	66.5%	100.0%	92.6%
Alcoholism			
No	100.0%	84.1%	74.0%
Yes	00.0%	15.9%	26.0%
History of Depression			
No	78.6%	60.0%	52.2%
Yes	21.4%	40.0%	47.8%
History of Child Victimization			
No	97.6%	82.4%	76.0%
Yes	2.4%	17.6%	24.0%
History of Domestic Violence			
No	100.0%	76.9%	13.7%
Yes	00.0%	23.1%	86.3%
Drug Use			
No	33.0%	100.0%	00.0%
Yes	67.0%	00.0%	100.0%
Income			
Category 1 = > $20,000	26.7%	13.6%	0.0%
Category 2 = $0 to $20,000	73.3%	86.4%	100.0%
Continuous Variables			
Mother's Age			
Mean	26.1	20.6	27.1

Table 7: Midwestern LONGSCAN Sample (n = 176)

Class	BIC	Log likelihood	Average Class Probability	Lowest Class Proportion	BLRT
One	2524.911	-1239.189	1	1	*
Two	2531.035	-1218.983	.958 (56), .856 (120)	0.32	p = .000
Three (final)	**2553.057**	**-1206.727**	**.821 (100), .887 (19), .845 (57)**	**0.21**	**p = .04**
Four	2576.786	-1195.324	.802 (57), .853 (42), .783 (41), .901 (36)	0.23	p = .06
Five	2603.264	-1185.296	.859 (20), .839 (63), .890 (12), .821 (42). .904 (39)	0.07	p = .06

Note : BLRT could not be estimated for one class

Table 8: Probability and Mean Scores for Midwestern Site (n = 176)

Latent Class	(3) Lowest Risk	(2) Moderate Risk	(1) Highest Risk
Name	Low Depression and Alcoholism	Mostly Single and Poor	Many Risk Factors
Class Probability (N)	.845 (57)	.887 (19)	.821 (100)
Percentage of Sample	32.4%	10.8%	56.8%
Categorical Variables			
Single-Parent Status			
No	35.9%	69.9%	00.0%
Yes	64.1%	30.1%	100.0%
Alcoholism			
No	100.0%	86.8%	65.0%
Yes	0.0%	13.2%	35.0%
History of Depression			
No	86.3%	51.4%	54.6%
Yes	13.7%	48.6%	45.4%
History of Child Victimization			
No	88.3%	00.0%	80.0%
Yes	11.7%	100.0%	20.0%
History of Domestic Violence			
No	76.7%	28.5%	60.1%
Yes	23.3%	71.5%	39.9%
Drug Use			
No	64.2%	26.7%	26.7%
Yes	35.8%	73.3%	73.3%
Income			
Category 1 = > $20,000	33.4%	63.1%	3.3%
Category 2 = $0 to $20,000	66.6%	36.9%	96.7%
Continuous Variables			
Mother's Age			
Mean	22.7	24.4	25.2

Table 9: Southern LONGSCAN Sample (n = 132)

Class	BIC	Log likelihood	Average Class Probability	Lowest Class Proportion	BLRT
One	1931.507	-943.781	1	1	*
Two	1933.008	-922.559	.919 (30), .952 (102)	0.23	p = .000
Three (final)	**1938.825**	**-903.495**	**.949 (87), .978 (11), .883 (34)**	**0.08**	**p = .000**
Four	1963.927	-894.073	.932 (69), .839 (15), .870 (35), .922 (13)	0.10	p = .667
Five	1990.353	-885.314	.874 (18), .896 (64), .940 (12), .861 (27), .991 (11)	0.08	p = .333

Note : BLRT could not be estimated for one class

Table 10: Probability and Mean Scores for Southern Site (n = 132)

Latent Class	(3) Lowest Risk	(1) Moderate Risk	(2) Highest Risk
Name	Low Depression and Alcoholism	Mostly Single and Poor	Many Risk Factors
Class Probability (N)	.883 (34)	.949 (87)	.978 (11)
Percentage of Sample	25.8%	65.9%	8.3%
Categorical Variables			
Single-Parent Status			
No	100.0%	19.0%	14.2%
Yes	0.0%	81.0%	85.8%
Alcoholism			
No	82.4%	78.7%	30.8%
Yes	17.6%	21.3%	69.2%
History of Depression			
No	72.0%	71.3%	45.0%
Yes	28.0%	28.7%	55.0%
History of Child Victimization			
No	73.1%	78.9%	75.4%
Yes	26.9%	21.1%	24.6%
History of Domestic Violence			
No	60.8%	65.6%	65.4%
Yes	39.2%	34.4%	34.6%
Drug Use			
No	66.2%	55.9%	54.8%
Yes	33.8%	44.1%	45.2%
Income			
Category 1 = > $20,000	80.2%	10.5%	0.0%
Category 2 = $0 to $20,000	19.8%	89.5%	100.0%
Continuous Variables			
Mother's Age			
Mean	23.6	18.4	31.9

Table 11: Northwestern LONGSCAN Sample (n = 133)

Class	BIC	Log likelihood	Average Class Probabilities	Lowest Class Proportion	BLRT
One	1985.492	-970.739	1	1	*
Two (final)	**2011.797**	**-961.885**	**.795 (20), .958 (113)**	**0.15**	**p = .4286**
Three	2038.073	-953.017	.766 (68), .834 (48), .925 (17)	0.13	p = .6667
Four	2065.306	-944.627	.787 (30), .825 (60), .883 (26), .804 (17)	0.13	p = .2174
Five	2092.627	-936.281	.925 (17), .965 (6), .774 (22), .889 (71), .868 (17)	0.05	p = .6667

Note : BLRT could not be estimated for one class

Table 12: Probability and Mean Scores for Northwestern Site (n = 133)

Latent Class	(1) Moderate Risk	(2) Highest Risk
Name	Mostly Married	Many Risk Factors
Class Probability (N)	.795 (20)	.958 (113)
Percentage of Sample	15.0%	84.9%
Categorical Variables		
Single-Parent Status		
No	86.8%	13.5%
Yes	13.2%	86.5%
Alcoholism		
No	100.0%	72.4%
Yes	0.0%	27.6%
History of Depression		
No	61.4%	64.0%
Yes	38.6%	36.0%
History of Child Victimization		
No	49.7%	39.4%
Yes	50.3%	60.6%
History of Domestic Violence		
No	63.2%	25.4%
Yes	36.8%	74.6%
Drug Use		
No	48.2%	18.0%
Yes	51.8%	82.0%
Income		
Category 1 = > $20,000	51.3%	16.8%
Category 2 = $0 to $20,000	48.7%	83.2%
Continuous Variables		
Mother's Age		
Mean	27.9	24.5

Table 13: Class Solution for Primary Sample Comparison Table

Measurement model				
	BIC	Log likelihood	Lowest Average Class Probability	Percent Sample
1	8742.5	-4342.433	1	*
2	8690.01	-4287.374	0.80	48.0%
3	**8668.89**	**-4247.998**	**0.80**	**16.0%**
4	8679.06	-4224.265	0.78	10.0%
5	8704.35	-4208.095	0.73	25.0%
Covariate model				
	BIC	Log likelihood	Lowest Average Class Probability	Percent Sample
1	*	*	*	*
2	8614.95	-4240.239	0.86	53.0%
3	**8595.36**	**-4192.018**	**0.81**	**15.0%**
4	8615.71	-4163.775	0.74	24.0%
5	8638.52	-4136.756	0.74	19.0%

NOTE : A covariate model could not be estimated with one class

Table 14: Characteristics of Risk and the Association Across Sites

Probabilities	Latent Classes		
	Class 2 - Some Victimization	Class 3 - Younger and Poor	Class 1 - Multiple Categories of Risk
Latent class probability:	0.149	0.457	0.394
N	90	276	238
Conditional probability of latent class given site:			
Eastern	0.066	0.681	0.253
Midwestern	0.136	0.502	0.363
Southern	0.319	0.515	0.167
Northwestern	0.108	0.001	0.891
Conditional probability of the indicator given latent class membership:			
Single Parent Status	0.059	0.905	0.860
Alcoholism	0.090	0.125	0.299
Depression	0.240	0.265	0.461
History of Child Victimization	0.331	0.076	0.510
History of Domestic Violence	0.294	0.190	0.721
Drug use	0.418	0.441	0.783
Low Income	0.313	0.890	0.863
Mean:			
Age	24.244	22.385	25.046

Table 15: Probability and Mean Scores for Covariate Model (N = 604)

Latent Class	(2) Lowest Risk	(3) Moderate Risk	(1) Highest Risk
Name	Some Victimization	Younger and Poor	Multiple Categories of Risk
Class Probability (N)	.808 (90)	.840 (276)	.859 (238)
Percentage of Sample	14.9%	45.7%	39.4%
Categorical Variables			
Single-Parent Status			
No	94.1%	90.5%	14.0%
Yes	5.9%	9.5%	86.0%
Alcoholism			
No	91.0%	87.5%	70.1%
Yes	9.0%	12.5%	29.9%
History of Depression			
No	76.0%	73.5%	53.9%
Yes	24.0%	26.5%	46.1%
History of Child Victimization			
No	66.9%	92.4%	49.0%
Yes	33.1%	7.6%	51.0%
History of Domestic Violence			
No	70.1%	81.1%	27.9%
Yes	29.9%	19.0%	72.1%
Drug Use			
No	58.2%	44.1%	21.7%
Yes	41.8%	55.9%	78.3%
Income			
Category 1 = > $20,000	31.3%	11.4%	13.7%
Category 2 = $0 to $20,000	68.7%	88.6%	86.3%
Continuous Variables			
Mother's Age			
Mean	24.2	22.4	25.0

Appendix C

Figure 1 through Figure 3

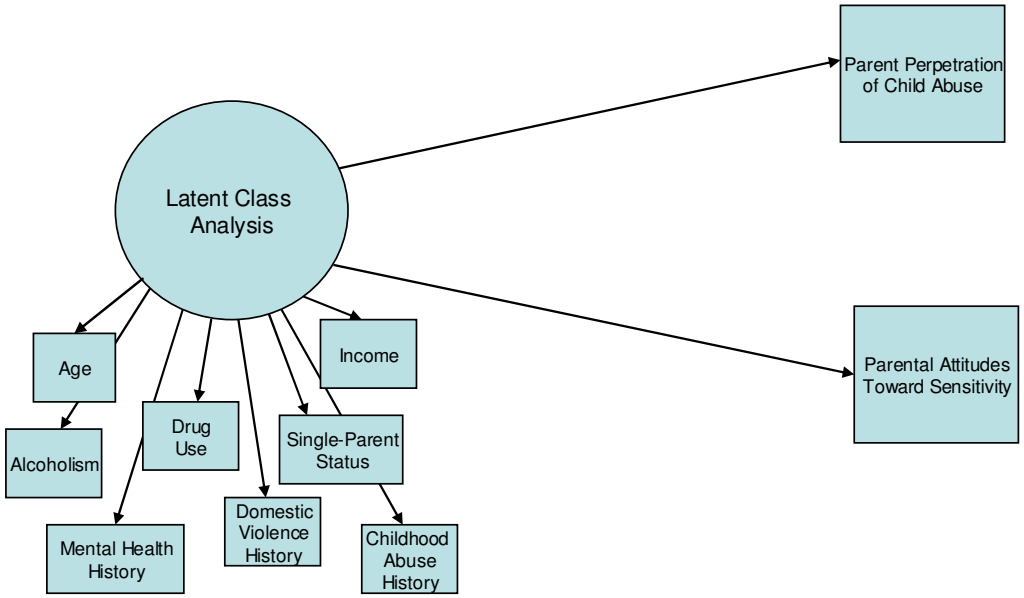
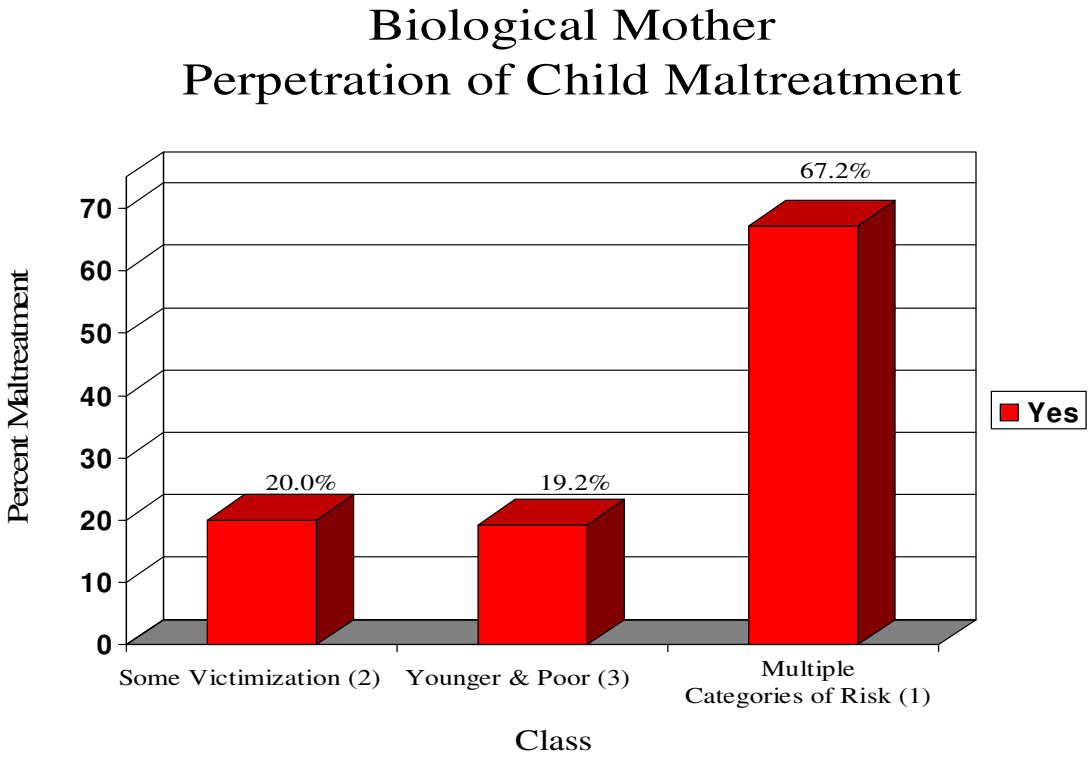
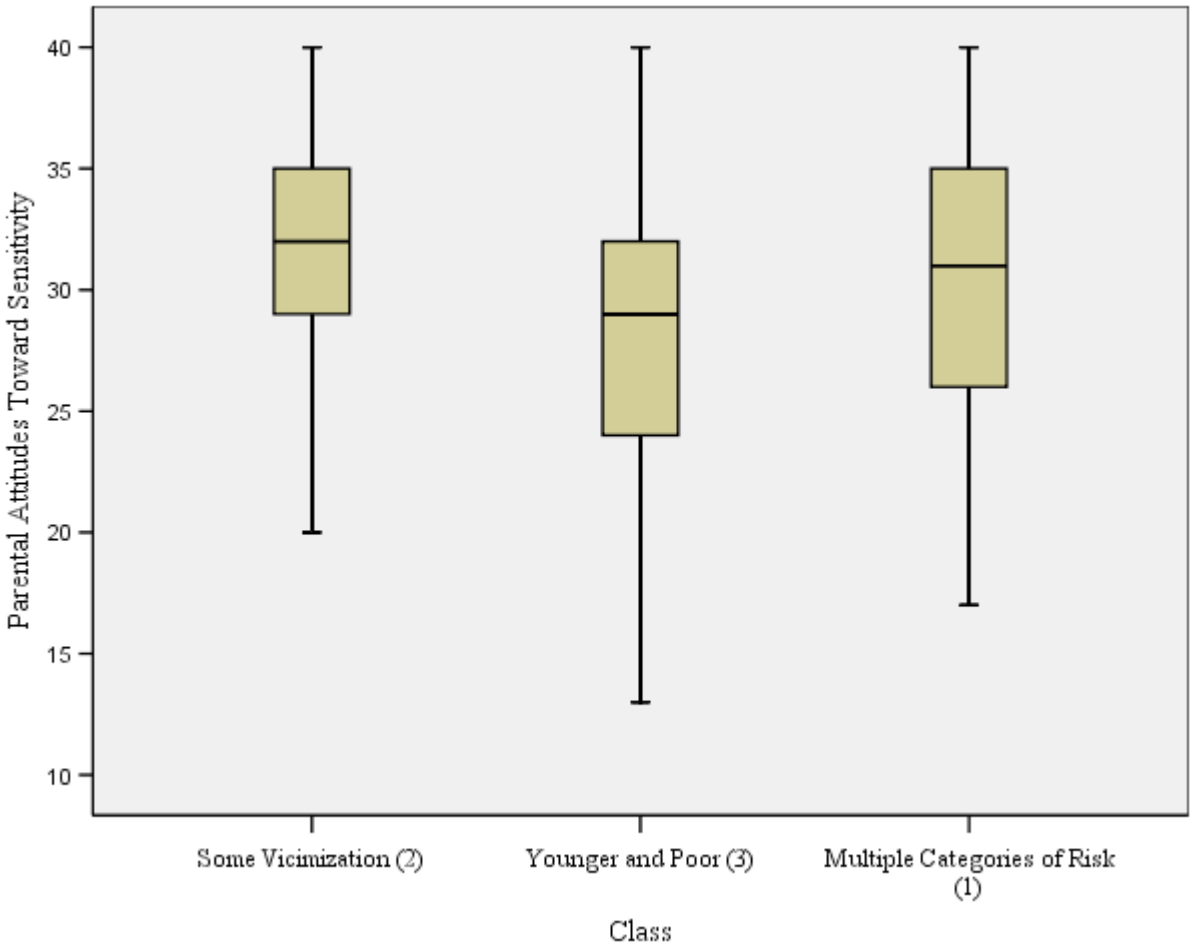

Parent Perpetration of Child Abuse
Latent Class Analysis
Parental Attitudes Toward Sensitivity
Age
Income
Drug Use
Alcoholism
Single-Parent Status
Domestic Violence History
Mental Health History
Childhood Abuse History

Figure 1


Biological Mother
Perpetration of Child Maltreatment
Percent Maltreatment
70
60
50
40
30
20
10
0
67.2%
20.0%
19.2%
Some Victimization (2)
Younger & Poor (3)
Multiple
Categories of Risk (1)
Class
Yes


Parental Attitudes Toward Sensitivity
40
35
30
25
20
15
10
Some Victimization (2)
Younger and Poor (3)
Multiple Categories of Risk (1)
Class

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