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**Document Title: Problem Behaviors in Maltreated Children and Youth: Influential Child, Peer, and Caregiver Characteristics**

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**Document No.: 208860**

**Date Received: February 2005**

**Award Number: 2003-IJ-CX-1004**

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PROBLEM BEHAVIORS IN MALTREATED CHILDREN AND YOUTH:  
INFLUENTIAL CHILD, PEER, AND CAREGIVER CHARACTERISTICS

by  
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A dissertation submitted to the faculty of the University of North Carolina  
at Chapel Hill in partial fulfillment of the requirements for the degree of  
Doctor of Philosophy in the School of Social Work.

Chapel Hill  
2004

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## ABSTRACT

ARIANA E. WALL: Problem Behaviors in Maltreated Children and Youth:  
Influential Child, Peer, and Caregiver Characteristics  
(Under the direction of Richard P. Barth)

This dissertation examines the problem behaviors of maltreated children and adolescents, and the predictors of changes in behavior over 18 months. Problem behaviors include aggression, delinquency, risky sexual practices, substance abuse, and suicidal behaviors.

Data are from the National Survey of Child and Adolescent Well-Being (NSCAW), the first national probability survey of children assessed following a child maltreatment report. All analyses were conducted with calculated sample weights in SAS using SUDAAN® to adjust standard errors, account for clustering and stratification in the sampling design, and allow for inferences about problem behaviors in the population of children and youth investigated as victims of child maltreatment in the U.S.

Many child characteristics were associated with higher levels of aggression and delinquency at baseline—e.g., hyperactivity-impulsivity-attention (HIA) problems, low social skills and depression. Delinquent and aggressive adolescents were also likely to have deviant peers, be substance abusers, engage in high-risk sexual behaviors, and report harsh discipline. For 6- to 10-year olds, high cumulative risk was associated with high levels of aggression at baseline.

Changes in problem behavior did not vary by as many factors as were found in bivariate analyses. For 6- to 10-year-old males, factors associated with aggressive behavior

change included race/ethnicity, new maltreatment report, academic achievement, and cumulative risk. For 6- to 10-year olds females, age, maltreatment type, poverty, and cumulative risk were associated with aggressive behavior change.

Factors associated with aggressive and delinquent behavior change over 18 months varied by gender for maltreated adolescents. For males, behavior change varied by age and peer rejection. For females, behavior change varied by age, child welfare services, peer rejection, and deviant peer associations.

Risky sexual behavior varied by sexually assaultive behavior and level of caregiver monitoring for males and child welfare services, maltreatment type, and race/ethnicity for females. Factors associated with changes in substance abuse also varied by gender. For males, changes in substance abuse level varied by depression and by level of caregiver relatedness for females. Suicide risk behavior changes varied by age and level of caregiver relatedness for males and by peer rejection and level of caregiver monitoring for females.

## ACKNOWLEDGMENTS

Words cannot adequately express how much I appreciate all of the people who have made this dissertation possible: Rick, who helped in so many ways (constructive, if sometimes painful, feedback; offering his van to help me move; telling me I should go to Greece; thickening my skin; sitting with me for three hours to practice my first national conference presentation). Mark, who encouraged me to visit Chapel Hill in the first place, counted our “ums” in class presentations, and gave plenty of PowerPoint opportunities; who has also been a great cheer leader and the best possible example that you can be both a great teacher and a great researcher. Jack, my advisor and mental health consultant, who let me vent as I plodded through the challenges of the doctoral program, and supported my efforts to figure out what the heck to do with my life once I actually had a degree. Shenyang, for his encouragement and assistance with all things methodological and for explaining concepts in a way I could understand. Carolyn, for her good-nature and attention to detail in papers I gave her. Her suggestions are hopefully improving my ability to present “the big picture.”

Then there are the many friends and family who have also been a great support. First, Charles, for his love, support, patience, and ability to trouble-shoot in my moments of panic. If it were not for Charles the sticky note solution would never have been discovered! My mother, for her editorial and grammar skills, and just for being my mother. My father, who is boisterous and full of ideas and has survived a dissertation himself. My grandparents, Frances and John, who always asked when I was finishing and helped financially to get me

through school quicker. Marsha, who is a calming presence and a reminder that the Higher Power is in charge and things are all right no matter what. Mary, because she is Mary. Sabrina, Sheara, and Daniel for finishing before me and reminding me that I could do this. Manny, Vanessa, Jimmy, and Cyrette for being entertaining to work around and helping me to feel less isolated while dissertating. Trish and Claire, because they are fellow sufferers in doctoral programs and NSCAW data analysis and report writing. Knowing they could do it reminded me that so could I. Becky, the SAS queen, and Rod Rose, the SAS king, who rescued me at the eleventh hour.

Last, but certainly not least, I want to thank the National Institute of Justice Graduate Research Fellowship Program, whose financial support helped me to rest a bit easier. This project was supported by Grant No. 2003-IJ-CX-1004 awarded by the National Institute of Justice, Office of Justice Programs, U.S. Department of Justice. Points of view in this document are those of the author and do not necessarily represent the official position or policies of the U.S. Department of Justice.

And there are many others inside who offered words of support and encouragement too. To all of you, I am eternally grateful and I promise to pass it on.

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## CHAPTER I

### INTRODUCTION

The purpose of this dissertation is to examine the problem behaviors of maltreated children and adolescents and the predictors of changes in behavior over 18 months. Problem behaviors include aggression, delinquency, risky sexual practices, substance abuse, and suicidal behaviors. It is hoped that findings can provide information about potential intervention targets as well as directions for future research. Data are from the National Survey of Child and Adolescent Well-Being (NSCAW), the first national probability survey of children assessed following a child maltreatment report.

All analyses were conducted with calculated sample weights in SAS using SUDAAN® to adjust standard errors, account for clustering and stratification in the sampling design, and allow for inferences about problem behaviors in the population of children and youth investigated as victims of child maltreatment in the U.S. Descriptive analyses and repeated measures regression using generalized estimating equations (GEE) addressed change over time. Separate models were analyzed for males and females in each of the studies (Chapters 2 through 4). To maintain adequate sample size, a multi-stage approach was used by running separate models for child-, peer-, and family-level factors before running final models that included only significant variables from each of these blocks along with control variables.

Chapters 2 through 4 are manuscripts intended for eventual publication. *Chapter 2* examines aggression and changes over 18 months for children aged 6 to 10 years. *Chapter 3* examines self-reported delinquency and caregiver-reported aggressive and delinquent behavior and changes over 18 months for youth aged 11 to 15 years. *Chapter 4* examines risky behavior changes (risky sexual behavior, substance abuse, and suicidal risk behavior) over 18 months for youth aged 11 to 15 years. In all three of these chapters characteristics in the realm of the child, peer, and family are examined, as are child welfare services and maltreatment experiences. Table 1-1 summarizes these three chapters, including sub-population, methods and hypotheses. *Chapter 5* concludes the dissertation with a brief summary of findings and recommendations for future research.

Table 1-1

### Summary of Dissertation Papers

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**Chapter 2:** *Aggression and Changes in Maltreated Elementary School-Age Children: The Influence of Child Welfare Services and Child and Parent Characteristics*

**Dependent Measure:** Child Behavior Checklist Aggressive Behavior subscale

**Sub-population:** Children aged 6 to 10 years, who were reported and investigated as victims of maltreatment, and were living at home at the time of the initial interview

**Hypotheses:**

- (1) Physically abused children are more aggressive than children who experience other types of maltreatment.
- (2) Child characteristics—low academic achievement, low social skills, HIA problems, peer rejection—are associated with higher aggression at baseline and less improvement in aggressive behavior over 18 months.
- (3) Caregiver characteristics—domestic violence, arrest, substance abuse, poverty—are associated with higher aggression at baseline and less improvement in aggressive behavior over 18 months.
- (4) Higher cumulative risk is associated with higher aggression at baseline and less improvement in aggression over 18 months.
- (5) Males are more aggressive than females.

- (6) Meaningful variation exists by gender for child and caregiver characteristics associated with aggressive behavior at baseline.
- (7) Factors associated with change in aggression over 18 months vary by gender.

**Methods:** Chi-square and t statistics to assess associations at baseline for hypotheses 1 to 6. Linear regression using generalized estimating equations (GEE) to examine aggressive behavior changes for hypotheses 2, 3, 4, and 7.

---

**Chapter 3:** *Predicting Aggressive and Delinquent Behavior in Maltreated Adolescents: Child Welfare Services and Child, Peer, and Caregiver Characteristics*

**Dependent Measures:** Child Behavior Checklist Externalizing scale and Self-Reported Delinquency

**Sub-population:** Youth ages 11 to 15 years who were reported and investigated as victims of maltreatment.

**Hypotheses:**

- (1) Males exhibit higher levels of aggression and delinquency at baseline and 18 months than females.
- (2) The characteristics associated with aggression and delinquency at baseline differ substantially for males and females as do the characteristics associated with changes in aggression and delinquency over 18 months.
- (3) Physically abused or neglected youth exhibit higher baseline levels of aggression and delinquency and less behavior improvement over 18 months, compared to sexually abused youth.

**Methods:** Chi-square and t statistics for hypotheses 1 to 3. Regression using GEE to examine aggressive behavior changes for hypotheses 2 and 3. Linear regression was used for the continuous CBCL measure while logistic regression was used for the dichotomized SRD measure.

---

**Chapter 4:** *Risky Behavior in Maltreated Youth at Entry to Child Welfare Services and 18-Months Later*

**Dependent Measures:** Risky Sexual Behavior, Substance Abuse, and Suicide Risk Behavior (scores were created based on items from youth interviews)

**Sub-population:** Youth ages 11 to 15 years at baseline who were reported and investigated as victims of maltreatment.

**Hypotheses:**

- (1) Risky behavior levels at baseline differ for males and females as do the factors associated with changes in risky behavior over 18 months.
- (2) Sexually abused youth engage in higher levels of risky sexual behavior at baseline and experience less improvement in risky sexual behavior over 18 months than youth experiencing other types of maltreatment.
- (3) Older youth exhibit higher levels of risky behavior at baseline than younger youth.

**Methods:** Chi-square and t statistics for hypotheses 1 to 3. Logistic regression using GEE to examine risky behavior changes in hypotheses 1 and 2.

---

The following sections provide a brief introduction to child welfare services, followed by information about problem behaviors and their association with maltreatment. Gender differences in problem behavior are considered next. The chapter concludes with a brief summary of some of the child, peer, and family characteristics often prevalent in the lives of maltreated children and youth and also associated with problem behavior.

### *Child Welfare Services*

Child welfare agencies in the U.S. collectively receive approximately 50,000 reports of child maltreatment weekly, but roughly one-third of all reports received are not served by child welfare agencies. Some cases are considered outside of the agency's realm of responsibility and are referred to other agencies. Other reports lack sufficient information for follow-up. Agency workload may also prohibit further attention to some cases (U.S. Department of Health and Human Services Administration for Children and Families, 2003).

Approximately two-thirds of maltreatment reports meet States' policies for requiring an investigation or assessment. Following the investigation or assessment, a case may be closed as *unsubstantiated* or opened and child welfare services provided to assure the safety of the child. When maltreatment is *substantiated*, a child may remain in the home and receive services or be placed out of the home. Services are usually based on an assessment of the family's strengths, weaknesses, and needs and may include individual counseling, case management, family-based services, in-home services, or foster care services (U.S. Department of Health and Human Services Administration for Children and Families, 2003). Out-of-home placements may be with a relative (*kinship foster care*), a non-relative (*non-kinship foster care*), or in a *residential* or *group home* facility.

Adolescents in the child welfare system are more likely than younger children in the system to be placed in group care, through child welfare auspices or under juvenile justice supervision (Stahl, Finnegan, & Kang, 2002; U.S. Department of Health and Human Services Administration for Children and Families, in press). Youth with serious problem behaviors are also more likely than less troubled youth to be placed in group care. Maltreated children and adolescents living in group homes exhibit a significantly greater proportion of problem behaviors than maltreated children and adolescents in all placements combined (in-home, kinship or non-kinship foster care, group care, and other out-of-home placement): 96% versus 40% for 6- to 10-year-olds and 80% versus 55% for 11- to 15-year-olds (U.S. Department of Health and Human Services Administration for Children and Families, in press). Because most persistent problem behaviors develop at an early age (Moffitt & Caspi, 2001), group care is unlikely to be the primary cause of serious problem behaviors though research does indicate that interventions that place antisocial youth together may have the effect of increasing rather than decreasing problems (Dishion & Andrews, 1995).

### *Problem Behaviors*

The occurrence of some behavior problems is not unusual in childhood. Problem behavior generally escalates in adolescence and, while many mature out of conduct problems, some youth persist in behaviors with increasing severity into adulthood. Conduct problems that begin in elementary school are more likely to continue past adolescence (Moffitt & Caspi, 2001). Also, as behaviors become more serious, so do consequences. A youth may suffer only minor repercussions for lying or running away, but the consequences of vandalism or acts of violence may result in harm to self or others, involvement with law enforcement and possibly the juvenile justice system. Once a youth becomes involved with

the juvenile justice system, odds greatly increase for reinvolvement (Widom, 1989). Only a small proportion of adolescents reach this level of seriousness, yet the numbers are sufficient to merit attention—for example, children were charged with delinquent offenses in almost 1.7 million dispositions in 2000, resulting in probation for 41% and secure confinement placement for 10% (Stahl et al., 2002). Additionally, children under 18 years accounted for 16% of arrests for violent offenses (murder, forcible rape, robbery, and aggravated assault) in 2003 (Federal Bureau of Investigation, 2004).

In addition to aggression and delinquency, other high-risk behaviors are also common in maltreated adolescents. Maltreated youth may be at greater risk of suicide because of the multiple traumas they have faced and can expect to face in the future (MacGowan, 2004b). Physical abuse has been associated with substance abuse and having a multiple sex partners (Newcomb, Locke, & Goodyear, 2003). These risky behaviors, similar to delinquency, have many negative repercussions including depression (Miller-Johnson et al., 1999), teen pregnancy or sexually transmitted infections (Franklin, 2004; Rounds, 2004), and violence (Office of Applied Studies - Substance Abuse and Mental Health Services Administration, 2002).

#### *Gender Differences in Problem Behavior*

Gender differences in problem behaviors, particularly aggressive behavior, are at least partially the result of socialization through parental influence, discipline, and relationship orientation mechanisms. Boys have reported expecting less negative self-evaluations and parental disapproval for aggressive behavior than females (Eron, 1992). In other research, female aggression was more likely to be ignored than male aggression, increasing the likelihood that the behavior would be extinguished in females due to a lack of reward

(Patterson, 2002). Additionally, parent- and peer-rated aggression was highly correlated for girls only: an indication of differential expectations for behaviors of boys and girls (Eron, 1992).

Differential expectations for boys and girls appear to influence parental discipline and child behavior as well. Boys are more likely than girls to be punished physically whereas girls are more likely to be punished psychologically through withdrawal of love (Eron, 1992; Herrenkohl, Egolf, & Herrenkohl, 1997). This physical versus psychological form of punishment may also be seen in the differing relationship goals and aggression of boys and girls. Boys tend to be more power oriented in their relationships than females and are also more physically aggressive. In contrast, girls tend to be more interpersonally oriented than boys are and also more relationally aggressive, damaging or manipulating relationships to cause harm rather than using physical means (Block, 1983; Crick & Grotpeter, 1995).

All of the gender differences mentioned—reinforcement for aggressive behavior in boys, physical versus relational aggression, power-orientation versus interpersonal-orientation in relationships—influence the behavior of children and adolescents to some extent. Self-reported delinquency levels are often similar for males and females, though males more frequently report aggressive types of behaviors (Liu & Kaplan, 1999).

Gender differences in the levels of risky sexual behavior and substance abuse are less noticeable than the different repercussions males and females may experience. Substance abuse is associated with risky sexual behavior for males and females, which may increase the odds of sexually transmitted infections (Bachanas et al., 2002) but only for females is child-bearing an issue. Teen pregnancy is associated with school drop-out and poverty for females (Hoffman, Foster, & Furstenberg, 1993). Regarding suicide, attempts are more common for

females while completed suicides tend to be more common for males (MacGowan, 2004a; Slap, Goodman, & Huang, 2001).

### *Factors Associated with Problem Behavior*

It is also likely that such internal differences between males and females will interact with characteristics within the child, family, peer, group, school, and community to influence problem behaviors. Estimates of problem behaviors in maltreated children and adolescents range from 37% to 45%, depending on the source of the report (parent or teacher)—over double the proportion of children and adolescents in the general U. S. population (U.S. Department of Health and Human Services Administration for Children and Families, in press). Although not all maltreated children and adolescents will become seriously aggressive or delinquent or engage in other risky behaviors, the multiple challenges facing them increase the likelihood of the development and maintenance of serious conduct problems. Some of the characteristics that are more prevalent in maltreated than non-maltreated children and youth include hyperactivity (Simmel, Brooks, Barth, & Hinshaw, 2001), low social skills (Manly, Cicchetti, & Barnett, 1994), low academic achievement (Kinard, 2001), rejection by peers (Bolger & Patterson, 2001), parental substance abuse (Kelleher, Chaffin, Hollenberg, & Fischer, 1994), and poverty (Drake & Pandey, 1996; Lee & Goerge, 1999). These characteristics are also more prevalent in children and adolescents who are exhibiting problem behaviors. They are discussed throughout the following chapters.

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CHAPTER II

AGGRESSION AND CHANGES IN MALTREATED ELEMENTARY SCHOOL-AGE  
CHILDREN:

THE INFLUENCE OF CHILD WELFARE SERVICES AND CHILD AND PARENT  
CHARACTERISTICS

Aggressive behavior in childhood is, to some extent, normative. As children learn to negotiate relationships with peers, particularly as they enter school, some aggression is inevitable. A small proportion of children will become progressively more physically aggressive and violent. Such children often exhibit aggression that begins early, one significant step on a pathway of antisocial behavior that starts with bullying and threatening others, escalates to fighting and gang violence, and ends with even more serious types of violence such as rape and murder (Loeber & Hay, 1997). This pathway appears to be more typical for males than females. Though only a small proportion of aggressive children will follow the pathway of escalation, interventions targeting aggressive behaviors are an important contributor to reducing the likelihood of related problems such as school failure, peer rejection, and parent-child conflict. Reducing serious aggression also increases the likelihood that children will have the opportunity to develop into contributing members of society.

Physical aggression, hereafter called *aggression*, is the focus of the current research because of the greater external consequences physical aggression may bring, compared to

non-physical types of aggression. These include harm to others, school suspension or expulsion, injury from altercations, and involvement with law enforcement agencies. Aggressive conduct problems include fighting and intimidating others. Non-aggressive conduct problems include lying, stealing, and property destruction. Though aggression is the focus of the current research, studies of aggression may also include children with non-aggressive conduct problems. *Externalizing behavior* is another term for aggressive and non-aggressive conduct problems that has entered the vernacular because of the widespread use of the Child Behavior Checklist (Achenbach, 1991). Both of these terms, conduct problems and externalizing behavior, are used in the current research to indicate overt behavior problems (aggressive and non-aggressive) when aggressive problem behavior was examined in combination with non-aggressive problem behavior.

Some maltreated children fare worse than others. What factors are associated with aggression in maltreated children? Which of these factors are associated with changes in aggression over time? Are there differences between maltreated girls and boys that indicate a need for gender-specific interventions for maltreated and aggressive children? The purpose of the current research is to begin to answer these questions with the intention that findings be used to inform policy and practice decisions as well as directions for future research concerning maltreated children and youth.

### *Aggression and Child Maltreatment*

Maltreated children are particularly prone to aggressive behavior. National estimates indicate that approximately 22% of maltreated 6- to 10-year-olds exhibit clinical/borderline levels of aggressive behavior as measured on the CBCL, more than four times the proportion of children in the general U. S. population (Wall, 2004). Maltreated children also exhibited

more aggressive behavior than their non-maltreated peers at a summer day camp for economically disadvantaged children according to camp counselor and peer report (Manly, Kim, Rogosch, & Cicchetti, 2001). Similarly, children and adolescents are more likely to rate their physically abused peers as fighting more frequently than other classmates (Salzinger et al., 2002).

Social learning theory provides a clear explanation for aggressive behavior and predicts that aggression would be greater for children exposed to physical aggression and abuse by their parents. The modeling influence of aggression is evident from studies that link the aggressive behavior of children with a history of physical abuse (Fishbein & Pérez, 2000). Yet types of maltreatment other than physical abuse sometimes figure prominently in studies of aggression in elementary school-age children. For example, aggression was more common in maltreated children than non-maltreated children at a summer camp for low income children, but differences in aggression by maltreatment type were only found for camp counselor reports, not peer reports, and only for sexual abuse. More severe sexual abuse was associated with lower camp counselor reported aggression (Manly et al., 2001). Dodge and colleagues (1990) found that physically abused 5-year-olds were much more likely to be aggressive six months later—as reported by peers, teacher, and observation—than non-physically abused children. Other types of maltreatment were not examined. Examining two types of neglect in first and fifth graders, failure to provide was associated with aggression at baseline and five years later whereas failure to supervise was not (Knutson, DeGarmo, & Reid, 2004).

### *Aggression and Child and Caregiver Characteristics*

Though maltreatment may increase the likelihood that a youth will behave aggressively, other child- and caregiver-related characteristics also interact to influence behavioral outcomes. For example, fighting is more prevalent in elementary school-age males with any of the following problems compared to males who do not experience any of these problems—hyperactivity-impulsivity-attention problems, low academic achievement, parental substance abuse, paternal behavior problems, and low socioeconomic status (Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998). Next discussed are characteristics of children and caregivers that are associated with aggression. Gender differences in these characteristics and associations with aggression are also discussed.

Various child characteristics tend to be more prominent in aggressive than non-aggressive children. Low academic achievement tends to be more typical of aggressive children (Fleming, Harachi, Cortes, Abbott, & Catalano, 2004). Low social skills, such as misinterpreting social cues and reacting aggressively are also fairly prevalent in aggressive children (Dodge, Bates, & Pettit, 1990). Similarly, children exhibiting hyperactivity-impulsivity-attention problems are more likely to be involved in physical fights (Loeber et al., 1998). Adolescents are more inclined toward depression than elementary school-age children but pre-pubertal onset of depression tends to be more severe, difficult to treat, and associated with increased risk of developing future problems such as bipolar and manic symptoms (Jellinek & Snyder, 1998). Depressed children are apt to be more frequently disliked by peers than non-depressed children and this peer dislike is often followed by subsequent aggressive behavior (MacKinnon-Lewis & Lofquist, 1996). Even when peers reject a child during only one year of school, aggressive behavior increases. Children ages 6

to 8 years who were rejected by peers in first or second grade exhibited significantly more aggressive behavior, almost four times greater, than children never rejected did (Dodge et al., 2003).

Several characteristics of parents are also associated with childhood aggression, including domestic violence, parent criminality, parental substance abuse, and poverty. Although the association between exposure to domestic violence and child conduct problems is well-documented (e.g., McCloskey, Figueredo, & Koss, 1995; Sternberg et al., 1993), less information is available about solely aggressive behavior in elementary school-age children. The most frequently used measure of child behavior in the domestic violence literature is the Child Behavior Checklist (Achenbach, 1991). When the CBCL is used, most typically the Total or Externalizing score is used, which does not isolate aggressive behavior (e.g., Mohr, Lutz, Fantuzzo, & Perry, 2000). Parental criminality such as a history of arrest is often more prevalent in the lives of aggressive than non-aggressive children (Maughan, Pickles, Rowe, Costello, & Angold, 2000). Other parental antisocial behavior such as parental substance abuse is also more prevalent among aggressive than non-aggressive children (Wilens, Biederman, Kiely, Bredin, & Spencer, 1995). Children living in poverty also frequently exhibit more conduct problems than children not living in poverty (McLeod & Shanahan, 1993).

The literature is generally consistent regarding gender differences in aggression. Males have a tendency to be more aggressive than females (Crick & Grotpeter, 1995; Crick et al., 1998). Alternately, gender differences in the characteristics associated with aggression are not as clear, with the exception of hyperactivity-impulsivity-attention (HIA) problems and depression. HIA problems are often more common in males (American Psychiatric

Association, 2000). There is some indication that depression is higher for males pre-puberty but higher for females beginning in mid-puberty (Angold & Costello, 1998).

Maltreatment does not destine a child to aggressive behavior, nor does the presence of one child- or parent-related issue. Alternately, when several problems compound—for example, low social skills, peer rejection, parental substance abuse, poverty—the likelihood of childhood aggression increases. Many settings affect children as they interact with people within their families, schools, and peer groups. All of these systems affect children to a greater or lesser extent. There are also characteristics inherent in childhood and adolescence that influence how children of this age deal with and perceive the world. Children who are experiencing multiple problems simultaneously have greater odds of aggression than peers who are experiencing fewer problems. In research from the Seattle Social Development Project (Herrenkohl et al., 2000), child characteristics such as hyperactivity and peer delinquency at age 10 doubled the odds of violence at age 18. When 10-year-olds experienced greater than five risks, these children had over ten times the odds of peers who experienced no risk at age 10 of being violent at age 18. High cumulative risk at ages 14 or 16 years also increased the odds of violence at age 18. The influence of cumulative risk on the aggressive behavior of maltreated elementary school-age children has not been examined, to the knowledge of this author.

### *Aggression and Child Welfare Services*

Although child welfare services are intended, primarily, to ensure the safety of children from victimization by others, they are also expected to promote the more general well-being of children so that they may grow into independent and contributing members of society (Pecora, Whittaker, Maluccio, Barth, & Plotnick, 2000). Reducing aggression is an

important sub-goal in light of the high rates of subsequent involvement of maltreated children in juvenile and adult corrections (Stouthamer-Loeber, Loeber, Homish, & Wei, 2001; Thornberry, Ireland, & Smith, 2001; Widom, 1996). Limited research is available on the role of child welfare services in reducing aggressive behavior in maltreated children. In addition, even less is known about the impact of child welfare services involvement on aggressive behavior for children remaining at home versus removal and placement into out-of-home care. The research that does examine the problem behaviors of maltreated children remaining in the home usually examines adolescents rather than elementary school-age children (Jonson-Reid, 2002; Ryan & Testa, 2004). Because nearly 90% of children who receive an investigation for an alleged maltreatment report will subsequently remain at home, understanding how they fare under these conditions is critical to understanding how maltreated children fare following report of their maltreatment.

### *Hypotheses*

Hypotheses developed for the current research follow: (1) physically abused children are more aggressive than children who experience other types of maltreatment; (2) child characteristics—low academic achievement, low social skills, HIA problems, peer rejection—are associated with higher aggression at baseline and less improvement in aggressive behavior over 18 months; (3) caregiver characteristics—domestic violence, arrest, substance abuse, poverty—are associated with higher aggression at baseline and less improvement in aggressive behavior over 18 months; (4) higher cumulative risk is associated with higher aggression at baseline and less improvement in aggression over 18 months; (5) males are more aggressive than females; (6) meaningful variation exists by gender for child

and caregiver characteristics associated with aggressive behavior at baseline; and (7) factors associated with change in aggression over 18 months vary by gender.

## Methods

Data are from the National Survey of Child and Adolescent Well-being (NSCAW), the first national longitudinal probability study of child welfare to collect extensive data from children, caregivers, teachers, and child welfare workers. The NSCAW sample was generated from a two-stage stratified sampling design intended to maximize the precision of estimates related to children in the child welfare system. A total of 40 states were selected and 36 agreed to participate in NSCAW and were divided into nine strata. From these strata, primary sampling units (PSUs) were randomly selected. PSUs were defined as a geographic area encompassing the population served by a child welfare agency, usually a county, but in a few cases two or three contiguous counties were grouped to form a single PSU. Children were then randomly selected from PSUs monthly over 16 months, from September 1999 through December 2000. All children who had gone through the formal investigation or assessment that followed report of child abuse or neglect were eligible for selection. Stratification at the child-level was also conducted. Infants (less than one year), children receiving in-home child welfare services, children receiving out-of-home services, and sexually abused children were over-sampled. Substantiated and unsubstantiated cases were included, providing the opportunity to examine children and families who did and did not receive child welfare intervention after an investigation of child maltreatment (NSCAW Research Group, 2002).

Once the frame was selected, field interviewers obtained contact information from the child welfare agency and approached the family to introduce the study and secure consent to

participate. Only children aged 6 to 10 years at the time of the initial interview (baseline) were included in the current research. Data are from the baseline and 18-month interviews.

### *Measures*

A brief description of measures is next, including internal consistency as indicated by Cronbach's alpha for baseline measures. (For more information on NSCAW refer to [http://www.acf.dhhs.gov/programs/core/ongoing\\_research/afc/wellbeing\\_intro.html](http://www.acf.dhhs.gov/programs/core/ongoing_research/afc/wellbeing_intro.html), the Administration for Children and Families website.)

*Aggression.* The Child Behavior Checklist (CBCL) Aggressive Behavior T score was used to measure caregiver-reported behaviors such as arguing, bullying, destroying property, and fighting in the six months prior to the baseline and 18-month interviews. Problematic levels of behavior were defined by the cutpoints established in the CBCL manual (Achenbach, 1991) as borderline/clinical ( $T \geq 67$ ). Internal consistency in the current sample is high ( $\alpha = .92$ ).

*Child and family demographics.* Child demographics measured included gender, age, and race/ethnicity. *Gender* was defined as male or female. *Age* was defined as the child's age in years at the time of the initial interview. *Race and ethnicity* were collapsed into Black/Non-Hispanic/Latino, White/Non-Hispanic/Latino, Hispanic, and Other race/ethnicity. Ethnicity was considered before race; consequently, children identified as Hispanic/Latino were classified as such regardless of their race and children who identified as non-Hispanic/Latino were classified by their race (i.e., Black, White, or Other).

*Maltreatment.* Maltreatment information reported by the child welfare worker, using a slight modification of the Maltreatment Classification System (Manly, Cicchetti, & Barnett, 1994), was utilized to determine the most serious *maltreatment type* alleged in the current

report. Maltreatment types were physical abuse, sexual abuse, neglect-failure to provide, neglect-failure to supervise, and other. The other maltreatment type category included emotional maltreatment, moral/legal maltreatment, educational maltreatment, and exploitation.

Information about *re-reports* (i.e., new instances of maltreatment) was collected from child welfare workers at 12 and 18 months. The question asked at each time point is “Have there been any new reports of abuse or neglect involving this child since [the last interview]?”

*Child welfare services.* Child welfare services setting at baseline was defined as remaining in the home and receiving no child welfare services (In-Home No CWS) or living in the home and receiving child welfare services (In-Home CWS). Child welfare services over 18 months were defined as In-Home (In-Home No CWS or CWS at baseline and 18 months and lived in out-of-home care for less than 5% of the 18-month period), Out-of-home (OOH: living in non-kinship foster care, kinship foster care, group care, or other out-of-home placement at baseline and 18 months and lived in out-of-home care for greater than 95% of the 18-month period), or Mixed type (all others—children who remained in-home at both waves but lived in out-of-home care for greater than 5% of time, children who lived in out-of-home care at both waves but spent less than 95% of time in out-of-home care, children living in-home at baseline and out-of-home at 18 months, and children living in out-of-home care at baseline and in-home at 18 months). A child’s *prior history of child welfare services* was determined by the child welfare worker’s answer at baseline to the question, “Was there any prior child welfare services history, not including investigations?”

*Child characteristics.* Child characteristics, measured at baseline and 18 months, were academic achievement, social skills, depression, hyperactivity-impulsivity-attention (HIA) problems, and peer rejection. *Academic achievement* was measured using the Mini-Battery of Achievement (Woodcock, McGrew, & Werder, 1994). The mean of standardized Reading and Math scores (mean = 100, standard deviation = 15) was used, with academic achievement defined as Low (< 85, greater than one standard deviation below mean), Average (85 to 115, within one standard deviation of mean), or High (>115, greater than one standard deviation above mean), resulting in good internal consistency in the sample ( $\alpha = .81$ ). *Social skills* were measured with standardized scores (mean = 100, standard deviation = 15) on the Social Skills Rating System (SSRS) caregiver report (Gresham & Elliott, 1990). Social skills, like achievement, were defined as Low (< 85), Average (85 to 115), or High (>115) with internal consistency high in the current sample ( $\alpha = .88$ ). *Depression* and *HIA problems* were measured using the CBCL (Achenbach, 1991) Anxious/Depressed and Attention Problems T scores. T scores are classified as normal ( $T < 67$ ) or borderline/clinical score ( $T \geq 67$ ). Internal consistency in the current sample is high for Depression ( $\alpha = .84$ ) and HIA Problems ( $\alpha = .82$ ). *Peer rejection* was measured by self-report using a slight modification of the Peer Loneliness and Social Dissatisfaction Scale, PLSD (Asher & Wheeler, 1985) that asks about such things as making friends and having children to play with at school. Internal consistency in the current sample is good for both age groups ( $\alpha = .77$  for 6- and 7-year-olds;  $\alpha = .82$  for 8- to 10-year-olds). Because of the different measure ranges for each age group, z scores (mean = 0, standard deviation = 1) were calculated. Children were described as Rejected (greater than one standard deviation above the mean) or Not Rejected (less than one standard deviation above the mean).

*Caregiver characteristics.* Domestic violence, parental arrest, parent substance abuse, and poverty were measured at baseline. *Domestic violence* was measured using the Conflict Tactics Scale 1, CTS1 (Straus, 1979), and two items from the risk assessment section the child welfare worker interview. The CTS1 provided caregiver-report of domestic violence in the twelve months prior to the baseline interview. Items include being pushed, grabbed, slapped, choked, beaten, and threatened with a knife or gun. Child welfare workers were asked, “Was there a history of domestic violence against the caregiver?” and “At the time of the investigation was there active domestic violence?” Domestic violence was coded as “yes” if answers to any of the CTS1 items or either of the two child welfare worker questions were affirmative. *Parental arrest* was indicated by an answer of “yes” to either a question from caregiver interview, “Have you ever been arrested for any offense?” or a question from the child welfare worker interview, “Does [the primary caregiver] have a recent history of arrests or detention in jail or prison?” *Parental substance abuse* was measured by caregiver report using the Composite International Diagnostic Interview Short Form, CIDI-SF (Walters, Kessler, Nelson, & Mroczek, 2002), and several other items from caregiver and child welfare worker interviews. Presence of substance abuse was indicated if: (1) the caregiver’s CIDI score indicated alcohol dependency or that the parent had used any illicit drugs in the past 12 months; (2) the child welfare worker reported that the primary or secondary caregiver was using alcohol or drugs at the time of the investigation; or (3) the primary caregiver indicated the need for treatment of an alcohol or drug problem (three items). *Poverty* was defined by the poverty level of the family with whom the child was living at the time of the interview. Poverty level was calculated based on procedures followed by the U.S. Census Bureau (Dalaker, 2001), which includes both the family’s

income level and the number of adults and children in the household. A family was defined as living in poverty if the family was living at less than 100% of poverty (i.e., below the poverty line). Families living at or above 100% of poverty who were reported by child welfare workers as having “trouble paying for basic necessities such as food, shelter, clothing, electricity, or heat” at the time of the investigation were also considered to be living in poverty.

*Cumulative risk.* A cumulative risk score was created by summing the number of child and caregiver characteristics at baseline that constituted a risk for aggression—low achievement, low social skills, depression, HIA problems, peer rejection, domestic violence, parental arrest, parental substance abuse, and living in poverty. Scores ranged from 0 to 9.

### *Analyses*

Data were analyzed with SAS - callable SUDAAN® version 8.02 (Research Triangle Institute, 2002) to adjust the standard errors, account for the clustering and stratification in the sampling design, and allow for inferences about the population of children investigated as victims of child maltreatment in the U.S. Weighted data with the unweighted sample size are presented. Bivariate descriptive analyses were performed using chi-square and t statistics to assess associations at baseline for hypotheses 1 to 6. Following descriptive analyses of the sample at baseline, multivariate analyses of aggressive behavior changes over 18 months were conducted with linear regression using generalized estimating equations (GEE) to address multivariate aspects of hypotheses 1, 3, 4, and 7. The central feature of longitudinal analyses is the ability to study change directly through repeated observations of individuals. With such repeated measures, the problem of autocorrelation between observations for each individual arises as well as the autocorrelation of subjects within the same PSU. Traditional

methods, such as ordinary least squares (OLS) regression, render inaccurate estimates with longitudinal data—the OLS assumption that observations are independent of one another is violated in longitudinal data because of the nesting of measures within subjects and subjects within PSUs. GEE is a marginal approach model that corrects for these autocorrelations (Diggle, Heagerty, Liang, & Zeger, 2002).

SUDAAN was the software chosen because, in addition to utilizing GEE, this software can handle the complex sampling design and the sample weights. The standard error estimates that are typically produced by software packages such as SAS and SPSS assume simple random sampling, resulting in underestimates of standard errors when used with complex datasets such as NSCAW, which leads to biased estimates. SUDAAN uses Taylor series linearization and GEE for estimating standard errors, accounting for NSCAW's design complexity, including unequal weighting, stratification, and clustering of observations (U.S. Department of Health and Human Services Administration for Children and Families, 2004). In the current study, baseline weights were employed for baseline observations and 18-month weights were employed for 18-month observations. For further explanation of weighting choices across waves, refer to the NSCAW 18-month report (U.S. Department of Health and Human Services Administration for Children and Families, in press-b).

Weights were calculated for subjects at each wave with the purpose being to obtain unbiased estimates of means, proportions, regression coefficients, etc. in addition to allowing for inferences to children reported as victims of maltreatment nationally. Sample weights were constructed in stages, with adjustments made due to missing months of sample frame data or types of children (e.g., unsubstantiated cases, children not receiving child welfare services), non-response, and undercoverage (Dowd et al., 2003). Consequently, sample

weights must always be used to obtain unbiased estimates of the population parameters (U.S. Department of Health and Human Services Administration for Children and Families, 2004).

Though many variables were of interest, including all variables in the model often resulted in estimation problems because some cell sizes were 0 and the models would not run. Therefore, a multistage approach was used. Separate correlation matrices (not shown) were produced for males and females to inform decisions about variables to be included in multivariate models. Variables highly correlated (i.e.,  $r \geq .60$ ) with aggressive behavior were omitted from multivariate models (HIA problems for males and females). Other variables were excluded from models because of high correlations ( $r > .50$ ) between independent measures (social skills and parental substance abuse were omitted for females because of high correlation with cumulative risk,  $r = -.54$  and  $r = -.52$ , respectively).

Next, preliminary multivariate models were run. (In all multivariate models, interaction terms were created, interacting wave with each variable, to measure aggressive behavior change from baseline to 18 months.) The first model included age, race/ethnicity, maltreatment variables (type and re-reports), child welfare services variables (setting over 18 months and prior child welfare services history), and child characteristics—main effects and wave interactions. F statistics for child interactions significant at  $p < .20$  from the first model were maintained to be entered, along with main effects, in the final model. (A significance level of  $p < .20$  was used in preliminary models to prevent exclusion of variables that might play an important role in final models.) Then a similar process was followed for the next preliminary model, including main effects and wave interactions for caregiver characteristics rather than for child characteristics. A final regression was conducted including main effects and significant interactions from the first and second models along with child welfare

services and child maltreatment variables, age, and race/ethnicity. This process was followed for males and females. In addition to the unstandardized betas ( $b$ ), baseline and 18-month marginal mean aggressive behavior scores were obtained for categories within each variable (e.g., new maltreatment report and no new maltreatment report) conditioned on all other variables in the model. These baseline and 18-month marginal means (population estimates) are presented and discussed only for significant findings. Interpretation of  $b$  is as follows: the difference in change between two groups. For example, in Table 2-3,  $b = 8.73$  which is the difference in change between males with no new maltreatment report ( $-.82$ ) and males with a new maltreatment report ( $7.91$ ).

## Results

A full description of the final sample, including issues of missing data and subject attrition, precedes the presentation of findings related to variation in baseline levels of aggression by demographics, child maltreatment, child welfare services, and child and caregiver characteristics. Multivariate findings of aggressive behavior change over 18 months follow.

### *Sample Description*

The initial sample frame included all children at baseline who were aged 6 to 10 years, reported and investigated as victims of maltreatment, and living at home. This original sample of 1202 in-home 6- to 10-year-olds was reduced to 808 (67% of sample) due to missing data and subject attrition. Children excluded from the final sample were those with missing data for (1) aggressive behavior measures at both waves; (2) both waves for any child or caregiver characteristics included in final models; or (3) child welfare services variables, maltreatment type, re-report information at both waves, race/ethnicity, or age.

Response bias analyses in the total NSCAW sample were conducted to determine the extent of differences between responders and non-responders to the 18-month interviews. Subjects were compared on approximately 40 variables.<sup>1</sup> Differences, once identified, were accounted for in the sample weights with a final bias of  $\leq 4\%$  in all cases (Dowd et al., 2003). To examine possible bias due to missing data specific to the current study, baseline data ( $n = 722^2$ ) for the final sample of children were compared to baseline data for youth excluded from final sample ( $n=480$ ). Children in the final sample had higher scores than the excluded children for aggression, HIA problems, and cumulative risk at baseline—aggression: 59.3 versus 57.0 ( $t = 2.45, p < .05$ ), HIA problems: 59.5 versus 57.7 ( $t = 2.01, p < .05$ ), and cumulative risk: 2.8 versus 2.4 ( $t = 2.67, p < .01$ ). Children in the final sample were also significantly more likely than children in the excluded group to have a parent with an arrest history (36% versus 24%— $\chi^2 = 8.43, p < .01$ ). All remaining analyses focus on the final sample.

The final sample of 808 children averaged 8.02 years of age and 48% were female. The racial/ethnic breakdown was approximately 25% Black, 50% White, 17% Hispanic, and 8% other racial/ethnic groups. Breakdown for the most serious type of maltreatment reported was approximately 30% physical abuse, 13% sexual abuse, 19% neglect-failure to provide, 27% neglect-failure to supervise, and 11% other maltreatment types. Twenty-seven percent of children had a prior child welfare services history. At baseline, 20% of children remained in the home and were receiving child welfare services while 80% remained in the home and

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<sup>1</sup> These were crucial variables from baseline that were also considered for use in the 18-month weighting response adjustment, including sampling strata, sampling domains, gender, race, age, CWS status, maltreatment type, type of insurance coverage, overall health status of the child, and urbanicity and size of the PSU.

<sup>2</sup> Final sample size at baseline ( $n = 722$ ) is smaller than final sample size in multivariate models ( $n = 808$ ) because some children were missing data at baseline but not 18 months.

were not receiving services. By 18 months, 6% of these children had spent some time in out-of-home care. Males and females were similar across age, race/ethnicity, maltreatment type, and child welfare services characteristics.

Table 2-1 presents univariate statistics by gender. Parents reported levels of child aggression, HIA problems, and depression within the normative range ( $T < 67$ ) but higher than the mean of  $T = 50$  (Achenbach, 1991). Similarly, social skills and academic achievement were in the average range but lower than the mean (100). Peer rejection was low. Past or present domestic violence was indicated for 43% of caregivers. Thirty-six percent of primary caregivers had a recent history of arrest. Substance abuse was evident for 30% of caregivers. Approximately 60% of children were living in poverty. Males and females were similar across all measures with the exception of depression. Caregivers reported significantly higher levels of depression for males than females ( $t = 2.21, p < .05$ ).

Table 2-1

Univariate Statistics by Gender at Baseline

Baseline Measures	Total		Males		Females	
	Mean	SE	Mean	SE	Mean	SE
Aggressive Behavior	59.3	.7	60.1	1.0	58.5	.9
Cumulative Risk	2.8	.1	2.9	.2	2.7	.1
<u>Child Characteristics</u>						
Academic Achievement	96.8	1.2	95.8	1.6	98.1	1.7
Social Skills	91.4	1.0	92.7	1.5	90.1	1.4
HIA Problems	59.5	.6	60.0	.8	58.9	.8
Depression*	56.6	.5	57.7	.8	55.4	.7
Peer Rejection	.1	.1	.1	.1	.1	.1
<u>Caregiver Characteristics<sup>a</sup></u>						
Domestic Violence	43.0	4.2	42.4	4.5	43.7	6.0
Arrest	36.0	2.7	34.8	4.5	37.2	4.9
Substance Abuse	30.3	2.9	34.3	3.9	26.0	4.3
Poverty	59.6	3.7	57.7	6.3	61.7	5.0

\*  $p \leq .05$

<sup>a</sup> Data are in Percent rather than Means.

NOTE: Unweighted sample size ranges from 349 to 360 for males and from 325 to 362 for females due to varied levels of missingness at baseline.

### *Baseline Level of Aggression by Child Welfare Services Setting and Maltreatment*

For males, aggression at the time of the initial interview differed by maltreatment type but not child welfare services. Males with a most serious maltreatment type of failure to provide had significantly higher CBCL scores at baseline (63.4) than males with a most serious maltreatment type of sexual abuse (56.6;  $t = 3.05, p < .01$ ), failure to supervise (59.0;  $t = 2.46, p < .05$ ), or other (57.3;  $t = 3.18, p < .01$ ).

Similarly, for females, aggressive behavior at baseline differed by maltreatment type only, not child welfare services. Contrary to differences for males, females with a most serious maltreatment type of failure to provide had significantly lower aggression scores at baseline (55.8) compared to females with a most serious maltreatment type of sexual abuse (61.7;  $t = -2.34, p < .05$ ) or other (61.3;  $t = -2.60, p < .05$ ). Level of aggression for physically abused children, males and females, did not differ significantly from the aggression of children who experienced any of the other types of maltreatment.

### *Baseline Level of Aggression by Child and Caregiver Characteristics*

Aggression at the time of the initial interview varied by HIA problems, social skills, and depression for males and females (Table 2-2). Males with HIA problems had significantly higher aggression scores than males without HIA problems ( $t = 5.05, p < .001$ ). Males with low social skills exhibited significantly ( $p < .001$ ) more aggression than males with average or high social skills ( $t = 4.49$  and  $t = 7.60$ , respectively). Males with average levels of social skills were also more aggressive than males with high social skills ( $t = 5.92, p < .001$ ). Depression was also significantly associated with higher levels of aggression ( $t = 3.51, p < .001$ ).

Similarly, females with HIA problems were significantly more aggressive than females without HIA problems:  $t = 6.86, p < .001$  (Table 2-2). As aggressive behavior increased, social skills decreased. Females with low social skills had significantly ( $p < .001$ ) higher aggression scores than females with average or high social skills ( $t = 3.42$  and  $t = 8.86$ , respectively). Additionally, females with average social skills were more aggressive than females with high social skills ( $t = 4.56, p < .001$ ). Depressed females were more aggressive than non-depressed females ( $t = 6.12, p < .001$ ). Aggressive behavior at baseline did not vary by academic achievement, peer rejection, domestic violence, parental arrest, parental substance abuse, or poverty for males or females.

Higher levels of cumulative risk at baseline were associated with higher levels of aggression at baseline for males and females (Table 2-2). Males with high cumulative risk

Table 2-2

Aggressive Behavior by Child and Caregiver Factors at Baseline by Gender

	CBCL Aggressive Behavior T Score	
	Males	Females
	Mean (SE)	
HIA Problems		
Normal	56.3 (.8)***	56.2 (.8)***
Borderline/Clinical	68.4 (2.3)	69.1 (1.7)
Social Skills		
Low	66.9 (2.0) <sup>ab***</sup>	62.2 (1.2) <sup>ab***</sup>
Average	57.7 (1.0) <sup>c***</sup>	56.2 (1.0) <sup>c***</sup>
High	50.9 (.6)	50.7 (.5)
Depression		
Normal	58.2 (1.2)***	57.4 (.9)***
Borderline/Clinical	70.2 (3.2)	71.8 (2.1)
Cumulative Risk		
None	50.5 (.3) <sup>def***</sup>	52.6 (1.2) <sup>f***</sup>
Low (1 – 2 risks)	56.5 (1.5) <sup>g*</sup>	57.3 (1.1) <sup>dh**</sup>
Medium (3 – 4 risks)	61.5 (1.6) <sup>i*</sup>	58.7 (1.8) <sup>e**</sup>
High (5 – 9 risks)	68.3 (2.6) <sup>h***</sup>	65.2 (1.8) <sup>i*</sup>

\* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$

Unweighted n ranges from 349 to 360 for males and from 325 to 362 for females

CBCL Aggressive Behavior scores are classified as Normal ( $< 67$ ), Borderline ( $67 - 70$ ), or Clinical ( $> 70$ )

<sup>a</sup>Low > High <sup>b</sup>Low > Average <sup>c</sup>Average > High <sup>d</sup>No < Low <sup>e</sup>Now < Medium <sup>f</sup>No < High <sup>g</sup>Low < Medium <sup>h</sup>Low < High <sup>i</sup>Medium < High

scores exhibited significantly higher levels of aggression than males with medium ( $t = 2.10$ ,  $p < .05$ ), low ( $t = 3.93$ ,  $p < .001$ ), or no ( $t = 6.91$ ,  $p < .001$ ) cumulative risk. Males with medium cumulative risk scores were significantly more aggressive than males with low ( $t = 2.17$ ,  $p < .05$ ) or no ( $t = 6.73$ ,  $p < .001$ ) cumulative risk. Males with low levels of cumulative risk also exhibited higher levels of risk than males with no cumulative risk ( $t = 3.63$ ,  $p < .001$ ).

The association between cumulative risk and aggression at baseline for females followed a similar pattern with one exception: level of aggression did not differ between low and medium levels of cumulative risk. Females who experienced 5 to 9 risk factors at baseline had significantly higher aggression scores than females experiencing lower levels of risk: medium ( $t = 2.47$ ,  $p < .05$ ), low ( $t = 3.28$ ,  $p < .01$ ), and none ( $t = 5.64$ ,  $p < .001$ ). Similarly, females who experienced 3 to 4 or 1 to 2 risk factors at baseline were significantly ( $p < .01$ ) more aggressive than females who experienced no cumulative risk ( $t = 2.90$  and  $t = 2.88$ , respectively).

#### *Changes in Aggression Over 18 Months*

Aggression increased less than 1% over 18 months, from 58.0 to 58.4 for males (Table 2-3). Changes in aggressive behavior over 18 months varied by race/ethnicity, re-abuse, academic achievement, and cumulative risk for males. Though changes in aggression varied by racial/ethnic group, only the difference between White and Black males trended toward significance ( $b = -3.09$ ,  $p < .10$ ). This represented a 3.09 point difference which was comprised of an average increase in aggressive behavior of Black males of 1.98 points and a decrease of 1.11 points for White males. A new maltreatment report during the 18-months study period was also a significant indicator of differences in aggressive behavior change ( $b$

= 8.73,  $p < .01$ ). Aggressive behavior increased 14.3% for males with a new report while increasing only slightly for males with no new report of maltreatment at 12- or 18-months.

Table 2-3

Factors Predicting Changes in Aggressive Behavior over 18 Months for Males

Predictor Variables ( <i>Reference group</i> )	b	F	Significant Predicted Marginals			
			BL	18 mos	Change Score	% Change
Intercept	79.32					
Model minus intercept (df)		25.75 (34)***				
CWS ( <i>In Home</i> ) x Wave ( <i>Baseline</i> )		.11				
Mixed Type	.81					
Previous CWS History ( <i>No</i> ) x Wave ( <i>Baseline</i> )		1.45				
Yes	1.99					
Age in Years at Baseline x Wave ( <i>Baseline</i> )	.28	.33				
Race/Ethnicity ( <i>White</i> ) x Wave ( <i>Baseline</i> )		2.58*	59.20	58.09	-1.11	-1.9
Black	-3.09 <sup>†</sup>		57.66	59.64	1.98	3.4
Hispanic	-3.53		56.19	54.64	-1.55	-2.8
Other racial/ethnic group	-3.32		60.29	58.94	-1.35	-2.2
Maltreatment ( <i>Physical</i> ) x Wave ( <i>Baseline</i> )		1.25				
Sexual	-.38					
Failure to provide	-2.37					
Failure to supervise	-2.63					
Other maltreatment type	2.82					
New maltreatment report ( <i>No</i> ) x Wave ( <i>Baseline</i> )		10.17**	58.38	57.56	-.82	-1.4
Yes	8.73**		55.42	63.33	7.91	14.3
Social Skills x Wave ( <i>Baseline</i> )	.05	.72				
Academic Achievement x Wave ( <i>Baseline</i> )	-.11*	5.21*				

Low			52.92	59.93	7.01	13.2
Average			59.18	57.89	-1.29	-2.2
High			59.54	59.77	0.23	.4
Parental Substance Abuse ( <i>No</i> ) x Wave ( <i>Baseline</i> )		1.20				
Yes		1.68				
Poverty ( <i>No</i> ) x Wave ( <i>Baseline</i> )		.64				
Yes		1.53				
Cumulative Risk Score x Wave ( <i>Baseline</i> )	-1.82*	4.02*				
None			52.15	55.68	3.53	6.8
Low (1 – 2 risks)			57.63	57.27	-.36	-.6
Medium (3 – 4 risks)			60.65	59.54	-1.11	-1.8
High (5 – 9 risks)			65.87	64.75	-1.12	-1.7
Aggression controlling for all variables in the model			57.96	58.38	.42	.7

\* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$  <sup>t</sup>  $.05 < p < .10$  Unweighted  $n = 403$ ,  $R^2 = .46$   
 CBCL Aggressive Behavior scores are classified as Normal ( $< 67$ ), Borderline ( $67 - 70$ ), or Clinical ( $> 70$ )  
 Caregiver rater variable was included in all models to control for different caregivers at baseline and 18 months but is not presented. Main effects were included in models but are not presented.

Academic achievement also indicated differences in aggression change ( $b = -.11$ ,  $p < .05$ ). To probe this association, an identical model with achievement levels was run to obtain baseline and 18-month estimates of aggression by achievement level. Aggression increased 13.2% for low achieving males (to 59.9), while decreasing 2.2% for males at average levels of academic achievement (to 57.9), and remaining fairly stable for high achieving males (to 59.8). Cumulative risk at baseline was also associated with variation in aggressive behavior change ( $b = -1.82$ ,  $p < .05$ ). Probing this association by classifying risk into four categories, baseline and 18-month means indicate aggression increased only for males who experienced no cumulative risk (from 52.3 to 55.7), while decreasing slightly for males who experienced a greater number of risks at baseline—for example, from 65.9 to 64.8 for males experiencing high cumulative risk.

Aggression increased more for females than males over 18 months—3.4% more for females, from 56.4 at baseline to 58.4 at 18 months (Table 2-4). Changes in aggression also varied by age, maltreatment type, poverty status, and cumulative baseline risk. Age, examined continuously, varied with aggression changes ( $b = 1.02, p < .05$ ). Age was categorized in an identical model to obtain the baseline and 18-month aggression scores by age group. Aggressive behavior increased most (10.6%) for 10-year-olds, followed by 7-year-olds (4.4%).

Changes in aggressive behavior over 18 months were significantly different for females with a most serious maltreatment type of physical abuse compared to sexual abuse ( $b = 4.33, p < .05$ ), failure to provide ( $b = 3.82, p < .01$ ), and failure to supervise ( $b = 6.19, p < .001$ ). Aggression decreased 1.43 points (2.5%) over 18 months for physically abused females while increasing for females who experienced any of these other specific types of maltreatment, most noticeably failure to supervise—aggression increased 8.6% for these girls. The difference in aggressive behavior change was also significant by poverty status ( $b = 5.79, p < .01$ ). Living above poverty at baseline or 18 months was associated with a

Table 2-4

Factors Predicting Changes in Aggressive Behavior over 18 Months for Females

Predictor Variables ( <i>Reference group</i> )	b	F	BL	Significant Predicted Marginals		
				18 mos	Change Score	% Change
Intercept	63.58					
Model minus intercept (df)		10.31 (32)***				
CWS ( <i>In Home</i> ) x Wave ( <i>Baseline</i> )		0.00				

Mixed Type	.06					
Previous CWS History ( <i>No</i> ) x Wave ( <i>Baseline</i> )		.01				
Yes		-.16				
Age in Years at Baseline x Wave ( <i>Baseline</i> )	1.02*	5.61*				
6 years			59.41	59.70	.29	0.5
7 years			56.49	58.95	2.46	4.4
8 years			54.93	55.80	.87	1.6
9 years			56.56	57.75	1.19	2.1
10 years			54.53	60.29	5.76	10.6
Race/Ethnicity ( <i>White</i> ) x Wave ( <i>Baseline</i> )		.36				
Black		-.61				
Hispanic		-1.42				
Other		-2.36				
Maltreatment ( <i>Physical</i> ) x Wave ( <i>Baseline</i> )		4.99**	56.69	55.26	-1.43	-2.5
Sexual	4.33*		58.03	60.93	2.90	5.0
Failure to provide	3.82**		53.89	56.28	2.39	4.4
Failure to supervise	6.19***		55.44	60.20	4.76	8.6
Other	2.43		59.93	60.92	.99	1.7
New maltreatment report ( <i>No</i> ) x Wave ( <i>Baseline</i> )		.59				
Yes		2.36				
Domestic Violence ( <i>No</i> ) x Wave ( <i>Baseline</i> )		2.70				
Yes		3.22				
Arrest History ( <i>No</i> ) x Wave ( <i>Baseline</i> )		2.52				
Yes		2.93				
Poverty ( <i>No</i> ) x Wave ( <i>Baseline</i> )		8.23**	59.66	58.08	-1.58	-2.6
Yes		5.79**	54.34	58.55	4.21	7.7
Cumulative Risk Score x Wave ( <i>Baseline</i> )	-2.31*	4.24*				
None			47.41	60.41	13.0	27.4
Low (1 – 2 risks)			55.61	57.21	1.60	2.90
Medium (3 – 4 risks)			60.31	56.91	-3.40	-5.6
High (5 – 9 risks)			69.02	65.62	-3.40	-4.9

Aggression controlling for all variables in the model	56.44	58.36	1.92	3.4
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\* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$

Unweighted  $n = 405$ ,  $R^2 = .26$

CBCL Aggressive Behavior scores are classified as Normal ( $< 67$ ), Borderline ( $67 - 70$ ), or Clinical ( $> 70$ )

Caregiver rater variable was included in all models to control for different caregivers at baseline and 18 months but is not presented. Main effects were included in models but are not presented.

reduction in aggression over 18 months—2.6%, to 58.1—while living in poverty was associated with increases in aggression over 18 months—7.7% to 58.6. Cumulative risk for females, similar to males, was associated with differing changes in aggression ( $b = -2.31$ ,  $p < .05$ ). Aggression increased most for females who experienced no cumulative risk at baseline—27.4% to 60.4—though females experiencing high levels of risk were the only group to exhibit borderline levels of aggression at baseline (69.0), though behavior improved into the normal range at 18 months (65.6).

## Discussion

In this final section findings are discussed in terms of study hypotheses. Limitations of the current research are then addressed. Implications for theory, practice, policy, and future research complete this section.

Physically abused children are not more aggressive than children who experience other types of maltreatment. Changes in aggression over 18 months did differ across maltreatment types for females but not in the expected direction. Males and females with a most serious maltreatment type of neglect, failure to supervise exhibited the greatest increase in aggressive behavior. This is not the first finding that neglect, the most prevalent type of maltreatment as indicated in current research and other national estimates (U.S. Department of Health and Human Services Administration for Children and Families, in press-a), is associated with high levels of aggression (Knutson et al., 2004). Neglect is associated with

internalizing symptoms (Manly et al., 2001) and increased risk for juvenile incarceration (Jonson-Reid & Barth, 2000) and school failure (Kendall-Tackett & Eckenrode, 1996). The relationship with parental failures to monitor has long been shown (Ary, Duncan, Duncan, & Hops, 1999; Kilgore, Snyder, & Lentz, 2000; Patterson & Dishion, 1985). Neglected children also tend to receive fewer mental health services than physically or sexually abused children, perhaps because these types of abuse are more active types of maltreatment than neglect which may be viewed as a more passive type of abuse (Garland, Landsverk, Hough, & Ellis-MacLeod, 1996). This may reduce the likelihood that these children get assistance for their growing aggressiveness.

Some child characteristics are associated with higher aggression at baseline and less improvement over 18 months. For both maltreated males and females, higher levels of aggressive behavior at the time of the initial interview are associated with lower social skills, HIA problems, and depression. A substantial amount of the work of Dodge and colleagues has shown that maltreated children, more frequently than non-maltreated peers, exhibit numerous information processing deficits. Deficits include less attention to relevant cues, more attribution of hostile intent, poorer response generation, aggressive responses to provocations, more aggressive problem-solving tactics, a more positive endorsement for aggression, and self-efficacy for aggression (Dodge et al., 1990; Dodge, Petit, & Bates, 1997; Price & Landsverk, 1998). Maltreated children with such deficits are, consequently, not skilled at problem-solving, may be distractible and irritable, and may have trouble getting along with peers.

Changes in aggression differ by achievement level for males. Aggressive behavior increased for low achieving males, though still in the normal range at 18 months, and

changing very little for average and above average achieving males. Gender differences in achievement and problem behavior have not been consistent and achievement is not as strongly associated with aggression as other factors such as hyperactivity and low social skills. Low academic achievement, if not remedied, may lead to long-term negative consequences such as poverty, resulting from employment in low paying jobs.

Changes in aggression differ by poverty status only and only for females. As hypothesized, living in poverty is associated with increases in aggression (less improvement) while living above poverty was associated with slight decreases in aggression. Other characteristics within the child, parent, and community co-occur with poverty and are reciprocally influential, having some bearing on problem behavior. Over half of maltreated 6- to 10-year-olds are living below poverty. Are maltreated females more affected by economic deprivation than their male counterparts? Over the short-term, perhaps they are. Longer follow-up is necessary before this question can be answered with certainty.

Surprisingly, no caregiver factors at baseline—domestic violence, parental arrest, parental substance abuse, or poverty—are indicative of higher levels of aggressive behavior at baseline for males or females. It may be that other challenges facing maltreated children are more influential than antisocial parent behavior. Other studies of the association between problem behaviors and parental criminality typically have a follow-up period of longer than the 18 months in the current research or collect child behavior information when children are around age 15 years (Fergusson, Horwood, & Lynskey, 1994; Flouri & Buchanan, 2002; Maughan et al., 2000). Though not prominent in the current study as indicators of differing levels of change, antisocial parent behaviors should still be considered when trying to identify children who may be at the greatest risk of later problem behaviors.

Cumulative risk was the most frequently significant factor in bivariate and multivariate analyses. As level of cumulative risk increases so does the level of aggression at baseline for males and females. Changes in aggression also vary by cumulative risk level for maltreated males and females. Contrary to expectations, aggressive behavior of children with higher levels of risk improved while the aggressive behavior of children with no risk worsened substantially. This finding may be explained at least partially by aggression scores regressing to the mean. Still, maltreated children experiencing five or more risks at baseline have consistently higher levels of aggression. These findings point to the notion that it is often the number rather than the nature of risks that makes the difference (Fraser & Allen-Meares, 2004). Children who are exhibiting the most serious problem behaviors are often struggling with multiple issues in multiple realms. The influence of cumulative risk may also explain why changes in aggression across child characteristics were not significant in the preliminary female multivariate model—cumulative risk, more than individual child characteristics, is indicative of variation in aggression changes for females.

Though aggression scores average in the non-clinical range for maltreated children, of particular concern are the small proportion of children exhibiting high levels of aggression at baseline and at 18 months—14% of males and 11% of females. The work of Moffitt and colleagues (Moffitt, 1993; Moffitt & Caspi, 2001) describes characteristics of the pathways of adolescent-limited and life-course-persistent antisocial behavior. The small group of children who are exhibiting serious aggression should not be ignored. Early problem behaviors are strong predictors of a life-course-persistent pathway. Children with conduct problems in early elementary school need to be targeted at that time rather than waiting until problems escalate in late childhood or early adolescence. Promising interventions such as the

Making Choices program have been used to teach problem-solving to children in the general population and to children whose behavior is oppositional, impulsive, or aggressive (Fraser, Day, Galinsky, Hodges, & Smokowski, 2004).. Such interventions may be useful prevention tools.

As previously discussed, the aggressive behavior of males and females looks similar across child and caregiver characteristics. Factors associated with changes in aggression vary by gender more in multivariate than bivariate analyses. New maltreatment reports are associated with increases in aggression over 18 months for males. This may indicate that males are in more aggressive conflict with their parents, resulting in child abuse reports or this may indicate that the males are becoming more aggressive as a result of the child maltreatment. But similar proportions of males and females experienced re-reports over 18 months (12%) and did not differ substantially in the type of maltreatment of the re-report.

While the occurrence of a new maltreatment report is indicative of greater increases in aggressive behavior for males, maltreatment type figures prominently in the aggressive behavior change of females. Aggressive behavior of sexually abused females increased more and was at higher levels at baseline and 18-months than for all other types, excepting failure to supervise. Research of sexually abused 8- to 15-year-olds males and females found that sexually abused females were more likely than their male counterparts to experience post traumatic stress symptoms (intrusive thoughts and hyper-arousal) and perceive the world as a dangerous place (Feiring, Taska, & Lewis, 1999). This different reaction of girls may account for some of the increase in aggression we see in sexually abused females.

*Limitations.* Children in the final sample had significantly higher scores than children excluded from the final sample for aggression, HIA problems, cumulative risk, and parental

risk. Though statistically significant, these differences were not huge. Still, caution should be made when making inferences to children reported as victims of maltreatment nationally. Findings may be most applicable to maltreated children with slightly more problems.

Longitudinal methods provide rich opportunities for analyses but also pose challenges. Examining differences in behavior change across levels of an independent measure is not how problem behavior is typically measured. Often outcomes are examined as a function of predictors at an earlier time point. The approach used in the current study does not tell us how changes in levels of independent measures (e.g., below or above poverty) are associated with changes in aggression. Instead, changes in aggression are examined as a function of the level of the factor at either time point (e.g., living below poverty at baseline or 18 months). Presenting marginal means in multivariate analyses is one way to help explicate this less familiar method of presenting findings of change.

Measurement-related issues are also a consideration. In many studies peer rejection is measured using peer sociometric ratings of the most and least liked children (Dodge et al., 2003; Lewin, Davis, & Hops, 1999) but NSCAW used a self-reported measure of loneliness and social dissatisfaction that correlates with peer rejection (Asher & Wheeler, 1985). Having peer sociometric ratings would have provided a more precise definition of rejection. Also, peer rejection is most frequently studied in terms of the influence of early elementary school rejection on antisocial behavior in later elementary school (Miller-Johnson, Coie, Maumary-Gremaud, Bierman, & the Conduct Problems Research Group, 2002) or from early elementary school to middle school or early high school (Bolger & Patterson, 2001; Miller-

Johnson, Coie, Maumary-Gremaud, Lochman, & Terry, 1999). Measures at a later point in time may tell a different story.

Ratings of aggressive behavior may also vary by respondent (e.g., teacher and parent) and respondents generally do not agree on the extent of problems (Achenbach, Dumenci, & Rescorla, 2002; Fisher & Fagot, 1996). Unfortunately, using teacher-reported data would have decreased the sample size substantially due to missing data. Ideally, having multiple indicators from multiple sources would be desirable to most accurately capture aggression and risk.

*Implications.* This study was the first attempt to examine aggressive behavior changes over 18 months in a national probability sample of maltreated elementary school-age children. Larger proportions of maltreated children than children in the general population exhibit clinical levels of problem behaviors. Borderline/clinical levels of problem behaviors are evident for 25% of children who are exhibiting HIA problems and 12% who are depressed (Wall, 2004), compared to the normative sample (Achenbach, 1991) in which only 5% of children exhibit such serious levels of HIA problems or depression. Maltreated children experience considerable family stress, as approximately one-third of children are from homes where the caregiver had a recent arrest history, one-third are from homes where there was past or domestic violence at the time of the initial interview, and approximately 60% of are from homes functioning below the poverty level. The short-term implications for aggressive and maltreated children are worrisome. Academic achievement may be playing a different role in the aggressive behavior of maltreated males than females. Similarly, neglect seems to be playing a different role in aggression for maltreated males than females.

Maltreatment type also appears to have a more substantive impact on the aggression of maltreated females.

Developmental theories of aggression for maltreated females should take these findings into consideration though the current research is only a beginning. A much longer follow-up period is required to test any theories of aggressive behavior trajectories in the maltreated girls.

Maltreated children are facing multiple challenges in addition to their maltreatment experiences. Therefore interventions must consider problems children may be experiencing at school, with peers, and within the home. Multi-faceted interventions appear to be most effective in reducing problem behavior (Kumpfer & Tait, 2000; Robbins & Szapocznik, 2000; Webster-Stratton, 2000). More research is needed before specific intervention targets for maltreated males and females can be defined. Behavioral trajectories at 36 months may tell us more about gender-specific risk factors for aggression in maltreated males and females.

Child welfare services were not significant in analyses but this finding should not be interpreted as an indication that services are unnecessary. Future research will attempt to measure this construct in a more comprehensive manner by including the proportion of time in and type of out-of-home care and the number of placement moves.

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## CHAPTER III

### PREDICTING AGGRESSIVE AND DELINQUENT BEHAVIOR IN MALTREATED ADOLESCENTS: CHILD WELFARE SERVICES AND CHILD, PEER, AND CAREGIVER CHARACTERISTICS

Although all maltreated youth do not later engage in law-breaking behavior, being maltreated does increase the likelihood of exhibiting aggressive and delinquent types of behavior. The association between child maltreatment and later delinquency is well-documented (Smith & Thornberry, 1995; Stewart, Dennison, & Waterson, 2002; Stouthamer-Loeber, Loeber, Homish, & Wei, 2001; Thornberry, Ireland, & Smith, 2001; Widom, 1989a, 1989b). In contrast, much less is known about the factors associated with aggressive and delinquent behavior in maltreated youth specifically.

Aggressive and delinquent behaviors are behaviors that impair functioning in various settings such as school or home. Aggressive behaviors include bullying and fighting and more serious acts such as aggravated and sexual assault (Kazdin, 1996). Delinquent behaviors are behaviors committed by youth, generally under the age of 18 years, for which an adult could be prosecuted in a criminal court (Stahl, Finnegan, & Kang, 2002). Delinquent behaviors encompass aggressive acts and non-aggressive acts (e.g., property damage, theft). A substantial portion of maltreated adolescents self-report aggressive and delinquent types of behavior (33%), almost double the proportion in the general adolescent population (U.S. Department of Health and Human Services Administration for Children and

Families, in press-a). Juvenile arrests declined from 1980 to 2001, though a different story emerges when violent arrest rates are examined separately for males and females. Even though males are arrested for violent offenses such as aggravated assault at greater rates than females—about 300 of 1,000 males versus about 100 of 1,000 females—arrest rates for females are increasing more consistently than for males. From 1980 to 2001, juvenile arrests for aggravated assault increased by 113% for females versus only 22% for males (Office of Juvenile Justice and Delinquency Prevention, 2003). Female antisocial behavior is not thought to be of the magnitude of male antisocial behavior but is a problem of growing seriousness.

Most research and theory about adolescent antisocial behavior has been conducted and developed using male samples or, when females are included, examining males and females together (Lanctôt & LeBlanc, 2002; G. R. Patterson, Reid, & Dishion, 1992; Shoemaker, 2000). Fortunately, the tides of research focus are shifting as more researchers begin to examine female antisocial behavior development and intervention. For example, Chamberlain and her colleagues have begun to measure and target relational/social forms of aggression in delinquent females (Chamberlain & Moore, 2002).

Additionally, testing models with gender-specific variables such as sexual behavior and depression may indicate different pathways to aggression and delinquency for males and females. Identification of gender differences in the predictors of antisocial behavior may also point to a need for different intervention targets for males and females.

#### *Source of Behavior Report*

The level of problem behavior often varies by source of report. Numerous studies have used the Child Behavior Checklist and Youth Self Report (Achenbach, 1991a, 1991c) to

measure the problem behavior of children as reported by caregivers and self-report (Achenbach, Dumenci, & Rescorla, 2002; Stanger & Lewis, 1993; Youngstrom, Loeber, & Stouthamer-Loeber, 2000). Research oversampling delinquent youth found that YSR externalizing scores were significantly higher than CBCL externalizing scores but were correlated at .41 (Youngstrom et al., 2000). Alternately, recent national analyses of maltreated youth from the National Survey of Child and Adolescent Well-being (NSCAW) found caregivers reporting more borderline/clinical levels of externalizing behavior than youth—43% versus 33%— though  $r = .47$  (U.S. Department of Health and Human Services Administration for Children and Families, in press-a). Both caregiver- and self-reports provide valuable information about behavior that may be occurring in school and home contexts.

In the delinquency literature, self-report data are often used to capture instances of law breaking behavior not captured by official reports such as arrest records (Elliott & Ageton, 1980; Farrington, Loeber, Stouthamer-Loeber, Van Kammen, & Schmidt, 1996). Additionally, maltreated youth compared to non-maltreated youth have self-reported more offenses not known to police, suggesting that past research using arrest as a measure of delinquency may underestimate the maltreatment-delinquency relationship (Maxfield, Weiler, & Widom, 2000).

### *Risk Factors for Aggression and Delinquency*

Numerous factors influence the behavior of youth. From an ecological perspective (Bronfenbrenner, 1979), various factors within the child, peer group, family, school, and community interact and may serve to influence problem behavior development and maintenance. While school and community factors such as unsafe schools and community

violence influence problem behavior (Bowen & Bowen, 1999), the more proximal risks of child, peer, and family factors are the focus of this paper.

Maltreated children tend to experience more challenges to development than non-maltreated children and these risk factors, in turn, are often associated with increases in problem behavior development. Child characteristics that increase the likelihood of aggression and delinquency and are often more prominent in maltreated populations of children include hyperactivity-impulsivity-attention (HIA) problems (Cohen, Adler, Kaplan, Pelcovitz, & Mandel, 2002; Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998; Ruggiero, McLeer, & Dixon, 2000), low social skills (Dodge, Petit, & Bates, 1997; Fantuzzo, Weiss, Atkins, Meyers, & Noone, 1998), low academic achievement (Dodge et al., 1997; Fantuzzo et al., 1998; Kendall-Tackett & Eckenrode, 1996; Loeber et al., 1998), depression (Kovacs, 1996; Obeidallah & Earls, 1999), risky sexual behavior (Orr, Beiter, & Ingersoll, 1991; Thornberry, Wei, Stouthamer-Loeber, & Van Dyke, 2000), and substance abuse (Ireland, Smith, & Thornberry, 2002; Office of Applied Studies - Substance Abuse and Mental Health Services Administration, 2002b). Peer factors may also increase the likelihood of aggression and delinquency and these factors also tend to be more prevalent in maltreated children. Factors include association with deviant peers (Arellano, Kuhn, & Chavez, 1997; Kosterman, Graham, Hawkins, Catalano, & Herrenkohl, 2001), and peer rejection (Lewin, Davis, & Hops, 1999; Svetaz, Ireland, & Blum, 2000).

Caregiver characteristics associated with child maltreatment that may increase the likelihood of aggressive and delinquent behavior include a low sense of relatedness to caregivers (Anderson, Holmes, & Ostresh, 1999; Barnett, Ganiban, & Cicchetti, 1999; Lynch & Cicchetti, 1991), low parental monitoring (Carlo, Raffaelli, Laible, & Meyer, 1999; Gerald

R. Patterson & Dishion, 1985), harsh discipline (Bank & Burraston, 2001; Moffitt & Caspi, 2001; Palmer & Hollin, 2001), and poverty (Lipsey & Derzon, 1998).

### *Maltreatment Type*

Different maltreatment types may also predict different types of behavioral outcomes. Though findings vary somewhat, physical abuse and neglect are most commonly associated with later aggressive and delinquent behavior. Physically abused and neglected children are more likely than sexually abused children to be arrested as juveniles (Widom, 1989a). In research encompassing ten large California counties, juvenile incarceration rates were higher for youth with an initial report of neglect compared to youth with an initial report of physical or sexual abuse (Jonson-Reid & Barth, 2000). Alternately, a study of San Diego youth utilized self-reported delinquency data and found that physical abuse, but not neglect or sexual abuse, was associated with delinquent behavior at six-year follow-up (Taussig, 2002).

### *Child Welfare Service Setting*

Child welfare services (CWS) may mediate between child maltreatment and subsequent aggressive and delinquent behavior. Although the public often associates CWS with placement into foster care, most children who become involved with CWS continue to live at home. Only 19% of approximately two million investigated reports of abuse or neglect during 2001 resulted in children placed in foster or group care. Fanshel (1992) has argued that prevention of delinquency is a central role of CWS.

The impact of different forms of placement—specifically, in-home, foster care, kinship foster care, and group care—is a central concern of child welfare and juvenile justice program administrators. Although most non-secure juvenile justice-supervised placements are in group care rather than foster care or treatment foster care, the opposite is true of

children under CWS supervision. The debate about use of group care is particularly compelling and significant for the juvenile justice community. A review of evidence-based practice in mental health services for youth noted the lack of treatment efficacy of residential/group home care for children with severe behavioral difficulties (Hoagwood, Burns, Kiser, Ringeisen, & Schoenwald, 2001). Dishion and colleagues go further, raising concerns about the unintended negative impact of group care and identifying a probable contagion effect of grouping high-risk children together (i.e., bad behavior begetting bad behavior). According to their work, the behavior of children placed into group care deteriorates faster than the behavior of children placed into alternative placements (Dishion, McCord, & Poulin, 1999).

Limited research exists on the association between CWS and delinquency. Generally, group care placement tends to be associated with more delinquent and aggressive behavior. Though data from NSCAW indicate that out-of-home caregivers are reporting similar levels of problem behavior compared to caregivers of children remaining in the home (56% versus 55%), group home caregivers are reporting a significantly greater proportion of youth with borderline/clinical levels of problem behavior (80%) than kinship (42%) or non-kinship (47%) foster caregivers (U.S. Department of Health and Human Services Administration for Children and Families, in press-a). A similar pattern is found when youth self-report behavior: 61% of maltreated youth living in group care reported borderline/clinical levels of problem behavior compared to 32% of youth living in kinship foster care and 39% of youth living in non-kinship foster care (U.S. Department of Health and Human Services Administration for Children and Families, in press-a). Other recent research has found that children placed in out-of-home care had significantly more delinquency petitions (Ryan &

Testa, 2004) and greater risk of entry into a juvenile correctional facility (Jonson-Reid, 2002) than maltreated children who remained in the home.

### *Hypotheses*

Several hypotheses posed in the current research are: (1) males exhibit higher levels of aggression and delinquency at baseline and 18 months than females; (2) the characteristics associated with aggression and delinquency at baseline differ substantially for males and females as do the characteristics associated with changes in aggression and delinquency over 18 months; and (3) physically abused or neglected youth exhibit higher baseline levels of aggression and delinquency and less behavior improvement over 18 months, compared to sexually abused youth.

### Methods

Data are from the National Survey of Child and Adolescent Well-being (NSCAW), the first national longitudinal probability study of child welfare to collect extensive data from children, caregivers, teachers, and child welfare workers. The NSCAW sample was generated from a two-stage stratified sampling design intended to maximize the precision of estimates related to children in the child welfare system. A total of 40 states were selected and 36 agreed to participate in NSCAW and were divided into nine strata. From these strata, primary sampling units (PSUs) were randomly selected. PSUs were defined as a geographic area encompassing the population served by a child welfare agency, usually a county, but in a few cases two or three contiguous counties were grouped to form a single PSU. Children were then randomly selected from PSUs monthly over 16 months, from September 1999 through December 2000. All children who had gone through the formal investigation or assessment that followed report of child abuse or neglect were eligible for selection.

Stratification at the child-level was also conducted. Infants (less than one year), children receiving in-home child welfare services, children receiving out-of-home services, and sexually abused children were over-sampled. Substantiated and unsubstantiated cases were included, providing the opportunity to examine children and families who did and did not receive child welfare intervention after an investigation of child maltreatment (NSCAW Research Group, 2002).

Once the frame was selected, field interviewers obtained contact information from the child welfare agency and approached the family to introduce the study and secure consent to participate. Only children aged 11 to 15 years at the time of the initial interview (baseline) were included in the current research. Data are from the baseline and 18-month interviews.

### *Measures*

A brief description of measures is next, including internal consistency as indicated by Cronbach's alpha for baseline measures. (For more information on NSCAW refer to [http://www.acf.dhhs.gov/programs/core/ongoing\\_research/afc/wellbeing\\_intro.html](http://www.acf.dhhs.gov/programs/core/ongoing_research/afc/wellbeing_intro.html), the Administration for Children and Families website.)

*Aggression and delinquency.* Aggression and delinquency are defined by two measures: Child Behavior Checklist (CBCL) Externalizing scale and Self-Report Delinquency (SRD). The CBCL externalizing T score was used to measure caregiver-reported behaviors in the six months prior to the interview such as lying, stealing, alcohol/drug use, property destruction, and fighting. Problematic levels of behavior were defined by the cutpoints established in the CBCL manual (Achenbach, 1991a) as borderline/clinical ( $T \geq 60$ ). Internal consistency in the current sample is high ( $\alpha = .92$ ).

The SRD (Elliott & Ageton, 1980) was designed for use in the National Longitudinal Survey of Youth (NLSY). The SRD version used for NLSY's Wave 7 (1987) was modified for NSCAW. Questions are asked of children aged 11 years and older. A total of 36 questions asked about specific delinquent acts over the previous six months. Items were weighted by seriousness of the delinquent act (0 = Did not commit act, 1=Minor, 2=Moderate, 3=Serious). Follow-up questions asked about the frequency of each act (0 = not in the previous 6 months, 1 = once to 5 = 5 or more times). Delinquent act items were multiplied by the frequency of act and then summed. Scores ranged from 0 to 380 (0=No delinquency, 1 to 4 = Minor, 5 to 14 = Moderate, 15 to 380 = Serious). Seriousness level and scoring correlated highly with past studies that have used various versions of the SRD (Elliott and Ageton, 1980; Loeber et al., 1998).

*Child and family demographics.* Child demographics measured included gender, age, and race/ethnicity. *Gender* was defined as male or female. *Age* was defined as the child's age in years at the time of the initial interview. *Race and ethnicity* were collapsed into Black/Non-Hispanic/Latino, White/Non-Hispanic/Latino, Hispanic, and Other race/ethnicity. Ethnicity was considered before race; consequently, children identified as Hispanic/Latino were classified as such regardless of their race and children who identified as non-Hispanic/Latino were classified by their race (i.e., Black, White, or Other).

*Child characteristics.* Child characteristics measured were Hyperactivity-Impulsivity-Attention (HIA) problems, social skills, academic achievement, depression, aggression, substance abuse, and risky sexual behavior. The presence of *HIA problems* was defined as a borderline or clinical score ( $T \geq 67$ ) on the Attention Problems subscale of the Child Behavior Checklist (Achenbach, 1991a) with good internal consistency in the sample

( $\alpha = .72$ ). *Social skills* were measured by caregiver report on the Social Skills Rating System (SSRS) with standardized scores based on a mean of 100 and a standard deviation of 15 (Gresham & Elliott, 1990). Social skills were defined as Low ( $< 85$ ), Average (85 to 115), or High ( $>115$ ) with internal consistency high in the current sample ( $\alpha = .91$ ). *Academic achievement* was measured using the Mini-Battery of Achievement (Woodcock, McGrew, & Werder, 1994). A mean combined score of Reading and Math (mean = 100 and standard deviation = 15) was used, with academic achievement defined as Low ( $< 85$ ), Average (85 to 115), or High ( $>115$ ), resulting in good internal consistency in the sample ( $\alpha = .80$ ). *Depression* was measured with the CBCL (Achenbach, 1991a) and YSR (Achenbach, 1991a) and was defined by a borderline or clinical score ( $T \geq 67$ ) on the Anxious/Depressed subscale with good internal consistency in the sample for the CBCL subscale ( $\alpha = .87$ ) and the YSR subscale ( $\alpha = .86$ ). *Aggression* was defined by a borderline or clinical score ( $T \geq 67$ ) on the Aggressive Behavior subscale of the YSR (Achenbach, 1991a) with good internal consistency in the sample ( $\alpha = .86$ ).

Two types of high risk behaviors were included: substance abuse and risky sexual behavior. *Substance abuse* was measured by questions about the frequency of use of seven substances in the previous 30 days. Substances were weighted by seriousness— No use = 0) cigarettes and chewing tobacco = 1; alcohol, inhalants, and non-prescribed medications = 3; marijuana = 5; and hard drugs = 7—and multiplied by frequency of use—0 = 0 days, 1 = 1 to 2 days, 2 = 3 to 11 days, and 3 = 12 or more days. These weighted frequencies were then summed for total substance abuse score, ranging from 0 to 66: 0 = No use; 1 to 6 = Low use (at a minimum, tobacco use  $\geq 12$  days); 7 to 14 = Moderate use (use of alcohol, inhalants, and/or non-prescribed medications with some three or more times and some marijuana use);

and 15 to 66 = High use (more frequent use of multiple drugs and more serious types of drugs—marijuana and hard drugs). Internal consistency in the current sample is high ( $\alpha = .89$ ).

*Risky sexual behavior* was measured using a three-item index: (1) Had youth ever had intercourse (1 = if youth answered “Yes” and first experience was voluntary, 0 = involuntary first intercourse experience or youth had never had intercourse); (2) Consistency of use of protection for sexual intercourse (0 = “Always” or not applicable, 1 = “Often,” 2 = “Sometimes,” or 3 = “Never or rarely”); and (3) Had youth ever been pregnant or gotten someone pregnant (0 = “No” or not applicable, 1 = “Yes”). Scores ranged from 0 to 5: No risk (scores of 0); Low risk (scores of 1, indicating youth has had intercourse but has used protection consistently and has never been pregnant or gotten someone pregnant); or High risk (scores  $\geq 2$ , indicating inconsistent use of protection and possible pregnancy).

*Peer characteristics.* Peer characteristics measured were deviant peer associations and peer rejection. *Deviant peer associations* were defined by one item on the CBCL (Achenbach, 1991a), “Hangs around with kids who get in trouble,” and one item on the YSR (Achenbach, 1991b), “I hang around with kids who get in trouble.” Caregiver or youth responses of “very true” or “often true” classified a youth as having deviant friends. In the multivariate model using CBCL externalizing as the dependent measure, deviant peer associations were defined by the YSR item only because the CBCL item is part of the CBCL externalizing scale. *Peer rejection* was measured by self-report using a slight modification of the Peer Loneliness and Social Dissatisfaction Scale (PLSD: Asher & Wheeler, 1985) that asks questions about how true various statements are regarding such things as making friends and having children to play with at school. Scores ranged from 16 to 80 with higher scores

indicating more loneliness and social dissatisfaction. Youth are described as Rejected ( $\geq 1$  standard deviation above the mean, scores  $\geq 45$ ) or Non-rejected ( $< 45$ ). Internal consistency in the current sample is high ( $\alpha = .91$ ).

*Caregiver characteristics.* Caregiver characteristics measured were relatedness to caregiver, caregiver monitoring of youth, discipline, and poverty level. *Relatedness* to the primary and secondary caregiver was measured using a shortened version of the Relatedness scale from the Rochester Assessment Package for Schools, RAPS (Connell, 1991; Lynch & Cicchetti, 1991). A mean rather than a summed score was created to account for the fact that not all children answered the same number of questions (i.e., not all answered questions for the secondary caregiver). Relatedness is described as Low ( $< 2.5$ ), Average (2.5 to 3.49), or High ( $\geq 3.5$ ) with high internal consistency in the current sample ( $\alpha = .88$ ). *Monitoring* by the caregiver was defined by five questions asked of youth about the primary caregiver (Dishion, Patterson, Stoolmiller, & Skinner, 1991). Monitoring is described as Low ( $< 3.5$ ), Average (3.5 to 4.5), or High ( $> 4.5$ ) with good internal consistency in the sample ( $\alpha = .70$ ). *Discipline* was measured by adolescent report from the Parent-Child Conflict Tactics Scale, CTS-PC (Strauss, 2001; Strauss, Hamby, Finkelhor, Moore, & Runyan, 1998). Harsh discipline was said to have occurred if any of the Very Severe or Severe Physical Assault items had ever occurred, or Minor Physical Assault score was at or above the 90<sup>th</sup> percentile (Hotelling, Straus, & Lincoln, 1989). *Poverty* was defined by poverty level which was calculated based on procedures followed by the U.S. Census Bureau (Dalaker, 2001), which includes caregiver-report of both the family's income level and the number of adults and children in the household. A family was defined as living in poverty if the family was living at less than 100% of poverty.

A *rater* variable was included in the multivariate model for caregiver report of aggression and delinquency. This variable indicated if the caregiver rating behavior at baseline and 18 months was the same (Yes) or different or it could not be determined if the rater was the same at baseline and 18 months (No). Including this variable controlled for the rating of the behavior of some youth by different caregivers at the two time points. A *wave* variable was included in all multivariate models to control for the time factor. Wave was included as a main effect and interacted with all variables in the multivariate models to measure changes in aggression and delinquency over time.

*Maltreatment.* Maltreatment type was defined from information reported by the child welfare worker using a slight modification of the Maltreatment Classification System (Manly, Cicchetti, & Barnett, 1994). The maltreatment experience was defined as the most serious maltreatment type only. (Severity and chronicity information are not included in the current study because of incomplete information that would have resulted in a reduction in sample size and power.) Maltreatment type was defined as the most serious type of alleged maltreatment (physical abuse, sexual abuse, neglect-failure to provide, neglect-failure to supervise, or Other) of all types related to the current report.

*Child welfare services.* Child welfare services setting was defined as In-Home (In-Home No CWS or CWS at baseline and 18 months and was in out-of-home care for less than 5% of the 18-month period), Out-of-Home (living out of the home in non-kinship, kinship, group care, or other out-of-home placement at baseline and 18 months and lived in out-of-home care for greater than 95% of the 18-month period), and Mixed type (all others—youth who remained in-home at both waves but lived in out-of-home care for greater than 5% of time, youth who lived in out-of-home care at both waves but spent less than 95% of time in

out-of-home care, youth living in-home at the time of the initial interview and out-of-home at 18 months, and youth living in out-of-home care at the time of the initial interview and in-home at 18 months).

### *Analyses*

Data were analyzed with SAS - callable SUDAAN® version 8.02 (Research Triangle Institute, 2002) to adjust the standard errors, account for the clustering and stratification in the sampling design, and allow for inferences about the population of children investigated as victims of child maltreatment in the U.S. Weighted data with the unweighted sample size are presented. Bivariate descriptive analyses were performed using chi-square and t statistics to assess associations at baseline. Following descriptive analyses of the sample at baseline, multivariate analyses of aggressive and delinquent behavior changes over 18 months were conducted with regression using generalized estimating equations (GEE). (Linear regression was used for the continuous CBCL measure while logistic regression was used for the dichotomized SRD measure.) The central feature of longitudinal analyses is the ability to study change directly through repeated observations of individuals. With such repeated measures, the problem of autocorrelation between observations for each individual arises as well as the autocorrelation of subjects within the same PSU. Traditional methods, such as ordinary least squares (OLS) regression, render inaccurate estimations with longitudinal data—the OLS assumption that observations are independent of one another is violated in longitudinal data because of the nesting of measures within subjects and subjects within PSUs. GEE is a marginal approach model that corrects for these autocorrelations (Diggle, Heagerty, Liang, & Zeger, 2002).

SUDAAN was the software chosen because, in addition to utilizing GEE, this software can handle the complex sampling design and the sample weights. The standard error estimates that are typically produced by software packages such as SAS and SPSS assume simple random sampling, resulting in underestimates of standard errors when used with complex datasets such as NSCAW, which leads to biased estimates. SUDAAN uses Taylor series linearization and GEE for estimating standard errors, accounting for NSCAW's design complexity, including unequal weighting, stratification, and clustering of observations (U.S. Department of Health and Human Services Administration for Children and Families, 2004). In the current study, baseline weights were employed for baseline observations and 18-month weights were employed for 18-month observations. For further explanation of weighting choices across waves, refer to the NSCAW 18-month report (U.S. Department of Health and Human Services Administration for Children and Families, in press-b).

Weights were calculated for subjects at each wave with the purpose being to obtain unbiased estimates of means, proportions, regression coefficients, etc. in addition to allowing for inferences to children reported as victims of maltreatment nationally. Sample weights were constructed in stages, with adjustments made due to missing months of sample frame data or types of children (e.g., unsubstantiated cases, children not receiving child welfare services), non-response, and undercoverage (Dowd et al., 2003). Consequently, sample weights must always be used to obtain unbiased estimates of the population parameters (U.S. Department of Health and Human Services Administration for Children and Families, 2004).

Though many variables were of interest, including all variables in the model often resulted in estimation because some cell sizes were 0 and models would not run. Therefore, a multistage approach was used. Separate correlation matrices (not shown) were produced

for males and females to inform decisions about variables to be included in final multivariate models. Variables highly correlated ( $r \geq .45$ ) or non-significantly ( $p > .15$ ) correlated with dependent measures were omitted from those multivariate models. Other variables were excluded from models because of high correlations ( $r > .50$ ) between independent measures.

Next, preliminary multivariate models were run. (In all multivariate models, interaction terms were created, interacting wave with each variable, to measure aggressive and delinquent behavior change from baseline to 18 months.) The first model included rater (for caregiver-report models only), age, race/ethnicity, child maltreatment, child welfare services, and child and peer characteristics—main effects and wave interactions. Child and peer interactions significant at  $p < .15$  from the first model were maintained to be entered, along with main effects, in the final model. Then a regression was conducted similar to the first but including main effects and interactions for caregiver rather than child and peer characteristics. Caregiver interactions significant at  $p < .15$  from the second model were maintained to be entered, along with main effects, in the final model. A final regression was conducted including main effects and significant interactions from the first and second models along with rater (for caregiver-report models only), child welfare services, age, race/ethnicity, and child maltreatment. This process was followed for males and females for both dependent measures. A significance level of  $p < .15$  was used in preliminary models to prevent exclusion of variables that might play an important role in final models. In addition to the unstandardized betas ( $b$ ) for the CBCL and odds ratios (OR) for the SRD, baseline and 18-month predicted margins were obtained for categories within each variable (e.g., peer rejection and no rejection) conditioned on all other variables in the model. Predicted

marginal in multivariate models are means for CBCL models and probabilities for SRD models (of moderate/serious delinquency) at baseline and 18 months.

## Results

A full description of the sample, including issues of missing data and subject attrition, precedes bivariate findings related to variation in baseline levels of aggression and delinquency by demographics, child maltreatment, child welfare services, and child, peer, and caregiver factors. Multivariate findings related to aggressive and delinquent behavior change over 18 month as reported by caregivers and youth conclude this section.

### *Sample Description*

The original sample of 1179 11- to 15-year-olds was reduced to 875 (74% of sample) because of missing data and subject attrition. Youth not included in final models were those with missing data for: (1) outcome measures at both waves; (2) both waves for any child, peer, or caregiver factor included in final models; or (3) child welfare services setting, maltreatment type, or demographics information. To examine possible bias due to missing data, baseline data for the sample of youth in final multivariate models ( $n = 798^3$ ) was compared to youth excluded from final models ( $n=308$ ). Two significant differences existed between the final sample and excluded youth. Youth in the final sample were reported at baseline by caregivers as exhibiting significantly higher caregiver-reported aggressive and delinquent behavior ( $t = 2.38, p < .05$ ; Mean = 61.2 and SE = .9 versus Mean = 59.0 and SE = 1.1), more HIA problems ( $t = 2.21, p < .05$ , Mean = 61.3 and SE = .6 versus Mean = 59.1 and SE = .9).

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<sup>3</sup> Final sample size at baseline ( $n = 798$ ) is smaller than final sample size in multivariate models ( $n = 875$ ) because some youth were missing data at baseline but not 18 months.

*Sample selection.* The initial sample frame included all children aged 11 to 15 years at baseline who were reported and investigated as victims of maltreatment (n=1179). Cases with missing data, either due to subject attrition or missing data on any of the variables analyzed, were excluded from all analyses resulting in a final unweighted sample size of 875.

Response bias analyses determined the extent of differences between responders and non-responders to the 18-month interviews. Subjects were compared on approximately 40 variables.<sup>4</sup> Once biases were identified, these differences were accounted for in the sample weights with a final bias of  $\leq 4\%$  in all cases (Dowd et al., 2003).

The final sample was composed of 875 children aged 11 to 15 at baseline. The average age was 12.7 years and 60% were female. The racial/ethnic breakdown was 30% Black, 49% White, 16% Hispanic, and 6% Other race/ethnicity. Breakdown for most serious type of maltreatment reported was 34% physical abuse, 15% sexual abuse, 11% neglect-failure to provide, 30% neglect-failure to supervise, and 11% Other maltreatment type. All remaining analyses focus on the final sample.

Upon examination of group means for males and females for the dependent measures and child, peer, and caregiver factors, mean delinquency scores were in the serious range (primarily attributable to the few extremely high scores). CBCL scores were in the borderline range (60 to 63). Social skills and academic achievement scores were within one standard deviation of the mean. HIA problems, depression, and aggression scores were above the mean of 50 but within the normal range ( $< 67$ ). Risky sexual behavior scores were low, indicating that most youth had not had intercourse at baseline. Substance abuse scores were also in the low range. On average, youth frequently associate with peers who “get into

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<sup>4</sup> These were crucial variables from baseline that were also considered for use in the 18-month weighting response adjustment, including sampling strata, sampling domains, gender, race, age, CWS status, maltreatment type, type of insurance coverage, overall health status of the child, and urbanicity and size of the PSU.

trouble.” Most youth felt accepted by peers. Youth reported generally high levels of caregiver relatedness and monitoring and normative levels of discipline. On average, youth were living in households that were at 140% of poverty. Males and females did not differ significantly on dependent measures or child, peer, or caregiver factors (Table 3-1).

Table 3-1

Dependent Measures and Child, Peer, and Caregiver Factors by Gender at Baseline

Baseline Measures	Males		Females	
	Mean	SE	Mean	SE
Self-Report Delinquency	19.7	7.80	7.4	2.19
CBCL Externalizing	61.0	1.02	61.4	1.23
<u>Child/Peer Factors</u>				
HIA Problems	62.2	.94	60.6	.79
Social Skills	91.2	1.26	90.3	1.36
Academic Achievement	91.1	1.61	95.0	1.64
Depression (youth report)	55.2	1.22	55.4	.77
Depression (caregiver report)	59.2	.82	59.4	.83
Risky Sexual Behavior	.7	.21	.5	.10
Substance Abuse	4.1	1.90	2.7	.72
Aggression (youth report)	57.8	1.04	58.2	.75
Aggression (caregiver report)	62.3	.86	62.5	.92
Deviant Peers (youth and caregiver)	1.7	.06	1.8	.04
Deviant Peers (youth report)	1.8	.06	1.9	.02
Peer Rejection	30.6	.98	31.1	1.19
<u>Caregiver Factors</u>				
Relatedness to Caregiver	3.3	.06	3.2	.06
Monitoring	4.1	.12	4.3	.06
Discipline	1.4	.07	1.3	.04
Poverty Rate	1.4	.15	1.4	.10

NOTE: Unweighted sample size ranges from 287 to 323 for males and from 419 to 475 for females due to varied levels of missingness at baseline.

*Level of Aggressive and Delinquent Behavior by Child, Peer, and Caregiver Factors*

Caregiver-reported levels of aggression and delinquency differed by several child, peer, and caregiver factors for both males and females (Table 3-2). For males, significant differences existed for HIA problems, social skills, depression, aggression, substance abuse,

deviant peer associations, peer rejection, monitoring, and discipline. CBCL scores were significantly higher for males with HIA problems than males whose HIA problems were in the normative range ( $t = 6.67, p < .001$ ). CBCL scores differed significantly between each category of social skills. Males with low social skills had significantly higher scores ( $p < .001$ ) than males with average ( $t = 8.80$ ) or high social skills ( $t = 11.01$ ) and males with average social skills had higher CBCL scores than males with high social skills ( $t = 6.84, p < .001$ ). Males with borderline or clinical levels of depression had significantly higher CBCL scores than males within the normal range for caregiver- ( $t = 8.03, p < .001$ ) and youth-reported ( $t = 2.57, p < .05$ ) depression. Males with borderline or clinical levels of self-reported aggression also had significantly higher CBCL scores than males within the normal range ( $t = 4.29, p < .001$ ). Higher levels of substance abuse were also associated with higher CBCL scores. Males who reported high levels of substance abuse had significantly higher CBCL scores than males reporting no substance abuse ( $t = 2.35, p < .05$ ). Males with deviant peers had significantly higher CBCL scores than males reporting no delinquent peers ( $t = 2.57, p < .05$ ). Externalizing scores were also significantly higher for males who were rejected by peers ( $t = 5.34, p < .001$ ) than males who were not rejected. Males who reported low monitoring also had significantly higher CBCL scores ( $p < .01$ ) than males reporting average or high levels of monitoring ( $t = 2.82$  and  $t = 2.72$ , respectively). Harsh discipline was also associated with more aggressive and delinquent behavior ( $t = 2.15, p < .05$ ). CBCL scores did not differ significantly by academic achievement, risky sexual behavior, relatedness to caregiver, or poverty level for males at baseline.

For females, significant differences existed for HIA problems, social skills, academic achievement, caregiver-reported depression, self-reported aggression, substance

abuse, risky sexual behavior, deviant peer associations, and discipline (Table 3-2). CBCL scores were significantly higher for females with HIA problems than those with HIA problems in the normative range ( $t = 5.42, p < .001$ ). Females with low or average social skills had significantly higher CBCL scores ( $p < .001$ ) than females with high social skills ( $t = 5.25$  and  $t = 3.85$ , respectively) and females with low social skills had significantly higher CBCL scores than females with average social skills ( $t = 2.02, p < .05$ ). Similarly, females with low or average academic achievement had significantly higher CBCL scores ( $p < .05$ ) than females with high academic achievement ( $t = 2.75, p < .01$ , and  $t = 2.08, p < .05$ , respectively). Females with borderline/clinical levels of caregiver-reported depression had significantly higher CBCL scores than females within the normal range ( $t = 7.15, p < .001$ ). Females reporting high levels of substance abuse had higher CBCL scores than females who reported no substance abuse ( $t = -3.87, p < .001$ ). Females reporting either low or high levels of risky sexual behavior had significantly higher CBCL scores than girls reporting no risky sexual behavior ( $t = 3.19, p < .01$ , and  $t = 5.16, p < .001$ , respectively). Associating with deviant peers was also associated with higher CBCL scores ( $t = 4.48, p < .001$ ). Harsh discipline was also associated with higher CBCL scores ( $t = 3.74, p < .001$ ). Caregiver-reported aggression and delinquency levels did not differ significantly by youth-reported depression, peer rejection, caregiver relatedness, monitoring, or poverty level for females at baseline.

Table 3-2

Caregiver-Reported Aggressive and Delinquent Behavior by Child, Peer, and Caregiver

Characteristics at Baseline by Gender

	CBCL Externalizing T Score	
	Males Mean (SE)	Females Mean (SE)
HIA Problems		
Normal	58.1 (1.4)***	58.7 (1.5)***
Borderline/Clinical	69.4 (1.0)	70.3 (1.3)
Social Skills		
Low	69.8 (.9)*** <sup>ae</sup>	65.4 (2.3) <sup>*e</sup>
Average	58.6 (1.0)*** <sup>b</sup>	59.6 (1.6)
High	41.4 (2.4)	50.6 (1.7)*** <sup>b</sup>
Academic Achievement		
Below average	62.0 (1.7)	63.2 (1.6)** <sup>a</sup>
Average	61.4 (1.3)	62.0 (1.5) <sup>*b</sup>
Above average	54.1 (4.8)	53.9 (3.7)
Depression (caregiver report)		
Normal	58.0 (1.2)***	58.2 (1.3)***
Borderline/Clinical	69.8 (.9)	72.7 (1.5)
Depression (youth report)		
Normal	60.4 (1.2)*	61.2 (1.2)
Borderline/Clinical	65.9 (1.3)	63.1 (7.7)
Aggression (youth report)		
Normal	59.8 (1.1)***	59.4 (1.4)***
Borderline/Clinical	67.2 (1.3)	68.1 (2.0)
Substance Abuse		
None	60.2 (1.3) <sup>*d</sup>	59.8 (1.2)*** <sup>d</sup>
Low	61.9 (2.8)	62.7 (4.1)
High	65.2 (1.7)	69.8 (2.3)
Sexual Behavior		
None	60.2 (1.0)	59.1 (1.4)** <sup>c</sup>
Low	65.8 (3.7)	67.1 (2.2)
High	62.5 (2.8)	70.7 (1.8)*** <sup>d</sup>
Deviant Peer Associations (youth report only)		
Yes	65.1 (1.6)*	69.8 (1.7)***
No	60.0 (1.1)	60.4 (1.3)
Peer Rejection		
Yes	67.9 (1.1)***	64.9 (2.8)
No	60.1 (1.1)	60.6 (1.4)
Monitoring of Child		
Low	66.0 (1.6)** <sup>ae</sup>	64.6 (3.0)
Average	60.3 (1.4)	61.6 (2.2)
High	59.5 (1.8)	60.0 (1.3)
Discipline		
Unharsh	59.5 (1.2)*	58.7 (1.6)***
Harsh	63.6 (1.5)	66.6 (1.5)

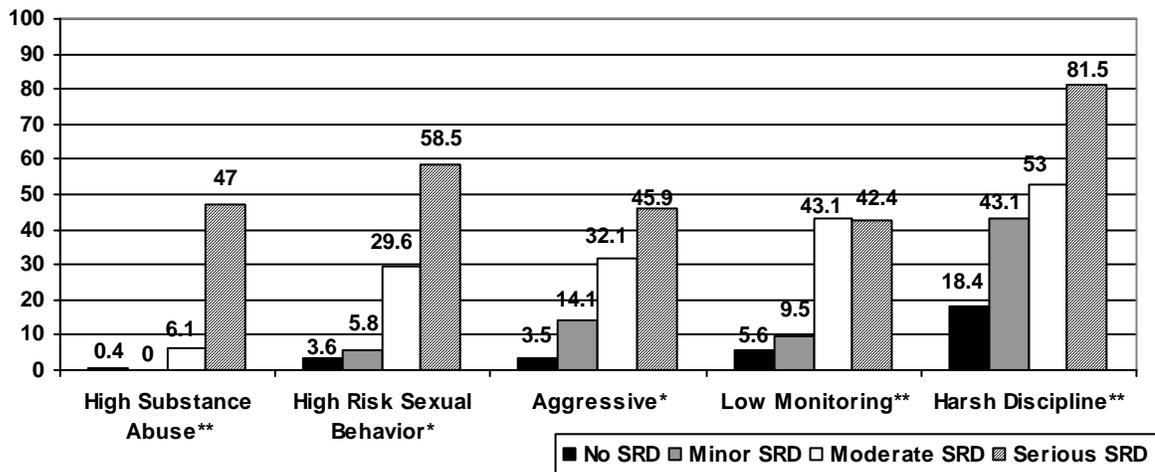
\*p ≤ .05 \*\*p ≤ .01 \*\*\*p ≤ .001

NOTE: Males (Unweighted n = 323) and Females (Unweighted n ranges from 455 to 475)  
 CBCL Externalizing scores are categorized as Normal (< 60), Borderline (60 – 63), and Clinical (> 63)  
<sup>a</sup>Low > High <sup>b</sup>Average > High <sup>c</sup>None < Low <sup>d</sup>None < High <sup>e</sup>Low > Average

SRD levels differed by fewer child, peer, and caregivers factors than CBCL scores. A significant association existed between SRD level and substance abuse, risky sexual behavior, self-reported aggression, monitoring, and discipline for males (Figure 3-1). Higher levels of substance abuse were associated with higher levels of SRD ( $\chi^2 = 21.75, p < .01$ )—47% of males reporting serious SRD reported high levels of substance abuse compared to less than 1% of males reporting no or minor SRD. Risky sexual behavior was also associated with SRD ( $\chi^2 = 16.58, p < .05$ )—over 58% of males reporting serious SRD reported high risk sexual behavior compared to very few males reporting no or minor SRD. Self-reported aggression exceeded normative levels for almost half (46%) of males reporting

Figure 3-1

Baseline Level of Self-Reported Delinquency by Significant Characteristics for Males



\*  $p \leq .05$  \*\*  $p \leq .01$  Unweighted n = 323

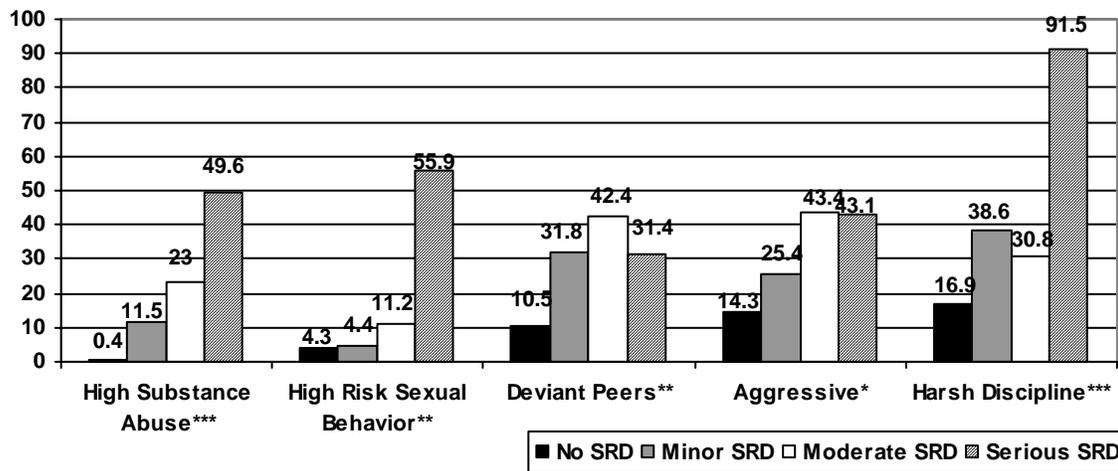
serious SRD but only 4% of youth reporting no SRD ( $\chi^2 = 9.22, p < .05$ ). Lower levels of monitoring were also associated with higher levels of SRD ( $\chi^2 = 20.25, p < .01$ ). Over 40% of males reporting serious or moderate SRD also reported low monitoring by caregivers compared to less than 10% of males who reported no or minor SRD. Finally, discipline was also associated with SRD for males ( $\chi^2 = 15.06, p < .01$ ) with 82% of males reporting serious SRD also reporting harsh discipline compared to 18% of males who reported no SRD. SRD level did not differ significantly by HIA problems, social skills, academic achievement, depression, deviant peer associations, peer rejection, caregiver relatedness, or poverty level for males at baseline.

A significant association existed between SRD level and substance abuse, risky sexual behavior, self-reported aggression, deviant peer associations, and discipline for females at baseline (Figure 3-2). High levels of substance abuse were associated with higher levels of SRD ( $\chi^2 = 22.23, p < .01$ )—50% of females who were reporting serious SRD also reported high levels of substance abuse compared to less than 1% of females reporting no SRD. Risky sexual behavior was also associated with higher levels of SRD ( $\chi^2 = 16.50, p < .05$ )—56% of females reporting serious SRD were reporting high risk sexual behavior compared to less than 5% of females reporting no or minor SRD. Deviant peer associations were significantly associated with SRD ( $\chi^2 = 12.60, p < .01$ ). Approximately one-third of girls who reported any SRD (minor, moderate, or serious) also reported associating with peers who “get into trouble” compared to only 10% of females who reported no SRD at baseline. Aggression was more prevalent at higher levels of SRD ( $\chi^2 = 8.15, p \leq .05$ ). Harsh discipline was also associated with SRD for females ( $\chi^2 = 19.36, p < .001$ ) with 92% of girls reporting serious SRD also reporting harsh discipline compared to 10% of females who

reported no SRD. SRD level did not differ by HIA problems, social skills, academic achievement, depression, peer rejection, caregiver relatedness, or poverty level for females at baseline. Neither caregiver-reported aggressive and delinquent behavior nor SRD differed significantly by maltreatment type for males or females.

Figure 3-2

Baseline Level of Self-Reported Delinquency by Significant Characteristics for Females



\*  $p \leq .05$  \*\*  $p \leq .01$  \*\*\*  $p \leq .001$  Unweighted n ranged from 455 to 475

### *Factors Predicting Change in Caregiver-Reported Aggressive and Delinquent Behavior over 18 Months*

Caregiver-reported aggression and delinquency decreased over three points for males, from 62.2 at baseline to 57.7 at 18 months (table not shown). Changes in CBCL scores were significantly different between levels of age and peer rejection (Table 3-3). Aggression and delinquency change was significantly different for 13-year-olds ( $b = 5.59$   $p < .05$ ) and for 15-year-olds ( $b = 9.07$ ,  $p < .01$ ) compared to 12-year-olds. Specifically, CBCL scores for 12-year-olds decreased by 7.2 points to 52.8, but only decreased by 1.6 points to 62.5 for 13-

year-olds. CBCL scores increased by 1.8 points to 67.8 for 15-year-olds (table not shown). The difference in CBCL change for rejected and non-rejected males was over nine points ( $b = -9.20, p < .05$ ). CBCL scores for rejected males decreased by 11.8 points to 55.8 at 18 months while CBCL scores for non-rejected males only decreased by 2.6 points to 57.8 (table not shown). A trend toward significance existed for substance abuse with a difference in change between non- and low-substance abusing youth ( $b = 5.67, p < .10$ ). CBCL scores decreased for non-substance abusing males, from 60.6 at baseline to 56.4 at 18 months. CBCL scores of low-substance abusing males increased 1.5 points but remained in the borderline category. CBCL scores also decreased more for high- than low-substance abusing males ( $b = -9.70, p < .05$ ) from 64.8 to 56.5 (table not shown).

Caregiver-reported aggression and delinquency decreased by 1.2 points from baseline to 18 months, but remained in the borderline range, for females (table not shown). Changes in CBCL scores were significantly different between levels of age, deviant peer associations, and peer rejection, with a trend toward significance for monitoring (Table 3-3). As females age, CBCL scores decreased with the most notable differences between the oldest and youngest children. The differences in change for 14- and 15-year-olds compared to 11-year-olds was approximately 8 points ( $b = -8.10, p \leq .001$ , and  $b = -7.88, p \leq .01$ , respectively). CBCL scores increased by 2.6 points for 11-year-olds to 62.5 (borderline range), while decreasing for 14-year-olds, by 5.5 to 59.5, and for 15-year-olds, by 5.2 to 58.0 (table not shown). CBCL scores also changed more for females with deviant peers than those without ( $b = -6.83, p < .05$ ). Scores decreased by over 7 points to 62.3 for females with deviant peers while decreasing by .4 point to 59.7 for females without deviant peers (table not shown). Rejected females showed greater decreases in CBCL scores than non-rejected females ( $b = -$

6.02,  $p \leq .05$ ). CBCL scores for rejected females decreased by 6.4 to 58.8 at 18 months while decreasing only .3 for non-rejected females to 60.3 (table not shown). The difference in CBCL change between low and average monitored females was significant ( $b = 8.12$ ,  $p < .01$ ). Low monitored females decreased in their CBCL scores over 18 months, by 6.2 points to 57.5, whereas average monitored females increased their scores, by 1.9 points to 63.7 (table not shown).

Table 3-3

Factors Predicting Changes in Caregiver-Reported Aggressive and Delinquent Behavior over 18 Months by Gender

Predictor Variables (Reference group)	Males		Females	
	Beta	F	Beta	F
Intercept	57.68***		59.00***	
Model minus intercept (df)		12.83 (34)***		6.67 (36)***
CWS (In Home) x Wave (Baseline)		1.80		1.01
Out-of-Home	8.89		3.96	
Mixed Type	2.55		-1.56	
Age (11 yrs) x Wave (Baseline)		2.82*		4.54**
12 yrs	-4.96		-3.16	
13 yrs	-.64^		-3.26	
14 yrs	-.95		-8.10***	
15 yrs	4.12^		-7.88**	
Race/Ethnicity (White) x Wave (Baseline)		1.53		1.30
Black	2.00		-2.01	
Hispanic	5.84		-3.56	

Other	.47		-2.38
Maltreatment ( <i>Physical</i> ) x Wave ( <i>Baseline</i> )		1.13	1.43
Sexual	-7.47		-.43
Failure to provide	-1.50		.43
Failure to supervise	-2.69		2.84
Other	-.99		4.47
Deviant Peers ( <i>No</i> ) x Wave ( <i>Baseline</i> )		NA	4.64*
Yes	NA		-6.83*
Peer Rejection ( <i>No</i> ) x Wave ( <i>Baseline</i> )		6.61*	5.74*
Yes	-9.20*		-6.02*
Monitoring ( <i>Low</i> ) x Wave ( <i>Baseline</i> )		NA	2.92 <sup>t</sup>
Average	NA		8.12*
High	NA		3.75
Substance Abuse ( <i>None</i> ) x Wave ( <i>Baseline</i> )		2.67 <sup>t</sup>	NA
Low	5.67 <sup>t</sup>		NA
High	-4.03 <sup>^</sup>		NA

\* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$  <sup>t</sup>Trend ( $p < .10$ ) NA = Not applicable (variable was not included in model)  
Males: Unweighted  $n = 357$ ,  $R^2 = .18$  Females: Unweighted  $n = 518$ ,  $R^2 = .20$   
Caregiver rater variable was included in all models to control for different caregivers at baseline and 18 months but is not presented. Main effects were included in models but are not presented.  
<sup>^</sup> Groups were significantly different when 12-year-olds were the reference group: 13-year-olds ( $b = 5.59$ ,  $p < .05$ ), 15-year-olds ( $b = 9.07$ ,  $p < .01$ ).  
<sup>^^</sup> Groups were significantly different when low substance abuse was the reference group: High substance abuse ( $b = -9.70$ ,  $p \leq .05$ ).

### *Factors Predicting Change in Self-Reported Delinquent Behavior over 18 Months*

Predictors of changes in the probability of moderate/serious SRD were examined for males and females (Table 3-4). The multistage modeling approach used in the current research resulted in the inclusion of only one child factor (self-reported aggression) and one caregiver factor (discipline) in the final male SRD model. While the omnibus F was

significant ( $F = 7.39, p < .001$ ), SRD changes over 18 months did not vary by level of child welfare services, maltreatment, race/ethnicity, age, aggression, or discipline. Baseline and 18-month probabilities of moderate/serious SRD (table not shown) indicate an overall increase for males, by .07 to .33.

The probability of moderate/serious SRD increased for females overall, changing from .21 to .28 (table not shown). Change in SRD varied significantly by child welfare services and age (Table 3-4). Resulting odds ratios for wave interactions are interpreted as a ratio of odds ratios. The ratio between baseline and 18 months in the odds moderate/serious SRD for females living in mixture of placements is .11 times the ratio in odds of moderate/serious SRD for in-home females ( $OR = .11, p < .01$ ) and .09 the ratio in odds for females living in out-of-home care ( $OR = .09, p < .05$ ). Specifically, the probability of moderate/serious SRD decreased for mixed placement type females, from .55 to .31, and increased for in-home females, from .16 to .27, and for out-of-home females, from .20 to .35 (table not shown). The probability of moderate/serious SRD decreased for 13-year-olds females (from .33 to .28) while increasing for 11-, 12-, and 15-year-olds—from .04 to .19, .13 to .21, and .09 to .28, respectively (table not shown).

Table 3-4

Factors Predicting Transition from No or Minor Delinquent Behavior to Moderate or Serious Delinquent Behavior over 18 Months by Gender

Predictors <i>(Reference group)</i>	No/Minor SRD versus Moderate/Serious SRD			
	Males		Females	
	Odds Ratio	F	Odds Ratio (95% CI)	F
Model minus intercept (df)		7.39 (31)***		6.65 (33)***
CWS ( <i>In-Home</i> ) x Wave ( <i>Baseline</i> )		.04		4.91**
Out of Home, 18 months	.20		1.14	
Mixed, 18 months	.00		.11**^	
Age ( <i>11 yrs</i> ) x Wave ( <i>Baseline</i> )		.48		3.29*
12 years, 18 months	.84		.25^^	
13 years, 18 months	.08		.08***	
14 years, 18 months	-.08		.19	
15 years, 18 months	-.43		.59^^	
Race/Ethnicity ( <i>White</i> ) x Wave ( <i>Baseline</i> )		2.00		1.03
Black, 18 months	.69		.68	
Hispanic, 18 months	1.43		1.62	
Other, 18 months	1.89		.46	
Maltreatment Type ( <i>Physical</i> ) x Wave ( <i>Baseline</i> )		.27		.43
Sexual, 18 months	.23		1.96	
Failure to provide, 18 months	.32		1.56	
Failure to supervise, 18 months	-.42		1.49	
Other, 18 months	.56		2.78	
Aggression ( <i>Normal</i> ) x Wave ( <i>Baseline</i> )		1.10		.16

Borderline/Clinical, 18 months	-1.09		
Relatedness to Caregiver ( <i>High</i> ) x Wave ( <i>Baseline</i> )		NA	1.21
Low, 18 months	NA		3.03
Average, 18 months	NA		.66
Discipline ( <i>Unharsh</i> ) x Wave ( <i>Baseline</i> )		1.19	NA
Harsh, 18 months	-.77		NA

\* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$  †Trend ( $p < .10$ ) NA = Not applicable (variable was not included in model)

^ Groups were significantly different when out-of-home was the reference group: Mixed (OR = .19,  $p \leq .05$ ).

^^ Groups were significantly different when 13-year-olds were the reference group: 12-year-olds (OR = 3.12,  $p < .001$ ), 15-year-olds (OR = 7.32,  $p < .05$ ).

Males: Unweighted  $n = 357$  Females: Unweighted  $n = 518$

Main effects were included in models but are not presented.

## Discussion

This study examined levels of caregiver- and self-reported aggression and delinquency in youth reported as victims of child maltreatment in the U.S. and factors associated with change over 18 months. Findings are discussed in terms of study hypotheses. Limitations of the current research are then discussed. Implications for theory, practice, research, and policy are then discussed.

Contrary to expectations, the aggressive and delinquent behavior levels of males and females did not differ significantly at baseline. Both males and females, on average, were reported by caregivers as exhibiting borderline levels of aggression and delinquency. Approximately 57% of youth were classified as having either borderline or clinical levels of behavior, over three times greater than the 17% of the normative sample (Achenbach, 1991a). This figure is particularly disturbing because children with high CBCL externalizing scores exhibit many of the characteristics associated with Conduct Disorder (Achenbach, 1991). Also, though the majority of males and females (55%) reported no SRD at baseline,

14% of youth reported serious delinquent behavior. Changes in CBCL scores are similar for males and females but the probability of moderate/serious delinquency is somewhat higher for males at baseline (.26 versus .21) and 18 months (.33 versus .28).

As anticipated, different factors are associated with changes in aggression and delinquency over 18 months for males and females. Factors associated with changes in CBCL scores are limited to age and peer rejection for males. CBCL scores for females change across levels of age, deviant peer associations, and peer rejection. Increased probability of moderate/serious SRD is associated with child welfare services and age for females. No variables are significant in the male SRD model, indicating that changes in SRD are stable across all variables included in the model.

Peer rejection was indicative of greater change in CBCL scores than non-rejection for males and females though rejected and non-rejected youth had similar 18-month CBCL scores. This contrary finding may be partially attributable to the manner in which peer rejection was defined. In many studies rejection is measured using peer sociometric ratings of the most and least liked children (Dodge et al., 2003; Lewin et al., 1999) but NSCAW used a self-reported measure of loneliness and social dissatisfaction that correlates with peer rejection (Asher & Wheeler, 1985). Having peer sociometric ratings would have provided a more precise definition of rejection. Additionally, more frequently, peer rejection is studied in terms of the influence of early elementary school rejection on antisocial behavior in later elementary school (Miller-Johnson, Coie, Maumary-Gremaud, Bierman, & the Conduct Problems Research Group, 2002) or from early elementary school to middle school or early high school (Bolger & Patterson, 2001; Miller-Johnson, Coie, Maumary-Gremaud, Lochman, & Terry, 1999). If peer rejection for youth had also been measured retrospectively for

elementary school, a different association may have been identified with current aggression and delinquency. Rejection may be a more useful measure when examining behaviors over time of the children in the NSCAW sample who were in early elementary school at baseline—these analyses are currently being conducted in other research by the author.

Associating with deviant peers was indicative of greater change in CBCL scores than not associating with deviant peers for females. A link between deviant peer associations and problem behavior is well-established in the literature (Kosterman et al., 2001; Loeber et al., 1998; Gerald R. Patterson, Dishion, & Yoerger, 2000). Most of the literature on deviant peer associations examines only males or does not examine gender differences but when differences are examined, peer associations are usually predictive of delinquency for males (Fishbein & Pérez, 2000). Deviant peer associations were defined by only one variable in the CBCL models and two variables in the SRD models. If additional variables had been available to create a more rigorous measure of antisocial peer associations, findings for this factor might have been more substantial. Females tend to be more interpersonally oriented than males (Block, 1983) which may explain why peer characteristics figure more prominently in behavior change than for males.

Substance abuse was associated with of high levels of aggression and delinquency at baseline for both caregiver- and youth-reported aggression and delinquency for both males and females. As mentioned previously, the high correlation ( $r = .91$ ) between substance abuse and SRD for males led to omission of this predictor in SRD multivariate models for males, but this association is also verification that substance abuse co-occurs with SRD. Extensive literature exists on the association between substance abuse and antisocial behavior. Substance abuse is associated with violent behavior in youth (Office of Applied

Studies - Substance Abuse and Mental Health Services Administration, 2002b) and has been found to predict persistent delinquency as well as internalizing problems (Loeber, Stouthamer-Loeber, & White, 1999). Maltreatment occurring in adolescence is also associated with substance abuse, with a greater proportion of maltreated than non-maltreated chronic juvenile offenders using drugs: 17% versus 9% (Ireland et al., 2002). Substance abuse is also associated with other youth behaviors that may harm youth including depression, suicide, and risky sexual behavior (Costello, Erkanli, Federman, & Angold, 1999; Office of Applied Studies - Substance Abuse and Mental Health Services Administration, 2002a; Tapert, Aarons, Sedlar, & Brown, 2001). Consequently, addressing substance abuse as a primary treatment goal may serve to remedy multiple challenges such youth may be facing.

Girls aged 11 years at baseline were reported by caregivers as exhibiting significantly greater increases in aggressive and delinquent behavior over time than all other ages. This difference was greatest for the 14- and 15-year-olds. One explanation may be maturation—the oldest girls, aged 16.5 to 17.5 years at 18-month follow-up, may have been outgrowing problem behaviors. In contrast, the youngest girls, now approximately aged 12 years at follow-up, may be starting to engage in more problem behavior.

Contrary to expectations, physically abused and neglected youth did not exhibit higher levels of aggression and delinquency at baseline. Nor did changes in aggression and delinquency vary across maltreatment types. These youth are experiencing a multitude of issues that may be overshadowing the influence of maltreatment type on behavior. Also, the fact of maltreatment, rather than the type, may be the greater issue. Numerous studies have demonstrated that maltreated youth are significantly more likely to engage in delinquent and

aggressive types of behaviors than non-maltreated peers e.g., (Stouthamer-Loeber et al., 2001; Thornberry et al., 2001; Widom, 1989b).

Changes in SRD vary by child welfare services. SRD probability was particularly high at baseline (.55) for females living in a mixture of placements types and decreased over 18 months while SRD increased for in-home and out-of-home. This behavioral improvement may be an indication that a placement either out of the home or a return to the home may have assisted in improving problem behavior.

Interestingly, low-monitored females were reported by caregivers as exhibiting increasing lower levels of aggression and delinquency compared to average-monitored females. While numerous studies (Loeber et al., 1998; Lavoie, Hébert, Tremblay, Vitaro, Vézina, & McDuff, 2002; Patterson & Dishion, 1985) link low monitoring to increased problem behaviors, perhaps some portion of low-monitored females are exhibiting few problem behaviors and are, consequently, monitored less by caregivers.

The proportion of youth reporting serious SRD at baseline who also reported harsh discipline was extremely high: 82% of males and 92% of females. Behavior and discipline are likely to have a reciprocal influence. Caregivers dealing with youth with serious problem behaviors face more challenges to parenting and some may use excessive physical discipline if lacking effective parenting skills. Communicating clear expectations and consequences for behavior, engaging in problem-solving talk that cues similar child responses and persistence in constructive teaching until child conflict passes are examples of skillful parenting (Snyder & Stoolmiller, 2002). Bivariate findings confirm past research indicating harsh discipline is positively associated with SRD (Palmer & Hollin, 2001). Because harsh discipline is consistently associated with later aggressive behavior (Farrington, 1989; Herrenkohl, Egolf,

& Herrenkohl, 1997; Moffitt & Caspi, 2001), this is a particularly important intervention target. Caregivers need support and information on effective parenting methods, which may reduce youth problem behavior and the harsh disciplinary tactics that often serve to exacerbate rather than remedy problem behavior.

### *Implications*

Many factors influence children: their family history (including parenting practices, family relationships, and parental psychopathology), their peer relations (issues such as rejection, acceptance, and number of friends), and a myriad of inherent individual characteristics such as gender and ethnicity and various malleable factors such as learning disabilities, aggressive behavior, social skill deficits, and HIA problems. Because of the reciprocal interchanges between children and the many systems with which they interact, simple explanations of the cause of aggression and delinquency and the methods of changing behavior do not exist. The current study was an initial examination of aggression and delinquency in the first national probability sample of maltreated youth to collect information from children, families, teachers, and child welfare workers.

Findings indicate that, on balance, maltreated youth are functioning within the average range as evidenced by group means, but exhibit more problems than youth in the general population when proportions are compared. More maltreated youth are experiencing risks including more HIA problems (24% versus 5%), low social skills (37% versus 16%), caregiver-reported depression (23% versus 5%), self-reported aggression (20% versus 5%), and poverty (50% versus 12%) (Achenbach, 1991a, 1991c; Gresham & Elliott, 1990; Proctor & Dalaker, 2002).

Multi-faceted programs addressing the various systems with which a child interacts are effective in improving family relations and serious behavioral problems of children (Henggeler, Mihalic, Rone, Thomas, & Timmons-Mitchell, 1998). Programs such as Incredible Years, Strengthening Families Program, and Brief Strategic Family Therapy address risk and protective factors in multiple realms and have been effective in reducing delinquency, substance abuse, sexual behavior and improving parenting skills such as relatedness and monitoring (Kumpfer & Tait, 2000; Robbins & Szapocznik, 2000; Webster-Stratton, 2000).

While practitioners and researchers have direct experience and knowledge of serious child behavior problems, policy makers and funding agencies may need to be educated further. For decision makers, who must pay particular attention to cost effectiveness in developing policies and distributing funds, the cost of not treating antisocial youth can be presented to demonstrate the need for programs to prevent and reduce delinquent behavior. Cohen (1998) estimated the cost to society in terms of financial and material losses and non-tangibles such as loss of quality of life and suffering. According to Cohen's calculations, a career criminal costs society from \$1.3 to \$1.5 million, a heavy drug user from \$370,000 to \$970,000, and a high school dropout from \$243,000 to \$388,000. Such stunning figures demonstrate a strong need to prevent youth from continuing on an antisocial pathway into adulthood. Effective intervention now means reduced problems and reduced costs later. The costs of intervention (e.g., \$2,300 for 12 families for the Strategic Family Program) pale in comparison to the longer-term costs to society of career criminals, high school dropouts, and heavy drug users.

Some gender differences merit further examination of potentially different pathways to antisocial behavior males and females. Deviant peer associations, peer rejection, and monitoring appear to have different implications for males and females, in terms of antisocial behavior as well as other long-term outcomes. Future theory development should consider and test these relationships separately for males and females.

Future research should also examine in more detail what was a first overview of this rich dataset. An examination of the influence of accumulating risks should be conducted. Also, future research should study in-home children only to take advantage of the abundant data available on this largest (and under-studied) segment of the population. Additionally, examining smaller blocks of independent variables such as caregiver characteristics only, particularly with the in-home population would enable the use of more rigorous measures and increased sample size and power.

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## CHAPTER IV

### RISKY BEHAVIOR IN MALTREATED YOUTH AT ENTRY TO CHILD WELFARE SERVICES AND 18-MONTHS LATER

The purpose of the current study is to identify factors associated with differing levels of risky behavior, including risky sexual behavior, substance abuse, and suicide risk, and their changes over 18 months in a national probability sample of adolescents reported as victims of maltreatment. Identifying factors that link to different levels of risky behavior, including differences for males and females, can inform decisions about specific intervention targets for reducing such behaviors in maltreated youth.

Risky behaviors are behaviors that increase the likelihood of health- and life-compromising outcomes (Jessor, 1992). Unprotected sexual contact, substance abuse, and self-harming behaviors (e.g., suicide attempts) are among the youth behaviors commonly viewed as “health-risk behaviors” (Centers for Disease Control and Prevention, 2004); indeed, these are arguably the most important of the spectrum of high risk behaviors. Maltreated youth are at greater risk than non-maltreated youth of engaging in risky behaviors, including multiple sexual partners and infrequent condom use (Newcomb, Locke, & Goodyear, 2003), substance abuse (Moran, Vuchinich, & Hall, 2004), and intentional self-injury and suicide attempts (Martin, Bergen, Richardson, Roeger, & Allison, 2004). Risky behaviors also interact with each other, creating the odds for a variety of negative developmental outcomes. For example, adolescent substance abuse is associated with greater

odds having sexual intercourse, sex with multiple partners, and a history of pregnancy (Boyer, Tschann, & Shafer, 1999). Suicidal behavior is also more frequent when youth are under the influence of alcohol or drugs (Brent, Baugher, Bridge, Chen, & Chiapetta, 1999).

Different types of maltreatment are sometimes associated with different types of risky behaviors, though associations are not consistent across studies. A longitudinal study of risky behavior of foster care youth found that neglect, but not sexual or physical abuse, was related to more substance abuse while maltreatment type was not associated with changes in suicidal or risky sexual behavior (Taussig, 2002). Data from the longitudinal National Survey of Child and Adolescent Well-being (NSCAW) indicate that sexually abused youth had greater odds of having had sexual intercourse than youth who had experienced physical abuse, neglect, or other maltreatment types (U.S. Department of Health and Human Services Administration for Children and Families, in press-a). In a smaller longitudinal study, sexual and physical abuse, but not neglect, were associated with increased odds of adolescent suicide attempts (Brown, Cohen, Johnson, & Smailes, 1999).

The evidence that child maltreatment is associated with subsequent risky behavior is largely generated from small studies with chance point-in-time samples. At its best (Lynch & Cicchetti, 1998), the evidence often fails to account for whether or not children received child welfare services to address or prevent problem behaviors that may be the result of their exposure to maltreatment. The literature on the association of risky behavior with child welfare services is almost non-existent. Although child welfare services are intended, primarily, to ensure the safety of children from victimization by others, services are also expected to promote the more general well-being of children so that they may grow into independent and contributing members of society (Pecora, Whittaker, Maluccio, Barth, &

Plotnick, 2000). In one of the few longitudinal studies of the relationship between involvement with child welfare services and risky behavior, Taussig and her colleagues (2001) found that foster care youth reunified with the families from which they were removed, compared to non-reunified foster care youth, were more likely to report adverse outcomes six years after first entering care, including self-destructive/suicidal behavior, substance abuse, delinquency, lower academic achievement, and lower social competence. The authors reasoned that the negative outcomes for reunified youth may have been due to problems still present in the home, reunification-related stressors, and differences among caregivers in risk factors such as poverty.

Far less is known about the impact of child welfare services involvement on risky behavior for children remaining at home versus removal and placement into out-of-home care. Most research of child welfare services involvement has examined children living in out-of-home care. The studies that have examined children remaining in the home did not examine the intersection of child welfare services with sexual, substance abusing, or suicidal behavior (Jonson-Reid, 2002; Jonson-Reid & Barth, 2000; Ryan & Testa, 2004; Widom, 1991). Because nearly 90% of children who receive an investigation for an alleged maltreatment report will subsequently remain at home, understanding how they fare under these conditions—compared to those children who enter out-of-home care—is critical to understanding how maltreated children fare following report of their maltreatment.

Child welfare services-involved adolescents exhibit more aggression, delinquency, attention problems and lower social skills than youth in the general population (Wall, Barth, & the NSCAW Research Group, in press). These problems and others appear to be magnified for maltreated youth living in out-of-home placements. While child safety is one

consideration in placing a child into out-of-home care, behavior problems may also be a factor in placing maltreated youth into more structured settings such as group care or treatment foster care rather than kinship or non-kinship foster care (Courtney, 1998). NSCAW data indicate that maltreated youth living in non-kinship foster care or group care exhibit higher levels of violent and delinquent behavior than maltreated youth remaining in their own home (U.S. Department of Health and Human Services Administration for Children and Families, in press-a).

Age is also associated with increases in risky behavior in maltreated and non-maltreated populations. Maltreated youth who had lived in foster care for a minimum of five months were followed up six years later, with the discovery that substance abuse and risky sexual behavior, but not suicidal behavior, increased with age (Taussig, 2002). Suicide was more common for youth aged 16 years or older than youth less than 16 years in a study that compared youth who had committed suicide to a matched comparison group (Brent et al., 1999). Additionally, older youth were more likely than youth under 16 years to be intoxicated when they committed suicide and to meet psychiatric diagnostic criteria.

#### *Factors Associated with Risky Behavior*

Many other factors that are prevalent among maltreated youth may influence adolescent risky behaviors and be influenced by child welfare services. Understanding how factors influence risky behavior in maltreated youth is important to assessing the contribution of child welfare services to mediating the adverse impact of child maltreatment on risky behavior. From an ecological perspective (Bronfenbrenner, 1979, 1989), numerous factors influence behavior. Various factors within the child, peer group, family, school, and community interact and may serve to influence adolescent risky behaviors (Corcoran, 2000;

Jessor, 1992). The proximal realms of child, peer, and family are the focus of the current research. Because child, peer, and caregiver factors may also be associated with the experience of maltreatment as well as the sequelae, these factors are next discussed.

*Academic achievement and school engagement.* Compared to children and youth with no maltreatment history, those with a history of maltreatment tend to have poorer academic achievement, including lower grades and achievement test scores (Kendall-Tackett & Eckenrode, 1996; Kinard, 1999). In research from the National Longitudinal Study of Adolescent Health (AddHealth), academic achievement in the form of a high grade point average reduced the likelihood of suicide attempts for males (Borowsky, Ireland, & Resnick, 2001). Higher reading achievement has also been associated with less drug use in males (Huizinga, Loeber, & Thornberry, 1994), whereas lower academic functioning doubled the odds of pregnancy by age 20 in a 20-year longitudinal study of New Zealand children (Woodward, Fergusson, & Horwood, 2001). School engagement, related to achievement, appears to serve as protection against risky behaviors as well. Males who were highly committed to school at baseline exhibited less drug use one year later compared to males whose commitment to school was low. Alternately, males with low school commitment at baseline exhibited more drug use than highly committed males one year later (Huizinga et al., 1994).

*Social skills.* Maltreated children tend to exhibit less self-control and interpersonal skills than non-maltreated children (Fantuzzo, Weiss, Atkins, Meyers, & Noone, 1998; U.S. Department of Health and Human Services Administration for Children and Families, in press-a). A clear association has not been established between the lack of social skills and all types of risky behavior but dysfunctional styles of emotional regulation and emotionally

driven behavior are central characteristics of risky behavior (Cooper, Wood, Orcutt, & Albino, 2003). In addition, youth with low social skills may not have the ability to communicate with a partner regarding safe sex practices (Taylor-Seehafer & Rew, 2000). For example, Champion and her colleagues (2004) found that maltreated adolescent females often had poor coping skills, which often led to negative outcomes in the form of multiple sexual partners and substance abuse. Literature on the influence of maltreatment on social information processing deficits indicates that physically abused children are significantly less attentive to relevant social cues, more likely to attribute hostile intent, and less likely to generate competent solutions than non-abused peers (Dodge, Bates, & Pettit, 1990). These deficits predicted aggressive behavior. Additionally, social information processing skills of children living in foster care accounted for a significant portion of variance in externalizing behaviors six to eight months later (Price & Landsverk, 1998). Specifically, information processing deficits that reflect biased, irrelevant and incompetent processing of information were associated with more externalizing behaviors.

*Aggression.* Aggression is also more prevalent in maltreated than non-maltreated youth (U.S. Department of Health and Human Services Administration for Children and Families, in press-a) and often presages other risky behavior. Aggression as a stable personality characteristic was found to be associated with teen childbearing (Miller-Johnson et al., 1999). Similarly, the National Household Survey on Drug Abuse (NHSDA) found that violent behavior was more prevalent in 12- to 17-year-olds who reported any illicit drug or alcohol use in the past year (Office of Applied Studies - Substance Abuse and Mental Health Services Administration, 2002). Suicide risk is also greater for aggressive than non-aggressive youth (Flannery, Singer, & Wester, 2001; Vannatta, 1997).

*Depression.* Maltreatment is associated with a greater likelihood of depression in youth (Schraedley, Gotlib, & Hayward, 1999). Girls reported as depressed by caregivers at 8 years had a higher probability of child bearing from 15 to 19 years than non-depressed girls (Miller-Johnson et al., 1999). Depression, particularly at clinical levels, has been consistently cited as a risk factor for suicide (Brent et al., 1993; Wannan & Fombonne, 1998; Weller, Young, Rohrbaugh, & Weller, 2001).

*Hyperactivity-impulsivity-attention (HIA) problems.* HIA problems are more characteristic of maltreated children than non-maltreated children as well (Simmel, Brooks, Barth, & Hinshaw, 2001). Evidence does exist for an association between HIA problems and risky behavior, though the literature is not extensive. Woodward and her colleagues (2001) found that high levels of HIA problems almost tripled the odds of pregnancy by age 20. Also, HIA problems were associated with increased odds of substance abuse by 10-year-old males but not 13-year-old males (Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998).

*Antisocial peers and peer rejection.* Maltreated youth may associate with antisocial peers more frequently than non-maltreated youth (Arellano, Kuhn, & Chavez, 1997; Bank & Burraston, 2001) and these peer relations may influence risky behaviors. Youth who tend to associate with antisocial peers are more likely to be sexually active and use alcohol or drugs (Huizinga et al., 1994; Woodward et al., 2001). Associating with antisocial peers does not appear to be related to suicidal behavior. Alternately, peer rejection may be one link in a chain of events that can lead to suicidal behavior. Youth not accepted by peers may feel lonely and depressed (Vernberg, 1990), which can lead to suicidal behavior. Some

characteristics of a youth's family relationships and parent characteristics may also influence risky behaviors.

*Relatedness, monitoring, and discipline.* Relatedness to caregivers, caregiver monitoring, and consistent discipline may all serve as protection against substance abuse (Borowsky et al., 2001; Huizinga et al., 1994). Alternately, when these characteristics are low, particularly relatedness, risky behaviors may increase. For example, conflict with parents was more typical of youth who committed suicide or were exhibiting suicidal behaviors than of comparison group youth (Brent et al., 1999; Wannan & Fombonne, 1998). Lower levels of caregiver monitoring of youth activities also increases the opportunity for youth to engage in sexual activity and substance abuse (Newman, Fox, Flynn, & Christeson, 2000).

*Parent cumulative risk.* Family dysfunction, such as parental substance abuse, parental arrest, and domestic violence, is often more common in the homes of maltreated than non-maltreated children (Cox, Kotch, & Everson, 2003; DePanfilis & Zuravin, 1999; Kelleher, Chaffin, Hollenberg, & Fischer, 1994; Phillips, Burns, Wagner, Kramer, & Robbins, 2002). Family problems such as psychopathology, domestic violence, and substance abuse are consistently associated with increases in all types of risky behaviors (Brent et al., 1999; Champion, Shain, & Piper, 2004; Fergusson, Horwood, & Lynskey, 1994).

*Poverty.* Poverty is also more prevalent in maltreated populations with half of families of maltreated children living below the poverty line compared to 11% of the general U. S. population (U.S. Department of Health and Human Services Administration for Children and Families, in press-a). The relationship between poverty and risky behaviors is

at least partially explained by the factors that are a consequence of poverty. Children living in poverty often have fewer educational opportunities, live in higher crime areas where drugs and weapons are more available, and may be less well monitored by caregivers who are working long hours or are preoccupied with stressors of their own. Stressful life events, often related to financial problems, are associated with ineffective discipline and conduct problems in children and youth (Liaw & Brooks-Gunn, 1994; Stern, Smith, & Jang, 1999).

*Gender differences.* Gender differences exist in risky behavior and the factors associated with risky behavior, though findings are not consistent. Of youth who had experienced consensual sex, non-virginal status was associated with an increased risk of suicide attempts for females only (Orr, Beiter, & Ingersoll, 1991). In other research, the probability of initiating cannabis use increased as the number of conduct problems increased much more for females than for males (Pedersen, Mastekaasa, & Wichstrøm, 2001). A high grade point average served as protection against suicide attempts for males while emotional well-being served the same function for females (Borowsky et al., 2001). Brent and colleagues (1999) found that substance abuse and a history of child maltreatment were two factors that increased the likelihood of males committing suicide but not females.

### *Hypotheses*

In summary, maltreated youth face a number of challenges in addition to their experience of maltreatment. In addition to more frequently engaging in various types of health-risk behaviors, maltreated youth, more frequently than non-maltreated peers, have social skill deficits, academic problems, depression, peer relationship struggles, and relationship issues with caregivers. Many experience harsh discipline and are living in

poverty. Little is known about the influence of child welfare services on risky behaviors and in conjunction with these factors.

The current paper is the first examination of risky behaviors in a national probability sample of maltreated children. Several hypotheses were tested: (1) risky behavior levels differ for males and females as do the factors associated with changes in risky behavior over 18 months; (2) sexually abused youth engage in higher levels of risky sexual behavior at baseline and experience less improvement in risky sexual behavior over 18 months than youth experiencing other types of maltreatment; and (3) older youth exhibit higher levels of risky behavior at baseline than younger youth.

#### Methods

Data are from the National Survey of Child and Adolescent Well-being (NSCAW), the first national longitudinal probability study of child welfare to collect extensive data from children, caregivers, teachers, and child welfare workers. The NSCAW sample was generated from a two-stage stratified sampling design intended to maximize the precision of estimates related to children in the child welfare system. A total of 40 states were selected and 36 agreed to participate in NSCAW and were divided into nine strata. From these strata, primary sampling units (PSUs) were randomly selected. PSUs were defined as a geographic area encompassing the population served by a child welfare agency, usually a county, but in a few cases two or three contiguous counties were grouped to form a single PSU. Children were then randomly selected from PSUs monthly over 16 months, from September 1999 through December 2000. All children who had gone through the formal investigation or assessment that followed report of child abuse or neglect were eligible for selection. Stratification at the child-level was also conducted. Infants (less than one year), children

receiving in-home child welfare services, children receiving out-of-home services, and sexually abused children were over-sampled. Substantiated and unsubstantiated cases were included, providing the opportunity to examine children and families who did and did not receive child welfare intervention after an investigation of child maltreatment (NSCAW Research Group, 2002).

Once the frame was selected, field interviewers obtained contact information from the child welfare agency and approached the family to introduce the study and secure consent to participate. Only the oldest children from NSCAW—those aged 11 to 15 years at baseline—were included in the current research. Data are from the baseline and 18-month interviews<sup>5</sup>.

### *Measures*

A brief description of measures is next, including internal consistency as indicated by Cronbach's alpha for baseline measures. (For more information on NSCAW refer to [http://www.acf.dhhs.gov/programs/core/ongoing\\_research/afc/wellbeing\\_intro.html](http://www.acf.dhhs.gov/programs/core/ongoing_research/afc/wellbeing_intro.html), the Administration for Children and Families website.)

*Risky behaviors.* Risky behaviors measured were risky sexual behavior, substance abuse, and suicidal behavior. A *risky sexual behavior* score measuring voluntary sexual behaviors associated with an increased likelihood of sexually transmitted diseases and pregnancy was created using a three-item index: (1) Had youth ever had intercourse (1 = if youth answered “Yes” and first experience was voluntary, 0 = involuntary first intercourse experience or youth had never had intercourse); (2) Consistency of use of protection for sexual intercourse (0 = “Always” or not applicable, 1 = “Often,” 2 = “Sometimes,” or 3 = “Never or rarely”); and (3) Had youth ever been pregnant or gotten someone pregnant (0 = “No” or not applicable, 1 = “Yes”). Scores ranged from 0 to 5: 0 = No risk; 1 = Low risk

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<sup>5</sup> Data for 36-month follow-up were not available at the time of analyses for the current research.

(youth has had intercourse but has used protection consistently and has never been pregnant or gotten someone pregnant); 2 to 5 = High risk (inconsistent use of protection and possible pregnancy).

*Substance abuse* was measured by questions about the frequency of use of seven substances in the previous 30 days. Substances were weighted by seriousness of the substance— No use = 0; cigarettes and chewing tobacco = 1; alcohol, inhalants, and non-prescribed medications = 3; marijuana = 5; and hard drugs = 7—and multiplied by frequency of use—0 = 0 days, 1 = 1 to 2 days, 2 = 3 to 11 days, and 3 = 12 or more days. These weighted frequencies were then summed for a total substance abuse score, ranging from 0 to 66: 0 = No use; 1 to 6 = Low use (at a minimum, tobacco use  $\geq$  12 days); 7 to 14 = Moderate use (use of alcohol, inhalants, and/or non-prescribed medications three or more times and some marijuana use); and 15 to 66 = High use (more frequent use of multiple drugs and more serious types of drugs—marijuana and hard drugs). Internal consistency in the current sample is high ( $\alpha = .90$ ).

A *suicidal behavior* risk score was created using a combination of items from the Child Behavior Checklist (Achenbach, 1991a), Youth Self Report (YSR: Achenbach, 1991b), and the Children's Depression Inventory (CDI: Kovacs, 1992). Six items ask the youth and caregiver about thoughts, plans, and suicide attempts of the youth. Scores range from 0 to 17: 0 = No risk; 2 to 3 = Low risk (Has had suicidal thoughts in the past two weeks); or 4 to 17 = High risk (Has deliberately tried to harm self and/or has had suicidal thoughts in the past two weeks, and has a plan).

*Child and family demographics.* Child demographics measured included gender, age, and race/ethnicity. *Gender* was defined as male or female. *Age* was defined as the child's

age in years at the time of the initial interview. *Race and ethnicity* were collapsed into Black/Non-Hispanic/Latino, White/Non-Hispanic/Latino, Hispanic, and Other race/ethnicity. Ethnicity was considered before race; consequently, children identified as Hispanic/Latino were classified as such regardless of their race and children who identified as non-Hispanic/Latino were classified by their race (i.e., Black, White, or Other).

*Maltreatment.* Maltreatment type was defined from information reported by the child welfare worker using a slight modification of the Maltreatment Classification System (Manly, Cicchetti, & Barnett, 1994). Maltreatment type was defined as the most serious type of alleged maltreatment (physical abuse, sexual abuse, neglect-failure to provide, neglect-failure to supervise, or other maltreatment type) of all types related to the current report.

*Child welfare services.* Child welfare services setting at baseline was defined as remaining in the home and receiving no child welfare services (In-home no CWS), living in the home and receiving child welfare services (In-home CWS), non-kinship foster care, kinship foster care,<sup>6</sup> group care, and other type of out-of-home care. Child welfare services over 18 months were defined as in-home, out-of-home, or mixed as follows: In-home meant living In-home no CWS or In-home CWS at baseline and 18 months and living in out-of-home care for less than 5% of the 18-month period; Out-of-home (OOH) was defined as living in non-kinship foster care, kinship foster care, group care, or other out-of-home placement at baseline and 18 months and lived in out-of-home care for greater than 95% of the 18-month period; and Mixed type included all others.

*Child characteristics.* Child factors measured were academic achievement, school engagement, social skills, depression, aggression, HIA problems, conduct problems, and

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<sup>6</sup> Kinship care was designated only when the state retained legal custody of the youth. If a youth was living with a relative and the relative had legal custody of the youth, CWS setting was classified as in-home.

sexually assaultive behavior. *Academic achievement* was measured using the Mini-Battery of Achievement (Woodcock, McGrew, & Werder, 1994). The mean of standardized Reading and Math scores (mean = 100 and standard deviation) was used, with academic achievement defined as Low (< 85), Average (85 to 115), or High (>115), resulting in good internal consistency in the sample ( $\alpha = .79$ ). *School engagement* was created from seven items that asked youth how often they enjoyed being in school, tried to do their best work, found classes interesting, listened carefully in class, completed their homework, and got along with teachers and other students. Scores ranged from 1 to 4, with higher scores indicating higher school engagement. Internal consistency is good in the current sample ( $\alpha=.72$ ). *Social skills* were measured using caregiver reported Social Skills Rating System (SSRS) standardized scores—mean = 100 and standard deviation = 15 (Gresham & Elliott, 1990). Social skills were defined as Low (< 85), Average (85 to 115), or High (>115) with internal consistency high in the current sample ( $\alpha = .91$ ). *Depression, Aggression, and HIA problems* were measured using the CBCL (Achenbach, 1991a) and YSR (Achenbach, 1991a) T scores from the Anxious/Depressed, Aggressive Behavior, and Attention Problems subscales. T scores were classified as normal ( $T < 67$ ) or borderline/clinical ( $T \geq 67$ ). Internal consistency in the current sample is high: Anxious/Depressed (CBCL:  $\alpha = .88$ , YSR:  $\alpha = .87$ ), Aggressive Behavior (CBCL:  $\alpha = .91$ , YSR:  $\alpha = .86$ ), Attention Problems (CBCL:  $\alpha = .83$ , YSR:  $\alpha = .81$ ). Similarly, CBCL and YSR *Externalizing Behavior* T scores, a combination of the Aggressive and Delinquent Behavior subscales, were used to measure behaviors associated with conduct disorder. T scores were classified as normal ( $T < 60$ ) or borderline/clinical ( $T \geq 60$ ). Internal consistency in the current sample is good (CBCL:  $\alpha = .92$  and YSR:  $\alpha = .90$ ). *Sexually assaultive behavior* was included in risky sexual behavior models and was measured

using two items from the Self-Report Delinquency (SRD; Elliott & Ageton, 1980) at baseline and 18 months: “In the past 6 months, have you physically hurt or threatened to hurt someone to get them to have sex with you?” and “In the past 6 months, have you had or tried to have sexual relations with someone against their will?” Youth responses of “yes” to either question classified a youth as sexually assaultive.

*Peer Characteristics.* Peer factors measured were deviant peer associations and peer rejection. *Deviant peer associations* were defined by one item on the CBCL (Achenbach, 1991a), “Hangs around with kids who get in trouble,” and one item on the YSR (Achenbach, 1991b), “I hang around with kids who get in trouble.” Caregiver or youth responses of “very true” or “often true” classified a youth as having antisocial friends. *Peer rejection* was measured by self-report using a slight modification of the Peer Loneliness and Social Dissatisfaction Scale (PLSD; Asher & Wheeler, 1985) that asks questions about how true various statements are regarding such things as making friends and having children to play with at school. Scores ranged from 16 to 80 with higher scores indicating more loneliness and social dissatisfaction. Youth were described as Rejected ( $\geq 1$  standard deviation above the mean, scores  $\geq 45$ ) or Non-rejected ( $< 45$ ). Internal consistency in the current sample is high ( $\alpha = .90$ ).

*Caregiver characteristics.* Caregiver factors measured were relatedness to caregiver, caregiver monitoring of youth, discipline, poverty level, and parent cumulative risk. *Relatedness* to the primary and secondary caregiver was measured using a shortened version of the Relatedness scale from the Rochester Assessment Package for Schools, RAPS (Connell, 1991; Lynch & Cicchetti, 1991). A mean rather than a summed score was created to account for the fact that not all children answered the same number of questions.

Relatedness is described as Low ( $< 2.5$ ), Average (2.5 to 3.49), or High ( $\geq 3.5$ ) with high internal consistency in the current sample ( $\alpha = .88$ ). *Monitoring* by the caregiver was defined by five questions asked of youth about the primary caregiver (Dishion, Patterson, Stoolmiller, & Skinner, 1991). Monitoring is described as Low ( $< 3.5$ ), Average (3.5 to 4.5), or High ( $> 4.5$ ) with good internal consistency in the sample ( $\alpha = .71$ ). *Discipline* was measured by adolescent report from the Parent-Child Conflict Tactics Scale, CTS-PC (Strauss, 2001; Strauss, Hamby, Finkelhor, Moore, & Runyan, 1998). Harsh discipline was said to have occurred if any of the Very Severe or Severe Physical Assault items had ever occurred, or the Minor Physical Assault score was at or above the 90<sup>th</sup> percentile (Hotelling, Straus, & Lincoln, 1989). *Poverty level* which was calculated based on procedures followed by the U.S. Census Bureau (Dalaker, 2001), which includes both the family's income level and the number of adults and children in the household. A family was defined as living in poverty if the family poverty level was less than 100% of poverty (i.e., below the poverty line). *Parent cumulative risk* measured the proportion of total risks present during the investigation for each family. Items include prior reports of maltreatment, caregiver substance abuse, caregiver mental health problems, caregiver arrest history, high stress on family, low social support, and past or current domestic violence. (Risk items related to child functioning were omitted because of association with the outcomes in question.) The score was created by summing the items answered affirmatively and dividing this number by the total applicable to each family (e.g., families wherein there was not a secondary caregiver present would not have these items included in their score). The distribution of scores was divided into tertiles to create three categories of cumulative risk: Low ( $\leq 20\%$  of the total

risks), Moderate (21% to 39%), and High ( $\geq 40\%$ ). Internal consistency is good in the current sample ( $\alpha = .78$ ).

### *Analyses*

Data were analyzed with SAS - callable SUDAAN® version 8.02 (Research Triangle Institute, 2002) to adjust the standard errors, account for the clustering and stratification in the sampling design, and allow for inferences about the population of children investigated as victims of child maltreatment in the U.S. Weighted data with the unweighted sample size are presented. Bivariate descriptive analyses were performed using chi-square and t statistics to assess associations at baseline for hypotheses 1, 2, and 3. Following descriptive analyses of the sample at baseline, multivariate analyses of risky behavior changes over 18 months were conducted with logistic regression using generalized estimating equations (GEE) for hypotheses 1 and 2. The central feature of longitudinal analyses is the ability to study change directly through repeated observations of individuals. With such repeated measures, the problem of autocorrelation between observations for each individual arises as well as the autocorrelation of subjects within the same PSU. Traditional methods, such as ordinary least squares (OLS) regression, render inaccurate estimations with longitudinal data—the OLS assumption that observations are independent of one another is violated in longitudinal data because of the nesting of measures within subjects and subjects within PSUs. GEE is a marginal approach model that corrects for these autocorrelations (Diggle, Heagerty, Liang, & Zeger, 2002).

SUDAAN was the software chosen because, in addition to utilizing GEE, this software can handle the complex sampling design and the sample weights. The standard error estimates that are typically produced by software packages such as SAS and SPSS

assume simple random sampling, resulting in underestimates of standard errors when used with complex datasets such as NSCAW, which leads to biased estimates. SUDAAN uses Taylor series linearization and GEE for estimating standard errors, accounting for NSCAW's design complexity, including unequal weighting, stratification, and clustering of observations (U.S. Department of Health and Human Services Administration for Children and Families, 2004). In the current study, baseline weights were employed for baseline observations and 18-month weights were employed for 18-month observations. For further explanation of weighting choices across waves, refer to the NSCAW 18-month report (U.S. Department of Health and Human Services Administration for Children and Families, in press-b).

Weights were calculated for subjects at each wave with the purpose being to obtain unbiased estimates of means, proportions, regression coefficients, etc. in addition to allowing for inferences to children reported as victims of maltreatment nationally. Sample weights were constructed in stages, with adjustments made due to missing months of sample frame data or types of children (e.g., unsubstantiated cases, children not receiving child welfare services), non-response, and undercoverage (Dowd et al., 2003). Consequently, sample weights must always be used to obtain unbiased estimates of the population parameters (U.S. Department of Health and Human Services Administration for Children and Families, 2004).

Though many variables were of interest, including all variables in the model often resulted in estimation problems because some cell sizes were 0 and models would not run. Therefore, a multistage approach was used. Separate correlation matrices (not shown) were produced for males and females to inform decisions about variables to be included in final multivariate models. Variables highly correlated ( $r \geq .45$ ) or non-significantly ( $p > .15$ ) correlated with risky behavior measures were omitted from those multivariate models. Other

variables were excluded from models because of high correlations ( $r > .50$ ) between independent measures.

Next, preliminary multivariate models were run. (In all multivariate models, interaction terms were created, interacting wave with each variable, to measure change from baseline to 18 months.) The first model included age, race/ethnicity, child maltreatment, child welfare services, and child and peer characteristics—main effects and wave interactions. F statistics for child and peer interactions significant at  $p < .15$  from the first model were maintained to be entered, along with main effects, in the final model. (A significance level of  $p < .15$  was used in preliminary models to prevent exclusion of variables that might play an important role in final models.) Then a similar process was followed for the next preliminary model, including main effects and interactions for caregiver rather than child and peer characteristics. A final logistic regression was conducted including main effects and significant interactions from the first and second models along with child welfare services, age, race/ethnicity, and child maltreatment. This process was followed for males and females for the three risky behavior measures. Resulting odds ratios for wave interactions are interpreted as a ratio of odds ratios. For example, in Table 4-2,  $OR = 11.63$  for females living in out-of-home care, indicating that the ratio between baseline and 18 months in the odds of engaging in risky sexual behavior for out-of-home females was over 11 times the ratio in odds for in-home females. This odds ratio explanation for an interaction is different from the way main effects odds ratios are translated and is less interpretable. Consequently, baseline and 18-month predicted margins of the three risky behavior measures were obtained for categories within each variable (e.g., in-home, out-of-home and mixed placement type) conditioned on all other variables in the model. These baseline and 18-

month values, not shown in tables, are interpreted as probabilities of a risky behavior occurring (e.g., low or high risky sexual behavior). Predicted marginals are discussed only for significant findings.

## Results

A full description of the sample, including issues of missing data and subject attrition, precedes the presentation of bivariate findings related to variation in baseline levels of risky sexual behavior, substance abuse, and suicide risk by demographics, child maltreatment, child welfare services, and child, peer, and caregiver characteristics. Multivariate findings related to risky behavior changes over 18 months follow.

The initial sample frame included all children aged 11 to 15 years at baseline who were reported and investigated as victims of maltreatment. The original sample of 1179 11- to 15-year-olds was reduced to 858 (73% of sample) due to missing data and subject attrition. Youth excluded from the current study were those with missing data for (1) risky behavior measures at both waves; (2) both waves for any child, peer, or caregiver factor included in final models; or (3) child welfare services setting, maltreatment type, race/ethnicity, or age.

Response bias analyses of the total NSCAW sample determined the extent of differences between responders and non-responders to the 18-month interviews. Subjects were compared on approximately 40 variables<sup>7</sup>. Once biases were identified, these differences were accounted for in the sample weights with a final bias of  $\leq 4\%$  in all cases (Dowd et al., 2003). To examine possible bias due to missing data specific to the current research, baseline data for the sample of youth in final multivariate models (350 males and

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<sup>7</sup> These were crucial variables from baseline that were also considered for use in the 18-month weighting response adjustment, including sampling strata, sampling domains, gender, race, age, CWS status, maltreatment type, type of insurance coverage, overall health status of the child, and urbanicity and size of the PSU.

442 females<sup>8</sup>) were compared to baseline data for youth excluded from final models (n=297). Several significant differences existed between youth included in analyses and those excluded from further analyses. Youth in the final sample reported significantly higher scores than youth excluded from the final sample for depression ( $t = 2.29, p < .05$ ), HIA problems ( $t = 2.55, p < .05$ ), and peer rejection ( $t = 2.08, p < .05$ ). Caregivers reported significantly higher scores for the final sample for aggression ( $t = 2.20, p < .05$ ) and conduct problems ( $t = 2.19, p < .05$ ). Parent cumulative risk scores, reported by the child welfare worker, were also significantly higher for included than excluded youth ( $t = 3.25, p < .01$ ). Included youth did not differ significantly from excluded youth by gender, race/ethnicity, age, maltreatment type, or child welfare services. All remaining analyses focus on included youth (the final sample).

The final sample of 858 youth had an average age of 12.7 years and 57% were female. The racial/ethnic breakdown was approximately 30% Black, 49% White, 15% Hispanic, and 7% Other race/ethnicity. Breakdown for most serious type of maltreatment reported was approximately 33% physical abuse, 15% sexual abuse, 10% neglect-failure to provide, 31% neglect-failure to supervise, and 11% other maltreatment type.

Table 4-1 provides univariate statistics by gender for all risky behavior measures and factors considered for multivariate analyses. Youth who have been reported as victims of maltreatment report low levels of risky sexual behavior, substance abuse, and suicidal behavior. Most child and peer factors are within the normative/low range, though means were often higher than means for youth in the general population (Achenbach, 1991), with

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<sup>8</sup> Total sample size at baseline (n = 792) is smaller than sample size in final multivariate models (n = 858) because some youth were missing data at baseline but not 18 months.

Table 4-1

Risky Behaviors and Child, Peer, and Caregiver Characteristics at Baseline by Gender

Baseline Measures		Males		Females	
		Mean	SE	Mean	SE
<u>Risky Behaviors</u>	Sexual Behavior	.6	.2	.5	.1
	Substance Abuse	3.9	1.8	2.8	.8
	Suicidal Behavior	1.5	.3	1.9	.3
<u>Child/Peer Factors</u>					
	Academic Achievement	90.8	1.6	95.3	1.7
	School Engagement	3.0	.1	3.2	<.1
	Social Skills	91.3	1.4	90.3	1.4
	Depression (CBCL)	59.7	.8	59.3	.9
	Depression (YSR)	55.0	1.2	55.3	.8
	Aggression (CBCL)	62.4	.9	62.4	1.0
	Aggression (YSR)	57.7	1.0	58.0	.8
	HIA Problems (CBCL)	62.4	.9	60.4	.8
	HIA Problems (YSR)	58.3	1.5	57.4	.7
	Externalizing Behavior (CBCL)	61.2	1.0	61.2	1.3
	Externalizing Behavior (YSR)	53.7	1.8	54.9	1.1
	Sexually Assaultive Behavior	2.0	<.1	2.0	<.1
	Peer Rejection	30.7	1.0	30.8	1.3
	Deviant Peers (CBCL/YSR)	1.7	.1	1.8	<.1
<u>Caregiver Factors</u>					
	Relatedness to Caregiver	3.3	.1	3.2	.1
	Monitoring*	4.0	.1	4.3	.1
	Discipline	1.4	.1	1.3	<.1
	Poverty Rate	1.4	.2	1.4	.1
	Parent Cumulative Risk	.3	<.1	.3	<.1

NOTE: Unweighted sample size ranges from 335 to 350 for males and 392 to 442 for females due to varied levels of missingness at baseline. CBCL = Child Behavior Checklist; YSR = Youth Self Report

\* p < .05

the exception of CBCL externalizing scores. Caregivers reported that youth were exhibiting conduct problems at baseline that exceeded the normative level, into the borderline category (Externalizing T scores of 60 to 63). Poverty and parent cumulative risk were also high in maltreated youth. On average, youth were living at 140% of the poverty line, functionally near the poverty level for most. Parent cumulative risk scores were in the medium range indicating that parents of these youth had experienced 30% to 40% of problems for which risk assessment items were answered (e.g., domestic violence, prior reports of maltreatment,

substance abuse). Males and females were similar across risky behaviors and all child, peer, and caregiver factors with the exception of monitoring. Males report significantly lower caregiver monitoring than females ( $t = -2.12, p < .05$ ).

### *Baseline Levels of Risky Behaviors by Child Welfare Services Setting, Maltreatment, and Demographics*

Age differed across levels of risky sexual behavior and substance abuse but not suicide risk for males. Males reporting no risky sexual behavior were significantly younger (Mean = 12.4 years, SE = .09) than males reporting low (Mean = 14.0 years, SE = .32;  $t = -4.48, p < .001$ ) or high (Mean = 13.2 years, SE = .23;  $t = -3.36, p < .01$ ) levels of risky sexual behavior. Males reporting no or low substance abuse (Mean = 12.5 years, SE = .12, and Mean = 12.8 years, SE = .30, respectively) were significantly younger ( $t = -3.18, p < .01$ , and  $t = -2.56, p < .05$ , respectively) than males reporting higher levels of substance abuse (Mean = 13.6 years, SE = .34).

Age differences across risky behaviors for females were similar to males with the exception of suicide risk. Females exhibiting no suicide risk were significantly younger than females exhibiting high levels of suicidal behaviors (12.6 years versus 13.2 years;  $t = -2.47, p < .05$ ). Otherwise, females exhibiting no risky sexual behavior were significantly younger (12.5 years) than females exhibiting low- (13.8 years;  $t = -9.63, p < .001$ ) or high-risk (13.9 years;  $t = -5.58, p < .001$ ) sexual behavior. Females reporting no substance abuse were significantly younger (12.6 years;  $t = -3.26, p < .01$ ) than higher substance abusing females (13.4 years).

Only one significant association existed for race/ethnicity, across all risky behaviors—substance abuse level for males ( $\chi^2 = 14.12, p < .05$ ). Most notably, fewer than

5% of Black males reported moderate-to-high levels of substance abuse compared to 13% of White males and 13% of Hispanic males.

Only risky sexual behavior varied by maltreatment type for females ( $\chi^2 = 19.88$ ,  $p < .05$ ). When all possible pairs of comparisons were made, the level of risky sexual behavior for sexually abused females differed from females with a most serious maltreatment type of failure to provide or other maltreatment type. Eight percent (8%) of sexually abused females reported high levels of risky sexual behavior compared to 1% for failure to provide and less than 1% for other maltreatment type. Substance abuse and suicidal behavior did not vary by maltreatment type.

Suicide risk varied by child welfare services at baseline for females ( $\chi^2 = 25.38$ ,  $p \leq .01$ ). Almost half (47%) of females living in group care reported high levels of suicide risk compared to 21% of females remaining in the home and not receiving child welfare services, 15% in-home receiving child welfare services, 9% in foster care, 9% in kinship foster care, and 24% in other types of out-of-home placements. Risky sexual behavior and substance abuse did not vary by child welfare services at baseline for males or females.

#### *Risky Sexual Behavior: Changes over 18 Months*

For males, the probability of engaging in risky sexual behavior increased by 65% from baseline to 18 months: from .23 to .38 (table not shown). Differences in sexually assaultive behavior and caregiver monitoring were associated with differences in risky sexual behavior change (Table 4-2). Males who reported sexually assaultive behavior reported much greater increases in the probability of risky sexual behavior than non-sexually assaultive males. The ratio between baseline and 18 months in the odds of engaging in risky sexual behavior for sexually assaultive males was over 114 times the ratio in odds of

experiencing the outcome for non-sexually assaultive males (OR = 114.31,  $p < .05$ ). Specifically, the probability of risky sexual behavior increased 210% (from .31 to .96) for sexually assaultive males and 61% (from .23 to .37) for non-sexually assaultive males (table not shown). Low caregiver monitoring was associated with reductions in risky sexual behavior compared to high and medium levels of caregiver monitoring (OR = .08,  $p < .01$ , and OR = .20,  $p < .05$ , respectively). For males reporting low levels of caregiver monitoring, the probability of risky sexual behavior decreased 16% (from .44 to .37) while increasing 74% (from .23 to .40) for moderately monitored males and 270% (from .10 to .37) for highly monitored males (table not shown).

For females, the probability of engaging in risky sexual behavior increased 50% over 18 months: from .22 to .33 (table not shown). Risky sexual behavior change differed significantly by child welfare services, race/ethnicity, and maltreatment type (Table 4-2). The ratio between baseline and 18 months in the odds of risky sexual behavior for females living predominantly in out-of-home care was almost 12 times the ratio in odds of risky sexual behavior for females who remained predominantly in-home (OR = 11.63,  $p < .05$ ) and almost 20 times the ratio for females who lived in a mixture of placements (OR = 19.91,  $p < .01$ ). Specifically, the probability of risky sexual behavior increased 248% (from .21 to .72) for out-of-home females while increasing less for in-home females (58%, from .19 to .30) and for females living in a mixture of placements (27%, from .37 to .47) (table not shown).

Race/ethnicity was also significantly associated with risky sexual behavior change. Black females reported significantly less risky sexual behavior change than White (OR = .29,  $p < .05$ ), Hispanic (OR = .18,  $p < .05$ ), and Other race/ethnicity (OR = .04,  $p < .001$ ) females. Examining baseline and 18-month probabilities of risky sexual behavior clarifies these

Table 4-2

Change in Odds of Low/High Sexual Behavior over 18 Months by Gender

Predictors <i>(Reference group)</i>	Males		Females	
	Odds Ratio	F	Odds Ratio	F
Model minus intercept (df)		6.60 (33)***		7.77 (33)***
CWS ( <i>In-Home</i> ) x Wave ( <i>Baseline</i> )		2.32		3.77*
Out of Home, 18 months	.28		11.63*^	
Mixed, 18 months	.26		.58	
Age ( <i>11 yrs</i> ) x Wave ( <i>Baseline</i> )		2.46		2.16
12 years, 18 months	2.27		.38	
13 years, 18 months	1.18		.43	
14 years, 18 months	6.81		.16	
15 years, 18 months	1.74		1.07	
Race/Ethnicity ( <i>White</i> ) x Wave ( <i>Baseline</i> )		1.99		5.41**
Black, 18 months	2.22		.29*	
Hispanic, 18 months	.76		1.58^	
Other, 18 months	10.53		8.03*^	
Maltreatment Type ( <i>Physical</i> ) x Wave ( <i>Baseline</i> )		.68		4.46**
Sexual, 18 months	.87		1.43	
FTP, 18 months	.30		22.85***^	
FTS, 18 months	1.28		2.63	
Other, 18 months	1.99			
Sexually Assaultive ( <i>No</i> ) x Wave ( <i>Baseline</i> )		4.06*		1.99
Yes, 18 months	114.31*		.20	

Social Skills ( <i>Above Average</i> ) x Wave ( <i>Baseline</i> )	NA	2.41
Below Average, 18 months	NA	2.09
Average, 18 months	NA	6.45
Caregiver Monitoring ( <i>High</i> ) x Wave ( <i>Baseline</i> )	4.60*	NA
Low, 18 months	.08**^	NA
Average, 18 months	.38	NA

\* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$  <sup>t</sup>Trend ( $p < .10$ ) Males: Unweighted  $n = 368$  Females: Unweighted  $n = 490$

NA = Not applicable (variable not included in model) FTP = Failure to provide FTS = Failure to supervise  
Main effects were included in models but are not presented.

^ For males, groups were significantly different when the reference group was medium monitoring: Low (OR = .20,  $p < .05$ ).

For females, groups were significantly different when the reference group was: Mixed: OOH (OR = 19.91,  $p < .01$ ); Hispanic: Black (OR = .18,  $p < .05$ ) and Other: Black (OR = .04,  $p < .001$ ); Sexual: FTP (OR = 16.00,  $p < .01$ ); FTS: FTP (OR = 8.68,  $p < .05$ ).

relationships. The probability of risky sexual behavior for Black females decreased 7% over 18 months—from .27 to .25—while increasing for White (60%, from .20 to .32), Hispanic (95%, from .20 to .39) and Other race/ethnicity (308%, from .12 to .49) females. Among females, risky sexual behavior change also varied by maltreatment type. Females with a most serious maltreatment type of failure to provide reported greater risky sexual behavior change than physically abused females (OR = 22.85,  $p < .001$ ), sexually abused females (OR = 16.00,  $p < .01$ ), and females with a most serious maltreatment type of failure to supervise (OR = 8.68,  $p < .05$ ). Although the probability of engaging in risky sexual behavior increased for all maltreatment types, this increase was the greatest for females who experienced failure to provide as the most serious maltreatment type—an increase of 675% over 18 months (from .04 to .34)—much greater than for females who experienced physical abuse (18%, from .28), sexual abuse (39%, from .23), or failure to supervise (79%, from .19). The probability of risky sexual behavior at 18 months was similar across maltreatment types.

*Substance Abuse: Changes over 18 Months*

The probability of substance abuse for males increased 45% (from .29 to .42) over 18 months (table not shown). Depressed males reported significantly less change in substance abuse than non-depressed males—OR = .10,  $p < .01$  (Table 4-3). Specifically, the probability of substance abuse increased 62% (from .26 to .42) for non-depressed males and decreased 39% (from .62 to .38) for depressed males (table not shown).

The probability of substance abuse increased 50% (from .30 to .45) over 18 months for females (table not shown). Substance abuse change varied by caregiver relatedness for females (Table 4-3). Females who reported low caregiver relatedness reported less substance

Table 4-3

Change in Odds of Low/High Substance Abuse over 18 Months by Gender

Predictors <i>(Reference group)</i>	Males		Females	
	Odds Ratio	F	Odds Ratio	F
Model minus intercept (df)		9.49 (35)***		8.88 (41)***
CWS ( <i>In-Home</i> ) x Wave ( <i>Baseline</i> )		1.48		1.47
Out of Home, 18 months	5.60		.80	
Mixed, 18 months	1.53		.33	
Age ( <i>11 yrs</i> ) x Wave ( <i>Baseline</i> )		1.28		2.06
12 years, 18 months	1.01		7.41	
13 years, 18 months	.42		1.74	
14 years, 18 months	.93		1.88	
15 years, 18 months	.10		1.91	
Race/Ethnicity ( <i>White</i> ) x Wave ( <i>Baseline</i> )		2.03		1.36
Black, 18 months	1.04		1.47	
Hispanic, 18 months	.38		2.81	
Other, 18 months	18.94		3.61	
Maltreatment Type ( <i>Physical</i> ) x Wave ( <i>Baseline</i> )		.90		1.75
Sexual, 18 months	1.73		5.35	
FTP, 18 months	.48		1.25	
FTS, 18 months	.72		2.02	
Other, 18 months	.16		6.50	
Academic Achievement ( <i>High</i> ) x Wave ( <i>Baseline</i> )		NA		1.38
Low, 18 months	NA		.98	
Average, 18 months	NA		2.24	
Depression ( <i>Normal</i> ) x Wave ( <i>Baseline</i> )		8.05**		NA

Borderline/Clinical, 18 months	.10**		NA
Suicide Risk ( <i>None</i> ) x Wave ( <i>Baseline</i> )		NA	.78
Low, 18 months	NA		.48
High, 18 months	NA		.58
Deviant Peers ( <i>No</i> ) x Wave ( <i>Baseline</i> )		2.59	NA
Yes, 18 months	3.41		NA
Relatedness to Caregiver ( <i>High</i> ) x Wave ( <i>Baseline</i> )		NA	4.89**
Low, 18 months	NA		.06**^
Average, 18 months	NA		.82
Monitoring ( <i>High</i> ) x Wave ( <i>Baseline</i> )		1.90	NA
Low, 18 months	.21		NA
Average, 18 months	.89		NA
Discipline ( <i>Unharsh</i> ) x Wave ( <i>Baseline</i> )		NA	3.66 <sup>t</sup>
Harsh, 18 months	NA		2.82 <sup>t</sup>

\* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$  <sup>t</sup>Trend ( $p < .10$ ) Males: Unweighted  $n = 368$  Females: Unweighted  $n = 490$

NA = Not applicable (variable not included in model) FTP = Failure to provide FTS = Failure to supervise  
Main effects were included in models but are not presented.

<sup>^</sup> For females, groups were significantly different when the reference group was Average relatedness: Low relatedness ( $OR = .07, p < .01$ ).

abuse change than females reporting average or high levels of relatedness ( $OR = .07, p < .01$ , and  $OR = .06, p < .01$ , respectively). More precisely, the probability of substance abuse decreased 35% (from .66 to .43) for females reporting low caregiver relatedness while increasing for females with average (71%; from .28 to .48) and high (111%; from .19 to .40) levels of caregiver relatedness. A trend toward significance existed for discipline ( $F = 3.66, p < .10$ ). The degree of substance abuse change was greater for harshly disciplined females than females reporting unharsh discipline ( $OR = 2.82, p < .10$ ). The probability of substance

abuse increased 94% (from .32 to .62) for harshly disciplined females but only 31% (from .29 to .38) for unharshly disciplined females.

*Suicidal Behavior: Changes over 18 Months*

Suicidal behavior was the only risky male behavior for which the probability decreased over 18 months. The probability of suicidal behavior decreased 34%, from .31 to .21 (table not shown). Changes in suicide risk varied by age and caregiver relatedness (Table 4-4). Thirteen-year-old males experienced greater changes in suicide risk than any other age group, increasing in risk while all other groups decreased. At baseline, 13-year-olds had the lowest probability of suicidal behavior (.10) that increased most (170% to .27), higher than all but the 11-year-olds. Suicide risk decreased for all other age groups: 11-year-olds (38%, .45 to .28), 12-year-olds (50%, .36 to .18), 14-year-olds (65%, .34 to .12), and 15-year-olds (60%, .60 to .24). Suicide risk for males reporting average caregiver relatedness changed less than for males reporting low levels of relatedness (OR = .03,  $p < .05$ ), decreasing only 3% (from .33 to .32) compared to 77% (from .77 to .18). A trend toward significance existed for self-reported aggression ( $F = 3.68$ ,  $p < .10$ ), with suicidal risk behavior decreasing more for aggressive males (52%, from .71 to .34) than for non-aggressive males (33%, from .27 to .18).

Table 4-4

Change in Odds of Low/High Risk Suicidal Behavior over 18 Months by Gender

Predictors <i>(Reference group)</i>	Males		Females	
	Odds Ratio	F	Odds Ratio	F
Model minus intercept (df)		18.63 (37)***		3.7 (33)***
CWS ( <i>In-Home</i> ) x Wave ( <i>Baseline</i> )		1.55		.27
Out of Home, 18 months	3.68		1.29	
Mixed, 18 months	.29		1.98	
Age (11 yrs) x Wave ( <i>Baseline</i> )		3.40*		1.03
12 years, 18 months	.73^		.25	
13 years, 18 months	14.01**		.57	
14 years, 18 months	.45^		.39	
15 years, 18 months	.33^		.68	
Race/Ethnicity ( <i>White</i> ) x Wave ( <i>Baseline</i> )		.89		.71
Black, 18 months	.37		2.18	
Hispanic, 18 months	.33		1.99	
Other, 18 months	.42		1.75	
Maltreatment Type ( <i>Physical</i> ) x Wave ( <i>Baseline</i> )		1.99		.59
Sexual, 18 months	.80		.66	
FTP, 18 months	2.22		2.53	
FTS, 18 months	.30		1.22	
Other, 18 months	.33		2.44	
Achievement ( <i>High</i> ) x Wave ( <i>Baseline</i> )		1.62		NA
Low, 18 months^	2.56		NA	
Average, 18 months	.67		NA	
Aggression ( <i>Normal</i> ) x Wave ( <i>Baseline</i> )		3.68 <sup>t</sup>		NA

Borderline/Clinical, 18 months	.22	NA	
Substance abuse ( <i>None</i> ) x Wave ( <i>Baseline</i> )		NA	2.08
Low, 18 months	NA	.47	
Moderate to High, 18 months	NA	.16	
Peer Rejection ( <i>No</i> ) x Wave ( <i>Baseline</i> )		NA	6.92**
Yes, 18 months	NA	.13**	
Relatedness to Caregiver ( <i>High</i> ) x Wave ( <i>Baseline</i> )		3.49*	NA
Low, 18 months	.09 <sup>^</sup>	NA	
Average, 18 months	3.24	NA	
Monitoring ( <i>High</i> ) x Wave ( <i>Baseline</i> )		NA	2.88 <sup>t</sup>
Low, 18 months	NA	.22*	
Average, 18 months	NA	.96	

\* $p \leq .05$  \*\* $p \leq .01$  \*\*\* $p \leq .001$  <sup>t</sup>Trend ( $p < .10$ ) Males: Unweighted  $n = 368$  Females: Unweighted  $n = 490$

NA = Not applicable (variable not included in model) FTP = Failure to provide FTS = Failure to supervise  
Main effects were included in models but are not presented.

<sup>^</sup> For males, groups were significantly different when the reference group was: 13-year-olds: 12-year olds (OR = .05,  $p < .05$ ), 14-year-olds (OR = .03,  $p < .01$ ), and 15-year-olds (OR = .02,  $p < .05$ ); Average relatedness: Low relatedness (OR = .03,  $p < .05$ ).

For females as well, suicidal behavior was the only risk behavior for which the probability decreased over 18 months, although it decreased only slightly for females—6% from .36 to .34 (table not shown). Changes in suicide risk varied by peer rejection (Table 4-4). Rejected females exhibited less of an increase in suicidal behavior than non-rejected females (OR = .13,  $p < .01$ ). Specifically, the probability of suicidal behavior decreased 54% (from .63 to .29) for rejected females while increasing 19% (from .32 to .35) for non-rejected females. A trend toward significance existed for monitoring ( $F = 2.88$ ,  $p < .10$ ). Low monitoring was associated with significantly less change in suicidal behavior than high monitoring (OR = .22,  $p < .05$ ). Low monitored females, like rejected females, exhibited a very high probability of suicidal behavior at baseline that decreased substantially over 18

months—38%, from .65 to .40. The probability of exhibiting any suicidal behavior increased slightly for highly monitored females (3%, from .31 to .34) and did not change for average monitored females (.34 at both times).

## Discussion

Current findings are evidence of the problems that many maltreated youth are experiencing. Means for risk factors were within the normative range (Table 1), though the proportions of maltreated youth exhibiting low social skills or borderline/clinical levels of depression, HIA problems, or aggressive and non-aggressive conduct problems are two to six times greater than youth in the general population (Achenbach, 1991a, 1991b; Gresham & Elliott, 1990). Also, a much larger proportion of maltreated youth are living below the poverty line—49%, compared to 12% of the U. S. population and 16% of individuals ages 24 and younger in the U. S. (Proctor & Dalaker, 2002).

Despite expectations, maltreated males and females exhibit similar levels of risky behavior at baseline. Though, on average, risky behaviors of maltreated youth are low, substantial proportions are reporting increases. Twenty-three percent of maltreated youth report increases in substance abuse, 20% report increases in risky sexual behavior, and 9% exhibit higher levels of suicide risk. Gender differences are more evident when examining changes in risky behavior and factors associated with changes.

The probability of risky sexual behavior increases over 18 months for males and females. Change in risky sexual behavior is greater for sexually assaultive than non-sexually assaultive males. Because so few males report sexually assaultive behavior (3% at baseline and at 18 months), this association should be interpreted with caution. (The association

between sexually assaultive behavior and risky sexual behavior was not significant at baseline or 18 months.)

Risky sexual behavior decreases for low monitored males but increases for males monitored at moderate or high levels, though the probability of risky sexual behavior is similar across groups at 18 months. In past research, monitoring has decreased the odds of risky sexual behavior for males, while not impacting the behavior of females (Borawski, Ievers-Landis, Lovegreen, & Trapl, 2003).

The probability of substance abuse increases over 18 months for males and females. The probability of substance abuse increases to the mean (.42) for non-depressed males while decreasing for depressed males, from a high of .62 to slightly below the mean. The meaning of this finding is not clear. Some research finds an association between depressive behavior and substance abuse when both are measured for more than one time point, though substance abuse tended to be more prevalent in males who were exhibiting delinquent behaviors in addition to internalizing types of behaviors (Loeber, Stouthamer-Loeber, & White, 1999).

For females, the degree of substance abuse change differs by caregiver relatedness. Unexpectedly, the probability of substance abuse decreases for females who felt a low sense of relatedness to their caregiver(s). These girls had the highest probability of substance abuse by far that decreased to near the group mean. Still, females reporting high caregiver relatedness report the lowest probability of substance abuse at both time points. Generally, better parental relations are associated with a reduction in various types of problem behaviors. For example, good parental relations in the form of trust were associated with decreased odds of tobacco and marijuana use for females while exerting no influence on the substance abuse of males (Borawski et al., 2003).

Contrary to other risky behaviors, the probability of suicide risk decreases over 18 months for males and females. For males, changes in suicide risk vary by age, caregiver relatedness, and aggression. The probability of any suicide risk decreases over 18 months for all age groups except the 13-year-olds, for whom behavior increases. This was also the group for which the probability of exhibiting any suicide risk was lowest at baseline.

The probability of suicide risk decreases substantially over 18 months for maltreated males reporting low relatedness, from a high of .77 down to .18, while remaining fairly stable for males reporting average levels of relatedness (.33 at 18 months). Though changes in suicide risk behavior for males reporting high caregiver relatedness do not differ from males with lower levels of relatedness, males reporting high relatedness at baseline or 18 months have the lowest probability of suicide risk behavior at baseline (.27) and at 18 months (.11). Several studies have found an association between better caregiver relations and less suicidal behavior, though gender differences were not examined (Borowsky et al., 2001; Brent et al., 1999; Wannan & Fombonne, 1998).

Suicidal behavior decreases more for aggressive than non-aggressive males, though aggressive males still have a higher probability of suicidal behavior at 18 months (.34 versus .18). Analyses of AddHealth data found that fighting in the past 12 months was associated with a 150% increase in the likelihood of a suicide attempt (Slap, Goodman, & Huang, 2001). Aggression may be a significant indicator of suicidal behavior change for maltreated males.

Most unexpectedly, the probability of exhibiting any suicide risk decreases over 18 months for rejected females while increasing slightly for non-rejected females. The

probability of suicide risk at baseline is particularly high (.63) for rejected females, which may explain the greater decrease.

Highly monitored females have the lowest probability of suicide risk at 18 months (.32) followed closely by moderately monitored females. As with rejected females, the probability of suicide risk at baseline is much higher for low monitored females (.65) than for higher monitored females.

Findings only partially support the second hypothesis—that sexually abused youth will engage in higher levels of risky sexual behavior at baseline. Sexually abused females engage in higher levels of risky sexual behavior at baseline (8%) than females who experienced failure to provide (1%) or other maltreatment (1%). These findings differ from Taussig (2002), who did not find maltreatment type to be significantly associated with risky behavior at six-year followup. Differences from Taussig's work may be due to sample characteristics, follow-up length, foster care definition, or differences in methodology.

The probability of any risky sexual behavior is similar across maltreatment types at 18 months for females. Despite this similarity, risky sexual behavior increases more for females with failure to provide than for sexual abuse, physical abuse, or failure to supervise.

As anticipated, at baseline older youth exhibit higher levels of risky behavior—older age is associated with higher levels of all risky behaviors for females and substance abuse and risky sexual behavior for males. These findings are similar to findings from a study of risky behavior of youth six years after foster care placement that found substance abuse and risky sexual behavior, but not suicidal behavior, increased with age (Taussig, 2002).

Substance abuse and risky sexual behavior often co-occur. As youth get older and have less adult supervision, more autonomy, and more unsupervised time with peers, the opportunity

for engaging in risky behaviors increases. Additionally, alcohol and drugs impair judgment and youth under their influence may engage in behaviors they normally would not—for example, unprotected sex and substance abuse. While suicide may be more frequent in older youth in the general population, (National Center for Injury Prevention and Control, 2004) this pattern held true only for maltreated females in the current research. This difference may be attributable to measurement (suicide completion versus suicidal behavior) or other issues such as the influence of child welfare services on maltreated children.

While age and suicidal behavior are not significantly associated at baseline for males, a significant association exists between age and changes in suicide risk level. Males aged 13 increase more in the probability of suicide risk behavior than all other age groups—they were the lowest as baseline and above group mean at 18 months.

Youth living in out-of-home care at baseline exhibit higher levels of risky behavior than children living at home. Specifically, more females living in group care report higher levels of suicide risk than in any other child welfare services setting. Receipt of child welfare services at baseline is not associated with suicidal behavior for males. Neither risky sexual behavior nor substance abuse at baseline are associated with child welfare services at baseline for males or females.

In multivariate analyses of change over 18 months, out-of-home females report greater increases in risky sexual behavior than females in other child welfare services settings. While placement into more structured environments is often indicative of greater youth and family problems, child welfare services do not appear to be a consistent determinant of differing risky behavior change over 18 months. At 18 months, most youth remain predominantly in the home, whereas by 36 months more youth will have experienced

multiple placements. The number of living transitions for maltreated youth has been associated with substance abuse, delinquency, and internalizing symptoms such as anxiety, depression and withdrawn behaviors (Herrenkohl, Herrenkohl, & Egolf, 2003; Newton, Litrownik, & Landsverk, 2000). Examining the association between risky behavior and the number of placements over 36 months may tell us more about the influence of child welfare services—specifically placement instability, on risky behavior in maltreated youth.

For females, the probability of risky sexual behavior increases greatly over 18 months (248% to .72) for those living predominantly in out-of-home care compared to females remaining in the home or living in a mixture of placements. These findings are somewhat contrary to other research where youth supervised in more structured environments exhibited fewer problem behaviors. Past research has found that maltreated females living in foster care were less likely to have had voluntary sex than maltreated females remaining in the home; but foster care females were also less likely than in-home females to have used birth control for their most recent sexual intercourse experience (Polit, Morton, & White, 1989). NSCAW data indicate that risky sexual behavior is increasing more for youth living predominantly in out-of-home care than those living in a mixture of placements (U.S. Department of Health and Human Services Administration for Children and Families, in press-b). Future research should examine whether this association is due to out-of-home care, the problematic behavior of youth, or some combination of these or other reasons.

### *Limitations*

Limitations exist in the current research. Among them are measurement shortcomings. Child welfare services did not play a prominent role in risky behavior change. An In-home CWS versus In-home no CWS categorization was not available for 18-month

NSCAW data, which may at least partially explain the limited child welfare services findings. In other research, when this distinction was made, maltreated youth receiving child welfare services in the home had a lower risk of juvenile corrections involvement than maltreated youth who remained at home but received no child welfare services (Jonson-Reid, 2002).

The degree of risky behavior change does not vary by level of parent cumulative risk at baseline for males or females. Lack of significant risky behavior changes by parent cumulative risk may be attributable to mismeasurement. The parent cumulative risk score was created from the child welfare worker report of all caregivers at baseline only. Detailed parent self-report of depression, criminality, substance abuse, and domestic violence at each wave were only collected for in-home caregivers.

Neither peer rejection nor having friends “who get into trouble” is associated with risky behavior at baseline. If friends exhibiting specific types of risky behaviors had been measured, significant associations would likely have been found. Sexually active youth often have friends who are sexually active (Kinsman, Romer, Furstenberg, & Schwarz, 1998). Similarly, youth with friends who actively use alcohol and drugs are likely to do so as well (Walden, McGue, Iacono, Burt, & Elkins, 2004) and having friends who have attempted or committed suicide is one risk factor for suicide (Borowsky et al., 2001). Unfortunately, such variables are not available on the NSCAW dataset. Asher and Wheeler (1985) classified children scoring one standard deviation as rejected, as was done in the current research. The mean score (54) was higher than in the current study than in the sample of third- to sixth graders children Asher and Wheeler examined (Mean = 45). Rejection scores could be higher because this is a different population in age or in terms of maltreatment. This author

is not aware of any studies that use the Peer Loneliness and Social Dissatisfaction Scale with adolescents.

Another limitation of the current research is that 27% of the original sample are lost to this analysis because of missing data or attrition. Youth in the final sample are experiencing higher levels of child, peer, and caregiver risks than those excluded from the final sample; therefore findings are indicative of maltreated youth with greater problems and may be somewhat of an over-estimate of problems in maltreated youth. Additionally, youth in the final sample may show less improvement because of the multitude of challenges they face compared to youth excluded from the final sample.

Multivariate models for maltreated youth who described the probability of high substance abuse, rather than any substance abuse as in the current research, could not be run due to a low proportion of high substance abusing females, but would likely have revealed different findings, implying possibly different targets for intervention when working with high substance abusing maltreated youth versus those reporting lower levels of use.

Finally, methods used in the current study of risky behavior are different from the structural equation modeling (SEM) framework used in many studies that examine adolescent problem behaviors (Ary, Duncan, Duncan, & Hops, 1999; Keiley, Lofthouse, Bates, Dodge, & Petit, 2003). At the time of analyses, software programs were not equipped to handle the complex sampling design of NSCAW for SEM and to produce correctly adjusted standard errors.

### *Implications*

Current findings offer clear evidence of the multiple challenges faced by maltreated youth and their families; problems that practitioners must consider so that appropriate

interventions can be implemented. Multi-faceted programs addressing the various systems with which a child interacts are effective in improving family relations and serious behavioral problems of children (Henggeler, Mihalic, Rone, Thomas, & Timmons-Mitchell, 1998). Programs such as *Incredible Years* (Webster-Stratton, 2000), *Strengthening Families Program* (Kumpfer & Tait, 2000), and *Brief Strategic Family Therapy* (Robbins & Szapocznik, 2000) address risk and protective factors in multiple realms and have been effective in reducing substance abuse and risky sexual behavior and improving parenting skills such as relatedness and monitoring. Yet these programs are almost unknown within child welfare services (Barth et al., in press). Child welfare services respond to children with substantial needs—indeed, an implicit function of child welfare services is to locate, assess, and serve society’s most at-risk children and youth. The limited evidence from this study, that child welfare services are able to broadly assist these children in achieving a safer future, is good reason to move aggressively forward to integrate more evidence-based intervention methods into standard child welfare services.

Although evidence of effective suicide interventions is limited, aspects of more successful approaches include cognitive behavioral strategies, family communication and problem solving (with youth without major depression), short-term intervention (less than six months), and outpatient rather than in-patient treatment (MacGowan, 2004b). Training youth and adults to recognize warning signs for suicide is also important (MacGowan, 2004). Caregivers, other family members, child welfare workers, teachers, peers, and other significant adults in a child’s life that have this information may be able to intervene before serious self-harm occurs.

Maltreated adolescents are facing more challenges to healthy development than youth in the general population and maltreated youth living in out-of-home care are often in need of the most assistance. Child welfare services may be ill equipped to handle the multiple challenges facing youth—at least there is no obvious reduction in problem behavior that results when children are removed from their home environment. Longer follow-up may provide a clearer picture of the role of child welfare services in risky adolescent behavior as shown in other research. Six years after first entering foster care, youth who returned home were exhibiting more problem behaviors than youth who were not reunified, most of who continued to receive child welfare services (Taussig, 2002). Other studies examining child welfare services and behavior, also for approximately six years, have found that maltreated youth receiving in-home or foster care services were at a lower risk of incarceration than maltreated youth who remained at home and received no child welfare services (Jonson-Reid, 2002; Jonson-Reid & Barth, 2000).

Finally, while maltreated adolescent males and females are similar in many ways, there are also gender differences that merit continued research and consideration when designing and implementing interventions for maltreated adolescents. The association for maltreated females of caregiver relatedness with substance abuse and of peer rejection and monitoring with suicidal behavior should be further explored. The role of caregiver relatedness in the suicidal behavior of maltreated males should also be further explored. If maltreated youth, who often face great obstacles to healthy development, are expected to grow into healthy, happy, and contributing members of society—caring for themselves, earning a wage, possibly caring for a family and raising children—they need the assistance and support necessary to overcome the challenges they face and to achieve these goals.

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## CHAPTER V

### CONCLUSIONS

This research contains the first in-depth examination of the problem behaviors of children and adolescents following an investigation for alleged maltreatment. Changes in behaviors and factors associated with changes in behavior were also examined. One detail that appears evident is that problem behaviors are more frequently associated with higher levels of child, peer, and caregiver related risk factors. What is less clear is the influence of these characteristics on behavior changes.

Maltreated children and adolescents are generally faring more poorly than non-maltreated peers. Maltreated children and adolescents have more hyperactivity-impulsivity-attention (HIA) problems, low social skills and depression. Domestic violence, parental substance abuse, and parental arrest are not uncommon. Poverty is also widespread—over half of maltreated children and adolescents are living below the poverty level.

Many of these factors are most notable in the portion of maltreated children and youth who are exhibiting the highest levels of problem behavior. For example, aggression scores for maltreated 6- to 10-year olds are higher for those with HIA problems, low social skills, depression, or a high cumulative risk score. A similar pattern is found for the aggressive and delinquent behaviors of maltreated 11- to 15-year-olds, with some additional factors of concern. Substance abuse figures prominently in this age group with higher levels of substance abuse associated with high levels aggression and delinquency. Also, delinquency

scores are high for youth who engage in high-risk sexual behavior or experience harsh discipline.

When problem behavior change over 18 months is examined, very few factors significant in bivariate analyses are significant. Since all of the variables considered for modeling change have been linked to the problem behaviors under examination, this came as some surprise. Indeed, many of the findings regarding problem behavior changes are contrary to expectations. Aggression increases more for children with lower levels of cumulative risk. Associating with deviant peers and peer rejection are indicative of greater reductions in caregiver-reported aggression and delinquency for girls. Low monitoring is associated with greater reductions in risky sexual behavior for males. Reductions in substance abuse are greater for depressed than non-depressed males. Low caregiver relatedness is associated with greater reductions in substance abuse for females and suicide risk behavior for males. In all of these examples, children and youth with the highest risk (e.g., high cumulative risk, low monitoring, depression, low relatedness) exhibit substantially higher problem behavior scores at baseline, which may provide some explanation of the greater reduction in problems, as scores regress to the mean. It could also be that the interventions maltreated children are receiving, may be improving behavior. Therefore, interacting risk factors with child welfare services might provide useful information. The maltreated children and adolescents who are showing increases in problems—low cumulative risk scores, non-depressed, high caregiver relatedness—still do not increase to levels that are higher than levels from which higher risk children decreased. These unusual findings are prime examples of the need for further analyses prior to submission of these studies for publication. For example, the association between peer rejection and depression may provide

some explanation of the relationship between peer rejection and reductions in caregiver-reported aggression and delinquency for females.

Several other tasks will be undertaken to make analyses more explicable. Cumulative risk was consistently associated with higher levels of aggression in children. Though children experiencing lower levels of cumulative risk often changed more, increasing in their aggression, the maltreated children experiencing the most child and parent risk factors (5 to 9 risks) had consistently higher levels of aggression. Creating a cumulative risk score for the adolescent studies may prove useful in explaining changes in delinquency and other risky behaviors in maltreated adolescents.

Child welfare services are not consistently associated with higher levels of problem behavior or greater changes. NSCAW is not an intervention study so examining the influence of child welfare services on child and adolescent outcomes is a particularly daunting task. Additional child welfare service-related variables will be considered before papers are submitted for publication. Information about new maltreatment reports was only included in the study of 6- to 10-year-olds (Chapter 2). This is an important variable to consider for addition to the adolescent papers (Chapters 3 and 4) and may provide one explanation for the lack of significant findings for child welfare services on behavior changes (e.g., any influence of child welfare services could be negated by additional maltreatment experiences).

In attempting to reduce the multitude of factors under consideration in the multivariate models, a multi-stage process was used. A correlation of  $r = .45$  between independent and dependent measures was used to decide upon independent variables to be excluded from preliminary-stage multivariate models. Such a conservative cutoff reduced

the probability of spurious significant findings but may be one explanation for minimal significant findings in change models, particularly for the adolescent studies—methods used to reduce spurious findings may have also increased the probability of missing some factors that were significant but not highly associated with behavior change. Raising the cutoff to  $r \geq .60$  and reconsidering previously eliminated variables will be another task before submission for publication. Also, variables non-significantly correlated with the dependent measure were omitted from preliminary multivariate models. These variables may have functioned differently in multivariate context than the bivariate context in which they were examined and will also be reconsidered.