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## Adolescent Risk Factors for Child Maltreatment

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### Abstract

We investigate adolescent risk factors, measured at both early and late adolescence, for involvement in child maltreatment during adulthood. Comprehensive assessments of risk factors for maltreatment that use representative samples with longitudinal data are scarce and can inform multilevel prevention. We use data from the Rochester Youth Development Study, a longitudinal study begun in 1988 with a sample of 1,000 seventh and eighth graders. Participants have been interviewed 14 times and, at the last assessment (age 31), 80% were retained. Risk factors represent 10 developmental domains: area characteristics, family background/structure, parent stressors, exposure to family violence, parent-child relationships, education, peer relationships, adolescent stressors, antisocial behaviors, and precocious transitions to adulthood. Maltreatment is measured by substantiated reports from Child Protective Services records. Many individual risk factors (20 at early adolescence and 14 at later adolescence) are significantly, albeit moderately, predictive of maltreatment. Several developmental domains stand out, including family background/structure, education, antisocial behaviors, and precocious transitions. In addition, there is a pronounced impact of cumulative risk on the likelihood of maltreatment. For example, only 3% of the youth with no risk domains in their background at early adolescence were involved in later maltreatment, but for those with risk in 9 developmental domains the rate was 45%. Prevention programs targeting youth at high risk for engaging in maltreatment should begin during early adolescence when risk factors are already at play. These programs need to be

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comprehensive, capable of addressing the multiple and interwoven nature of risk that is associated with maltreatment.

### Keywords

child maltreatment; risk factors; cumulative risk

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The Centers for Disease Control and Prevention (CDC) define child maltreatment as “any act or series of acts of commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child” (Leeb, Paulozzi, Melanson, Simon, & Arias, 2008, p.11). The most common types of maltreatment are physical abuse, sexual abuse, psychological abuse (acts of commission), and neglect (acts of omission). Maltreatment represents a substantial individual and public health concern in American society. It causes immediate harm, has many long-term consequences for the victim, and has serious deleterious effects for the family and society at large (Gilbert et al., 2009). It is estimated to cost at least \$100 billion each year (Wang & Holton, 2007).

In 2011, based on Child Protective Services (CPS) records, approximately 9.1 children per thousand were maltreatment victims in the United States (U. S. Department of Health and Human Services, 2012). Girls and boys are about as likely to be maltreated, except for sexual abuse where the rates are higher for girls. Neglect is the predominant form of maltreatment (78.5%), followed by physical abuse (17.6%), sexual abuse (9.1%), and other types (10.3%). Moreover, there is considerable co-occurrence of types within a single incident (U. S. Department of Health and Human Services, 2012). Reports from a national sample of community professionals offer a higher estimate: in 2005–2006 almost 40 children per thousand were maltreated (Sedlak et al., 2010). Maltreatment prevalence in community surveys is even higher, at 15% or more (e.g., Straus & Gelles, 1986; Thornberry, Ireland, & Smith, 2001).

Maltreatment is related to a variety of serious consequences, including substance use, violence, health-risking sex behaviors, depression, obesity and eating disorders, internalizing problems, and school disengagement (Gilbert et al., 2009). Another demonstrated long-term consequence of maltreatment is the heightened likelihood of abusing or neglecting others (Thornberry & Henry, 2013). Accordingly, practice and policy have typically focused on interventions designed to mitigate the ill effects of maltreatment, prevent its re-occurrence, and decrease the likelihood that maltreatment victims will one day maltreat others. Although it is critical to provide these services, from a public health perspective, it would be far more effective to reduce the prevalence of maltreatment in the first place. Indeed, the CDC has called for “a better understanding of the developmental pathways and social circumstances that contribute to perpetration ... [to] enhance the development of effective primary prevention programs and guide refinement of existing prevention programs” (CDC, 2002, p. 7). Unfortunately, as the CDC also noted, there has been considerably less research devoted to identifying the antecedent processes that lead to involvement in maltreatment and that, in turn, has hampered the development of effective primary prevention programs to reduce its occurrence. This study addresses this issue by providing a comprehensive assessment of

adolescent risk factors that are associated with later maltreatment. We focus on adolescence to identify risk factors that occur relatively early in the life course, well before involvement in maltreatment, but when cascades of risk are visibly accumulating and there is increased life-course turbulence.

## The Risk Factor Approach

A risk factor is “a measurable *characterization* of each *subject* in a specified *population* that precedes the *outcome* of interest and which can be used to divide the population into two groups (the high risk and low risk groups that comprise the total population)” (Kraemer et al., 1997, p. 338). In our case, the outcome of interest is maltreatment by parents or parent figures directed at one or more children, and we are interested in identifying individual risks during adolescence that significantly increase the likelihood of later involvement in maltreating behaviors. Identifying risk factors, especially those that occur early in the life course, has a number of advantages. Theoretically, it narrows the search for causal risk factors to the set of antecedent characteristics that are most strongly related to the outcome and helps identify intervening variables that translate the increased vulnerability into actually experiencing the outcome. Practically, such an approach can promote tailoring interventions to the specific risks or combinations of risks a person is experiencing and the timing of those risks. Also, as Farrington (2000) noted, the risk factor “paradigm is easy to understand and communicate, and it is readily accepted by policy makers, practitioners, and the general public” (p. 7).

The risk factor approach assumes that there is no single pathway to negative outcomes and that risk factors occur across multiple developmental domains or levels of a person's social ecology (Bronfenbrenner, 1988). Particular aspects of the adolescent social ecology that may influence later involvement in maltreatment include contextual factors such as neighborhood characteristics, economic standing, and family background, as well as more proximal factors such as parent-child relationships, educational performance, peer relationships, and involvement in problem behaviors (Belsky, 1993). In addition to identifying individual risk, the risk factor approach assumes that it is typically the accumulation of risk that is most strongly related to adversity (Masten & Wright, 1998). As stated by MacKenzie, Kotch, and Lee (2011), “... the central point of the cumulative risk approach is that it is less important which individual risk factors are present or measured and more important to a population approach to attend to the overall load of risk operating in a family” (p. 1640). Unfortunately, few prior studies of risk factors for maltreatment have simultaneously investigated risk in multiple domains, even though the likelihood of maltreatment is likely to increase substantially when risk is accumulated across multiple domains. Still fewer studies have investigated these issues in prospective longitudinal designs even though, by definition, a risk factor must precede the particular outcome. To help inform comprehensive prevention approaches we employ a community sample with a relatively high prevalence of child maltreatment, that has comprehensive measures of risk factors covering multiple domains of the person's ecology and that clearly establishes temporal order between the risk factors and the outcome of maltreating behavior.

## Previous Studies

Given the purpose of the present analysis—to identify which risk factors that occur during adolescence are related to maltreatment that takes place during adulthood—we limit our review to studies that focus on individual-level risk factors occurring in the family backgrounds of individuals who engage in maltreating behaviors. There is a larger literature that examines risk factors in proximal domains such as the interaction between the maltreating parent and their child as well as stressors and resources in the current neighborhood and family environment (Freisthler, Merritt, & LaScala, 2006; Zolotor & Runyan, 2006), but because there are existing comprehensive reviews of that literature (e.g., Black, Heyman, & Smith Slep, 2001; Stith et al., 2009; Wolfe, 2011) and because our focus is on risk factors in the adolescent history of adults involved in later maltreatment, we do not review those studies here.

Many studies have examined variables from the family of origin of the maltreating parent, particularly regarding relationships with their own parents as well as their own experiences of maltreatment. There is a particularly sizable literature linking experienced maltreatment to an elevated likelihood of later involvement in maltreatment (Berlin, Appleyard, & Dodge, 2011; Thornberry & Henry, 2013; see Thornberry, Knight, & Lovegrove, 2012, for a comprehensive review). Several studies have shown that greater amounts of physical abuse and severe beatings (Coohey & Braun, 1997; Salzinger, Feldman, Hammer, & Rosario, 1992; Whipple & Webster-Stratton, 1991), and by more people (Ethier, Lacharite, & Couture, 1995), increase involvement in future maltreatment and that this relationship is mediated by trauma, social isolation, and mental health issues (Berlin et al., 2011; Milner et al., 2010).

Maltreatment is also related to the quality of family relationships experienced during adolescence (Gaines, Sandgrund, Green, & Power, 1978). Low affective ties with the parent/caregiver and experiences of harsh, inappropriate discipline are related to subsequent maltreatment (Dubowitz, Hampton, Bithoney, & Newberger, 1987; Whipple & Webster-Stratton, 1991). For example, parents who viewed their childhood discipline and punishment as unfair and severe or who did not view their parents' discipline as appropriate are more likely to maltreat their own children (Altemeier, O'Connor, Vietze, Sandler, & Sherrod, 1982; Dubowitz et al., 1987). Similarly, parents who did not get along with their own parents, felt that one or more of their parents were displeased with them, or who lacked support from their mothers are more likely to maltreat their children (Altemeier et al., 1982; Whipple & Webster-Stratton, 1991).

Many studies have reported that parental deviance (e.g., prostitution) and substance use is associated with later maltreatment (Ethier et al., 1995; Salzinger et al., 1992). For example, Cash and Wilke (2003) found that a family history of alcohol or drug problems increases the likelihood of neglect, and Salzinger et al. (1992) reported that family history of alcohol or drug use is indirectly linked to later maltreatment, mediated through experienced maltreatment. Later maltreatment is associated with living below the poverty line, receiving welfare, and/or having low SES (Brown, Cohen, Johnson, & Salzinger, 1998; Chaffin, Kelleher, & Hollenberg, 1996; Cox, Kotch, & Everson, 2003; Hussey, Chang, & Kotch,

2006; MacMillan, 2000). Though these studies examined socioeconomic status in the current family rather than the family of origin, intergenerational continuity in SES indicators suggests that maltreatment is likely linked to disadvantage in the early family background as well. Finally, separation from parents (e.g., growing up in foster care) has also been found to be associated with later maltreatment (Altemeier et al., 1982; Ethier et al., 1995). Relatedly, Colman, Mitchell-Herzfeld, Kim, and Shady (2010), using a sample of youth released from juvenile correctional facilities, reported very high prevalence of CPS reported maltreatment through the age of 28, especially for the female participants.

Other characteristics of the individual that occur earlier in life are also associated with child maltreatment. For example, earlier age at first birth and low educational attainment are both associated with maltreatment (Berlin et al., 2011; Brown et al., 1998; Cox et al., 2003; Sidebotham & Golding, 2001). Various internalizing problems are linked to later child maltreatment, including low self-esteem (Christensen, Brayden, Dietrich, McLaughlin, & Sherrod, 1994; Whipple & Webster-Stratton, 1991) and depression (Chaffin et al., 1996; Ethier et al., 1995; Whipple & Webster-Stratton, 1991), as well as a history of psychopathology and severe mental illness (Brown et al., 1998; Chaffin et al., 1996; Stith et al., 2009). Externalizing behaviors, including alcohol and drug use (Chaffin et al., 1996; Kelleher, Chaffin, Hollenberg, & Fischer, 1994; MacMillan, 2000); criminal behavior (Altemeier et al., 1982); and anger expression, verbal aggression, and hostility (DiLalla & Crittenden, 1990; Rodriguez, 2008; Schumacher, Feldbau-Kohn, Smith Slep, & Heyman, 2001; Simons & Whitbeck, 1991; Stith et al., 2009) have also been associated with later maltreatment. It should be noted that, although these factors are likely to have emerged in childhood or adolescence, the majority of these studies identified and measured them retrospectively in adulthood.

There is also evidence that cumulative risk—that is, having risk in multiple developmental domains—is strongly related to later maltreatment. Brown et al. (1998) reported that the risk of maltreatment increases from approximately 3% when there are no risk factors present, to close to 25% when there are four or more risk factors present. Zolotor and Runyan (2006) reported that when indicators of reduced social capital build up, the likelihood of child neglect increases. Ethier, Couture, and Lacharite (2004) and MacKenzie et al. (2011) also found that when parents are exposed to a greater number of risk factors they are more likely to engage in child maltreatment. Although the impact of individual risk factors on maltreatment is often significant but of modest size, it appears that the *accumulation* of risk across multiple domains is much more damaging in the long run.

The present study is designed to extend this literature in several ways in an effort to enhance our understanding of adolescent risk factors for maltreatment. First, we use longitudinal data from a representative community sample to establish proper temporal order between the potential risk factors and maltreatment. Second, all examined risk factors are characteristics of the individual who engaged in the maltreatment or that individual's family of origin, measured prospectively. The majority of research on the adolescent background of those subsequently involved in maltreatment has relied on retrospective reports, which may be contaminated by memory decay or biased by current circumstances and experiences. Third, the risk factors are drawn from multiple domains of the individual's social ecology—e.g.,

family background, family processes, school performance, and antisocial behaviors. In each of these domains multiple measures are available to provide a broad-based picture of the antecedents of maltreatment. Fourth, we examine risk factors measured during early adolescence and during late adolescence to see whether the more distal risk factors are more strongly related to the outcome than the more proximal risk factors.

## Methods

The Rochester Youth Development Study (RYDS) is a multi-wave panel study originally designed to study the development of serious antisocial behavior. It began in 1988 with a sample of 1,000 adolescents. A total of 14 interviews were conducted over the course of three phases of data collection. Phase 1 covered the adolescent years from ages 14 to 18, when we interviewed the respondents nine times and their parents eight times at 6-month intervals. In Phase 2, we interviewed the respondents and their parents at three annual intervals, from ages 21 to 23. In Phase 3, we interviewed the respondents at ages 29 and 31. We also collected official data from the police, schools, and social services.

## Sample

RYDS oversampled youth at high risk for serious delinquency and drug use because the base rates for these behaviors are relatively low (Elliott, Huizinga, & Menard, 1989; Wolfgang, Thornberry, & Figlio, 1987). To accomplish this the target population was limited to seventh and eighth grade students in the public schools of Rochester, New York, a city that has a diverse population and a high crime rate. The sample was then stratified on two dimensions. First, males were oversampled, 75% versus 25%, because they are more likely than females to be chronic offenders and to engage in serious delinquency (Blumstein, Cohen, Roth, & Visher, 1986). Second, adolescents from areas where high proportions of adult offenders lived were oversampled on the premise that youth residing in these areas are at greater risk for offending. Each census tract in Rochester was assigned a resident arrest rate reflecting the proportion of the total population living in that tract that was arrested by the Rochester police in 1986. Participants were sampled proportionate to the rate of offenders living in their tract.

The initial cooperation rate was 80%. Families that refused were replaced by another family from the same stratum (i.e., the same gender, school grade, and census tract). Attrition has been acceptable for a longitudinal study of this duration. At age 18, 88% of the adolescents and 79% of their parents were retained. At age 23, 85% of the adolescents and 83% of their parents were retained. Finally, at age 31, 80% of the initial adolescents were retained. Comparing the characteristics of respondents who were retained at age 31 to those who left the study demonstrates that attrition did not bias the sample (Bushway, Krohn, Lizotte, Phillips, & Schmidt, 2013; Thornberry, 2013). All aspects of the study were reviewed and approved by the Institutional Review Board at the University at Albany. At numerous points throughout this long-term study, study procedures, including the collection of archival data such as CPS records, were described to the participants. Initially parents provided informed consent for themselves and their child; the child provided assent. As the children reached the

age of majority they provided their own informed consent. Participant payments were provided throughout the course of the study.

The participants are predominately African American (68%) with about equal proportions of Hispanics (17%) and whites (15%). Study participants come from relatively disadvantaged family backgrounds. For example, over half of their parents received public assistance, the parents completed on average 11 years of education, over half of the mothers had their first child as teenagers, only about one quarter of the youth lived with both biological parents during adolescence, and a substantial number lived in impoverished neighborhoods. Although the sample contains many at-risk families, the full range of the Rochester city socioeconomic spectrum is represented (Farnworth, Thornberry, Krohn, & Lizotte, 1994).

### Measure of Maltreatment

Our measure of child maltreatment comes from the records of CPS at the New York State Office of Children and Family Services, the statewide repository for such records. In 2010, we searched the records for 816 participants and recorded all incidents in which they were named as a *confirmed subject* for child maltreatment. We only had access to, and therefore only recorded, substantiated incidents—incidents for which there was sufficient evidence to consider the case valid.

The computerized records to which we had access contained a limited set of variables (e.g., date of the incident, number of victims). Unfortunately, they contained no narratives describing the maltreating incident. With respect to type of maltreatment the only information comes from a variable labeled *allegation*. The complete list of all allegations included in the CPS records, and how we classified them into the three major types of neglect, physical abuse, and sexual abuse, appears in Appendix A. No allegations of emotional abuse or of exposure to intimate partner violence were recorded. Also, this variable contained an *other* category with no further information about the nature of those allegations.

In 2010 82% of the initial sample still resided in New York State, so coverage is rather complete. Nevertheless, there is censoring along the older or right-hand side of the distribution. We know either the age at which each participant had their first substantiated case of maltreatment or, if none, their age at the last available year of observation (i.e., the age at right censoring). This is typically (59% of the cases) their age in 2010 when records were collected, but for some it represents their age at the last year we have consent to collect data or when they moved out of New York State. The average age of coverage is through age 33.2; 85% were at least 30 and the oldest participants were 38. We therefore have maltreatment data from 18 to, on average, 33 years of age, or 15 years of exposure. Because of the right censoring in these data (i.e., many people are not involved in maltreating behaviors prior to the end of the observation window or at the point at which they leave the study), we employ discrete time survival analysis (DTSA) as our primary analytic strategy. DTSA models the timing or onset of an event that is measured in discrete time periods and it properly accounts for right censoring (Singer & Willett, 2003).

Official maltreatment records have limitations; not all instances of maltreatment are reported, and not all reported cases are substantiated. Also, investigation bias may lead to the overestimation or underestimation of involvement in maltreatment by certain groups within the population (Eckenrode, Powers, Doris, Munsch, & Bolger, 1988; Straus & Smith, 1995; Widom, 1988). Despite these limitations, Widom, Raphael, and DuMont (2004) provide evidence that prospective data from substantiated records have strong psychometric properties. Also, when measures based on official maltreatment data, in our study and in other studies, are related to outcomes such as delinquency and violence, the results argue strongly for their construct validity (Gilbert et al., 2009).

### Measures of Risk Factors

Based on the socio-ecological framework (Bronfenbrenner, 1979), risk factors for maltreatment are grouped into 10 domains: area characteristics, family background/structure, parent stressors, exposure to family violence, parent-child relationships, education, peer relationships, adolescent stressors, antisocial behaviors, and precocious transitions. Table 1 lists the variables included in each domain along with the source of data (e.g., adolescent interview, official data); whether it was measured during early adolescence, late adolescence, or both; and the mean, standard deviation, and range of values. The early adolescence measures are taken as close to age 14.5 as the data allow; the late adolescence measures are as close to age 17.5 as possible. The risk factors were dichotomized either at naturally occurring breakpoints (e.g., a teen parent or not, a high school dropout or not) or, for continuous variables, at the riskiest quartile of the distribution versus the lower three quartiles (Farrington, 2000). Dichotomizing all the variables makes it easier to compare the size and strength of the odds ratios across multiple risk factors because it places them all on the same metric. Also, the second part of the analysis, which focuses on cumulative risk, requires that we dichotomize the variables in order to count the number of risk factors to which each individual was exposed. To ensure that our results were not impacted by this dichotomization, the models were re-estimated with the variables in their original metric and the results were virtually identical. Given the large number of variables considered—38 during early adolescence and 34 during late adolescence—we provide only brief descriptions of these measures in the text.

**Area characteristics**—Four indicators are included. *Percent in poverty* is a census measure indicating the level of poverty in the family of origin's census tract of residence. *Neighborhood disorganization*, a 17-item scale from the parent interview, indicates perceptions of crime, dilapidation, and disorganization in their community (Cronbach's  $\alpha = .96$ ). (If a scale is available during both early and late adolescence, the lower  $\alpha$  coefficient is reported.) *Neighborhood integration* is a 7-item scale indicating the extent to which neighbors interact with one another on a routine basis ( $\alpha = .85$ ). Finally, *neighborhood drug use* is based on adolescent reports of youth substance use in their neighborhood ( $\alpha = .85$ ).

**Family background/structure**—The parent's report of their highest grade of schooling completed, *parent education*, is dichotomized as less than high school versus high school and beyond. *Poverty-level income* comes from the parent interview and indicates whether the family income falls below the federally-defined poverty level for a given family size.



*Teenage mother* is based on the parent's report of how old the focal participant's mother was at the birth of her first child, comparing teenage mothers to older mothers. *Family transitions* indicates the number of interviews (from Wave 1 to Wave 9) in which there was a change in parents or guardians reported in either the parent or adolescent interviews.

**Parent stressors**—Five indicators of stressors exhibited by the focal participant's parent are included. *Parent depressive symptoms* is an 8-item scale of depressive symptoms such as frequency of feeling lonely, worthless, or suicidal ( $\alpha = .75$ ). *Parental stress* is an eight-item scale of parent's stress-related thoughts and feelings, such as frequency of not feeling in control or not being able to handle personal problems ( $\alpha = .68$ ). *Negative life events* is a 7-item index of the parent's report of the family experiencing stressful events such as divorce, death, health issues, and legal trouble. For early adolescence, *parent marijuana use* is a binary measure of whether at Wave 2 the parent reported having ever used marijuana; for late adolescence, the measure indicates any report of marijuana use at Waves 5 through 8. *Parent alcohol use* is a binary measure of whether the caregiver reported having 3-4 drinks at least half of the time when drinking.

**Exposure to family violence**—A binary measure of *parental partner conflict* is based on the Conflict Tactics Scale (Straus, 1979) indicating whether the adolescent was exposed to severe physical violence between their parent and their parent's partner. *Maltreatment victimization* is a binary measure indicating whether or not an official, substantiated report of neglect, physical abuse, or sexual abuse occurred before age 18. *Family hostility* is a 3-item index assessing the extent to which the parent reports a climate of hostility and conflict within the family.

**Parent-child relationships**—The tone of the relationship is measured with five indicators. *Attachment to parent* is an 11-item adaptation of the Child's Attitude Toward Parent scale (Hudson, 1982) in which the adolescent reports his/her perception of the degree of warmth and lack of hostility in the parent-child relationship ( $\alpha = .87$ ). *Attachment to child* is an analogous scale in which the parent reports on his/her relationship with the child ( $\alpha = .81$ ). *Inconsistent discipline* is a 7-item scale, based on the parent's report, indicating how often punishment is effective or the child gets away with things ( $\alpha = .72$ ). *Parent involvement* is an 11-item scale indicating how often parents report involvement with the adolescent in a range of prosocial activities ( $\alpha = .76$ ). *Supervision*, a 4-item scale, is the adolescent's report of their parent's awareness of their whereabouts, their friends, and their activities ( $\alpha = .56$ ).

**Education**—A 10-item scale, *commitment to school*, measures the adolescent's interest and involvement in schoolwork ( $\alpha = .81$ ). *College aspirations* is a single question assessing the adolescent's views on the importance of going to college. *College expectations* is a single question indicating the degree of certainty with which the adolescent expects to attend college. *Parent college expectations for the adolescent* is a similar item measuring the parent's assessment of how likely the adolescent is to attend college. *School grades* is the adolescent's official grade point average based on school records averaged from the 1986-87 through 1988-89 academic years.

**Peer relationships**—Three indicators of relationships with deviant peers are included. *Gang membership* is a binary measure of the adolescent's report of membership in a street gang. *Delinquent peers* is based on the adolescent's report of how many of their friends participated in 8 different delinquent behaviors ( $\alpha = .88$ ). *Unsupervised time with friends* is based on the adolescent's report of how much time they spend with friends “hanging out” without adults being present and supervising them.

**Adolescent stressors**—*Negative life events* counts the number of stressors experienced by the adolescent, such as breaking up with a partner or being suspended from school. *Depressive symptoms* is a 14-item scale ( $\alpha = .78$ ), based on a modified version of the CES-D (Radloff, 1977). *Self-esteem* is a 9-item measure derived from Rosenberg (1965), which measures satisfaction with and respect for self ( $\alpha = .78$ ). *Internalizing problems* is a trimmed version (Lizotte, Chard-Wierschem, Loeber, & Stern, 1992) of the internalizing behavior scale from the Child Behavior Checklist (Achenbach & Edelbrock, 1979) and is based on three subscales (withdrawn, somatic complaints, and anxious/depressed;  $\alpha = .87$ ).

**Antisocial behaviors**—Six indicators of problem behaviors are available. *Externalizing behaviors* is a trimmed version of the Child Behavior Checklist (Achenbach & Edelbrock, 1979) based on four subscales (hyperactivity, hostility, aggression, and delinquency;  $\alpha = .91$ ); due to limitations of the available data, at late adolescence only the *aggression* subscale is used. *Delinquent beliefs* is an 11-item scale asking the adolescent to rate how wrong it is to engage in delinquent behaviors such as stealing, using a weapon, and joyriding ( $\alpha = .84$ ). *General delinquency* is a self-report inventory of 32 items covering a broad array of behaviors ranging from minor status offenses to serious violent crimes. *Problem marijuana use* is a 6-item self-report index measuring problems related to the adolescent's marijuana use, such as needing more to get high or experiencing trouble at school as a result of use. *Problem alcohol use* is a similar index measuring problems related to the adolescent's alcohol use.

**Precocious transitions**—Five binary indicators are included. *Precocious sexual activity* indicates engaging in sexual activity before the age of 15. *Precocious parenthood* measures whether the adolescent had a child prior to age 20. *Precocious cohabitation* indicates whether the respondent reported living with a partner before age 19. *School dropout* indicates that the respondent was not attending high school and had not graduated by age 20. *Living independently from parent* measures whether the adolescent stopped residing with a parent before age 18.

In order to appropriately handle missing data we employed the Markov chain Monte Carlo method of multiple imputation in SAS, Version 9.2. The dependent variable, all the risk factors of interest, and several important auxiliary variables were included in the multiple imputation model. Twenty imputed datasets were created. All analyses were conducted on these 20 datasets and the results from each imputation were then combined using Rubin's (1987) rules to derive the final estimates and standard errors presented here.

## Results

Of the 816 participants, 102 had one or more substantiated reports of maltreating behavior (Table 2). The gross prevalence, to an average age of 33, is therefore 12.5%, higher than that reported in national surveys (U. S. Department of Health and Human Services, 2012; Sedlak et al., 2010), but consistent with rates observed in other community samples (e.g., Straus & Gelles, 1986). Obviously, as this sample continues to be followed forward in age, the rate is likely to increase.

These 102 individuals accounted for a total of 178 incidents of substantiated maltreatment, or 1.7 incidents per person. Almost three-quarters (71.6%) of those with a substantiated case had only one incident in their file; another 9.8% had two incidents, 14.7% had between three and five, and 3.9% had six or more. The maximum number observed, for one participant, was 11.

Turning to characteristics of the 178 incidents, the average age at which an incident took place was 27.5 years of age ( $SD = 5.2$ ) and, as shown in Table 2, they were spread rather evenly across the ages in the observation period. Just over half of all incidents (57.3%) involved a single child victim; in 19.1% of the cases there were two victims, in 18.5% there were three or four victims, and there were five or more victims in 5.1% of the incidents.

Nearly two-thirds of all incidents (60.6%) involved a single type of maltreatment, 34.3% of the incidents involved two types, and 5.1% involved three types. The vast majority of these incidents (88.2%) involved child neglect. The next most frequent type of maltreatment was physical abuse (24.7%). Sexual abuse was the least frequently occurring type (7.3%). In addition, 19.7% of the incidents were placed in the omnibus category of *other* without further distinction in the CPS records. Of the incidents that involved neglect, 60% of them were neglect only and the other 40% involved neglect plus at least one other type of maltreatment. The most common combination was neglect and physical abuse, 20.4% of the cases, followed by neglect and other" (11.4%), and neglect plus sexual abuse (7.6%).

### Early Adolescent Risk Factors for Maltreatment

We begin with risk factors drawn primarily from early adolescence, about age 14.5 (Table 3). The first four domains include relatively stable background characteristics relating to the adolescent's parents and family of origin. The next five include time-varying characteristics such as interpersonal relationships and behavior patterns. Since all predictors are coded as risk factors (i.e., 1 = *higher risk*, 0 = *lower risk*), all odds ratios presented in the table are hypothesized to be greater than 1. Each odds ratio in the table comes from a separate DTSA model which includes the risk factor of interest plus the sample stratifying variables of gender and neighborhood arrest rate. They are, in essence, the bivariate relationships between the risk factor and maltreatment, adjusting for gender and neighborhood arrest rate, the stratifying variables.

There is considerable variability in the extent to which these domains are related to maltreatment. By and large, characteristics of the neighborhood in which the participants grew up are not associated with subsequent maltreatment. Only one of the five measures,

perceptions of neighborhood drug use, significantly increases the odds of maltreatment. Similarly, stressors experienced by (and reported by) the adolescent's parent are generally not significant risk factors for maltreatment; only negative life events experienced by the parent is significantly related to their child's later maltreatment. Risk in areas such as parental depression, stress, and substance use does not significantly increase the odds that their child will engage in maltreatment in adulthood.

In contrast, two background areas are consistently related to the outcome. First, youth who come from more disadvantaged family backgrounds are significantly more likely to have a substantiated record for child maltreatment in early adulthood. Coming from a family characterized by low parent education, poverty-level income, a mother who began childbearing as a teenager, and frequent changes in parenting figures in the household, are all significant risk factors for maltreatment. Second, youth who were exposed to family violence are also at increased risk. In particular, youth who themselves were maltreated while growing up are at increased risk of maltreatment, as are youth exposed to parental partner conflict.

Turning to the dynamic risk factors, the parent-child relationship in the family of origin during early adolescence is surprisingly not predictive of later maltreatment. Only one of the five variables is statistically significant; when a parent reports lower attachment to the adolescent, that adolescent is significantly more likely to engage in maltreating behavior as an adult. In contrast, the educational arena is much more consistently and robustly related to the outcome. Youth who report low commitment to school, have poor school grades, have low expectations for attending college, and whose parents also have low expectations for them to attend college are significantly more likely to later maltreat a child.

Of the three peer variables, only membership in a street gang is significantly related to the outcome. Two of the adolescent stressors—experiencing negative life events and internalizing problems as reported by their parent—are significant predictors. Finally, involvement in antisocial behavior during early adolescence is strongly related to later maltreatment. Externalizing behaviors as reported by the parent, self-reported involvement in delinquency, problem marijuana use, and problem alcohol use are all significant risk factors for later maltreatment. In fact, problem marijuana use and problem alcohol use, at these relatively young ages, have the largest odds ratios reported in Table 3,  $OR = 2.42$ ; 95%  $CI = 1.18, 4.94$  and  $OR = 2.46$ ; 95%  $CI = 1.37, 4.42$ , respectively.

### **Late Adolescent Risk Factors for Maltreatment**

The results presented in Table 4 show the impact of risk factors measured at late adolescence (approximately age 17.5) on maltreatment. Nine domains are also included in this table. family background/structure measures are now excluded, but precocious transitions are added.

Background characteristics are generally not significantly related to the outcome. Of the nine risk factors in area characteristics, parent stressors, and exposure to family violence, only the odds ratios for parent alcohol use and parental partner conflict are significant.

Relatedly, of the variables reflecting parent-child relationships, only low attachment to child significantly increases the odds of maltreatment when the participants are adults.

At this developmental stage, within the school domain two variables emerge as significant risk factors—the adolescent's aspirations and expectations for attending college. In addition, associating with delinquent peers, internalizing problems as reported by the parent, aggression as reported by the parent, and self-reported delinquency are significantly related to the outcome.

All five of the precocious transition variables are significantly and strongly related to maltreatment. Youth who engage in precocious sexual activity, have their first child as a teenager, cohabit at an early age, live independently from their parents, and drop out of high school are all significantly more likely to engage in maltreatment. The odds ratios for these variables are the largest that have been observed in these analyses.

### Cumulative Risk

To this point we have looked at each risk factor individually while controlling for the stratifying variables. We now switch to a domain-based analysis and examine how each of these broader domains (e.g., area characteristics, family background/structure) was related to maltreatment and then how the accumulation of risk is related to maltreatment. To accomplish this, we first counted the number of risk factors present in each domain for each person (i.e., the number of variables per domain in which they were in the high risk end of the distribution). We then calculated the mean number of risk factors in each domain for the entire sample and coded as 1 all participants who were above the mean score. So, for example, a score of one in the education domain indicates a person who had an above average number of risk factors within the education domain.

Table 5 presents the relationship between each domain and maltreatment. During early adolescence all but one of the domains—parent-child relationships—are significantly related to maltreatment. Similarly, during late adolescence all but two of the domains—parent-child relationships and adolescent stressors—are significantly related to the outcome. Although almost all of these domains are significantly related to maltreatment, none of the odds ratios is particularly large; each of the significant effects contributes rather modestly to predicting maltreatment. Nevertheless, these findings point to the generality of risk that leads to this particular outcome. Risk does not emerge from one or even a few developmental domains; elevated risk in any of a number of developmental arenas increases the chances for maltreating behavior.

A central premise of the risk factor approach is that exposure to risk in multiple developmental domains will greatly increase the individual's vulnerability to negative outcomes. The “piling up” of risk in many developmental domains is likely to overcome coping strategies and, therefore, will have the largest impact on predicting the outcome. The data presented in Figure 1 are consistent with this expectation.

For early adolescence (solid line) only 2.8% of the individuals who had zero accumulated risk went on to engage in maltreatment and maltreatment was also very limited for

individuals who experienced risk in just one domain (3.7%). For those who experience risk in five of the domains, 16.0% engaged in maltreatment, but for those who experienced risk in all nine domains, 45.0% did. That is more than a tenfold increase in the proportion of individuals who engaged in maltreatment over those with risk in only one domain, and it is considerably higher than the average prevalence for the whole sample.

A very similar overall picture emerges for risk factors measured during later adolescence (dashed line). The prevalence of maltreatment increases from 3.9% when risk is not experienced in any domain to a peak of 38.2% when risk is experienced in all nine domains.

These results suggest that risk for maltreatment emanates from multiple domains, but those domains are themselves interrelated. To examine the impact of each domain while controlling for the influence of the others, Table 6 presents a multivariate DTSA in which all domains were simultaneously considered as predictors of maltreatment. During early adolescence, only risk in the area of family background/structure emerges as a statistically significant domain, holding all other domains constant. During later adolescence, only one domain exerts a significant impact on maltreatment; youth who have experienced an above-average number of precocious transitions have significantly higher odds of maltreating a child. These multivariate findings indicate that youth from disadvantaged backgrounds who themselves experience continued disadvantage in the transition to adulthood are particularly vulnerable to maltreating a child.

## Discussion

Child maltreatment is a serious individual and public health problem in American society. Numerous efforts have been launched to respond to its negative consequences as well as to provide services to prevent recurrent maltreatment (Cicchetti & Valentino, 2006). Unfortunately, less is known about the developmental course that leads to maltreatment and about how to intervene with a history of cumulative risks that might affect a parent's likelihood of maltreating their own children (CDC, 2002). The purpose of this investigation has been to respond to this issue by investigating the relationship between a comprehensive set of adolescent risk factors, as well as the accumulation of risk, on the likelihood that an individual will have a substantiated record of involvement in maltreatment as an adult.

Several conclusions can be drawn from the results. First, many adolescent characteristics, both during early and later adolescence, are significant risk factors for maltreatment during the adult years. Moreover, risk factors are not limited to one or two developmental domains but exist in most of the domains that were investigated in this study. During early adolescence several domains seem particularly important. Youth who come from families exhibiting structural disadvantage—such as low parental education, family poverty, a mother who was a teenage parent, and many changes in parent figures—are at elevated risk of later maltreatment. Also, youth who were disengaged from school, performed poorly at school, and had low expectations for college are more likely to engage in maltreating behaviors. Involvement in antisocial behaviors, especially problem marijuana use and problem alcohol use at these relatively young ages, is strongly related to later maltreatment. There is also evidence of intergenerational continuity in child maltreatment as a history of

maltreatment victimization is significantly related to later involvement in maltreating behavior (Thornberry & Henry, 2013). During later adolescence the impact of precocious and disorderly transitions is particularly noteworthy. The largest odds ratios for individual risk factors are observed in this arena; youth whom become teenage parents,  $OR = 3.90$ ; 95%  $CI = 2.57, 5.91$ , who enter into early cohabiting relationships,  $OR = 4.03$ ; 95%  $CI = 2.60, 6.24$ ), and who live independently from their parents ( $OR = 3.10$ ; 95%  $CI = 2.0, 4.78$ ) are particularly at risk for maltreating children.

Second, when risk accumulates across developmental domains, the likelihood of maltreating behaviors increases dramatically. Individuals who emerge relatively unscathed from adolescence—those who have below average levels of risk across multiple developmental domains—also have low risk for maltreatment. In contrast, as the number of domains with risk increases, so too does the likelihood of maltreatment. At the top of the cumulative risk distribution the rate of maltreatment is approximately 3 times the average rate for the entire sample. This pattern is quite consistent with the general risk factor paradigm (Masten & Wright, 1998; MacKenzie et al., 2011) and the developmental psychopathology approach (Cicchetti & Valentino, 2006) that argue that when stressors pile up on the individual and overwhelm coping strategies, negative outcomes such as maltreatment are most apt to occur.

The findings reported here have several implications for practice and for the development of prevention programs. First, risk factors for maltreatment emerge relatively early in the life course, in some cases many years before the onset of the maltreating behavior. Thus, preventative approaches should involve intervening well prior to the time of maltreatment episodes. While contemporaneous factors obviously play an important role in the onset and continuation of maltreatment, there are many factors in the early lives of later maltreating adults, for example family disadvantage and educational disengagement, that are important and useful in shaping preventative efforts. Early intervention, before the developmental cascades that lead to maltreatment build up, has been found to yield handsome benefits in the long run. One very promising approach that is consistent with these results is the Nurse Family Partnership (Olds, 2006; Olds et al., 2007) which focuses on mothers with characteristics such as being a teen mother, often as a single parent, from a distressed background. The Triple P program is another example of an efficacious public health approach to strengthening parenting (Prinz, Sanders, Shapiro, Whitaker, & Lutzker, 2009). Multiple strategies for addressing school disengagement and keeping students on track to graduate are also available (Balfanz, Herzog, & Mac Iver, 2007). Public health programs that can be widely disseminated among different populations as vehicles both for reducing population-based maltreatment and the developmental trajectories that trend in this direction are available (e.g., CDC, 2012; MacMillan et al., 2009). Unfortunately, such programs are often underutilized (Dolan, Smith, Casanueva, & Ringeisen, 2012) and many "... children do not receive needed services because of service delivery and use barriers" (Wekerle, 2011, p. 159). A concerted effort to more widely disseminate and implement evidence-based programs is clearly warranted.

Second, the impact that cumulative risk has on increasing the likelihood of maltreatment suggests the need for broad screening and comprehensive services. Risk does not emanate from just one or two areas of development; rather there are significant risk factors in both

early and late adolescence and across multiple domains of development. Programs that focus only on a single area, for example, school, may not be equipped to respond simultaneously to multiple areas of risk and the way these risks pile up on the individual, apparently overwhelming coping capacities. Programs targeting adolescents facing multiple risks for compromised development include Functional Family Therapy (Alexander & Robbins, 2011), Multisystemic Therapy (Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 2009), and Multidimensional Treatment Foster Care (Chamberlain, 2003). Although these programs were initially developed to prevent and treat adolescent antisocial behavior, they have also been adapted to respond to the needs of maltreatment victims and families receiving child welfare services with some evidence of success (Brunk, Henggeler, & Whelan, 1987; Leve et al., 2009; Hollimon, Alexander, & Robbins, 2013; Robbins & Rowlands, 2012; Swenson, Schaeffer, Henggeler, & Faldowski, 2010).

Third, our findings indicate that certain risk domains are more robustly related to maltreatment than others. In particular, experiencing disorderly and precocious transitions to adulthood is an important antecedent of maltreatment. Those youth are typically ill-prepared to face the broader challenges of adult roles in family formation and work, they are likely to have higher levels of stress, are more apt to engage in antisocial behaviors, and have difficulty establishing the human and social capital needed for a successful transition to adulthood (Capaldi & Stoolmiller, 1999; Furstenberg, Brooks-Gunn, & Morgan, 1987). All of these factors can interfere with appropriate parenting and increase the chances of child maltreatment. Future research needs to trace these potential pathways to better understand how these risk factors and adult contexts are associated with child maltreatment. In the meantime, it is important to help youth experiencing difficult transitions to avoid their consequences, including maltreating children. Programs that emphasize such strategies as the advantages of delaying initial childbirth, developing knowledge about normal infant and child development, and encouraging effective parenting behaviors are appropriate (e.g., Healthy Families America, 2012; Lundahl, Nimer, & Parsons, 2006; MacMillan et al., 2009; Olds, 2006).

Difficult transitions to adulthood are particularly notable in populations with deep involvement in social service and justice systems, where higher levels of prevention are in order. Among these populations are those transitioning out of foster care, those who have already abandoned home to the streets, and those with a juvenile justice history, especially those who have been residentially placed (Ryan et al., 2013). These youth are also likely to have large clusters of risk which fragmented systems are not currently well positioned to address (Osgood, Foster, Flanagan, & Ruth, 2006).

Although the focus of this paper has been on risk factors for involvement in maltreatment we should not lose sight of the fact that most people, even those with elevated risk, do not go on to commit acts of maltreatment. For example, of those who have risk in the greatest number of domains represented in Figure 1, the majority do not engage in maltreating behaviors by the time they reach their mid-30s. That is an impressive rate given the number of developmental domains in which they experience elevated risk and it reminds us that there are likely to be many sources of resilience to counteract risk processes (Masten, 2001). Although it is beyond the scope of this paper, future research needs to thoroughly investigate



the implications of resilience as that too has many important implications for preventing maltreatment and its sequelae. Several strands of promising policy development flow from recent research that promotes asset development as a prevention strategy touching multiple domains. For example, since 1990 when a blue-ribbon panel, the U. S. Advisory Board on Child Abuse and Neglect (1991), documented and reported on the national emergency of widespread child maltreatment, the Committee on National Strategy has advocated for coordinated community-based approaches to preventing maltreatment and demonstration projects such as the Strong Communities Initiative have resulted (Melton, in press). The CDC identified a general strategy for promoting and evaluating the protective effect of safe, stable and nurturing relationships and environments for caretakers (Merrick, Leeb, & Lee, in press). The Administration for Children Youth and Families and associated federal agencies involved in maltreatment response is broadening its strategy beyond preventing maltreatment to promoting child wellbeing through building assets at all levels including the community (U. S. Department of Health and Human Services, 2013).

Finally, some combinations of risk may be especially toxic for future maltreatment owing to missed opportunities for service system improvement, particularly coordination in services for youth in multiple service systems. There is evidence that youth in the juvenile justice system—often with a complex service system history and exposed to multiple risks—are at high likelihood of maltreating their children in adulthood (Colman et al., 2010). Lack of service coordination exacerbates all risk, but can be addressed. For example, several jurisdictions are utilizing the Crossover Youth Practice Model (e.g., Herz et al., 2012) which proposes several strategies for cross-system identification, tracking, and service provision for adolescents embedded in both the child welfare system and the juvenile justice system that will hopefully reduce risk of future maltreatment.

As is true of all studies, the present one has limitations. From a statistical perspective, maltreatment is a relatively rare event, and it was difficult to conduct more refined subgroup analyses, for example, for separate types of maltreatment. As noted, we relied entirely on official measures of substantiated maltreatment, the only measure available in the Rochester study. Official data are likely to underestimate the level of maltreatment and they incorporate, to some unknown extent, biases that may exist in official reporting and recording procedures. Our results are also specific to a particular cohort drawn from a single city and replicating these findings in other settings would certainly strengthen their generalizability. Given its initial purpose the Rochester study oversampled males by a ratio of 3 to 1. Because of that, we were not able to conduct separate analyses by gender.

Nevertheless, the present study does contribute to our understanding of the antecedents of child maltreatment in several important ways. It is based on a representative community sample that has been followed over a substantial portion of the life course. It was able to assess risk during both early and late adolescence and across a number of major developmental domains. The results identified several important risk domains that are related to the later likelihood of maltreatment. They include growing up in families characterized by structural adversity, being disengaged from the educational process, engaging in antisocial behaviors, and having a difficult transition from adolescence to adulthood. Although these specific domains were identified, the pattern of findings also

highlights the importance of accumulated risk. As the number of developmental domains characterized by risk increases, so too does the likelihood of later involvement in maltreating behaviors. Programs to address constellations of risk and prevent future maltreatment need to be equipped to respond both to the specific risk factors identified, as well as to the way they pile up or co-occur to overwhelm coping capacities and blunt appropriate system and community responses.

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### Appendix A

Categorization of allegations included in OCFS records.

- 
- Neglect:
    - Educational neglect
    - Emotional neglect
    - Inadequate food clothing and shelter
    - Inadequate guardianship
    - Inappropriate custodial conduct
    - Lack of medical care
    - Lack of supervision
    - Neglect
    - Parent's drug/alcohol misuse
  - Physical abuse:
    - Abuse
    - Burns, scalding
    - Choking/twisting/shaking
    - Excessive corporal punishment
    - Lacerations, bruises, welts
    - Physical abuse
    - Swelling/dislocation/sprains
  - Sexual abuse:
    - Sexual abuse
- 

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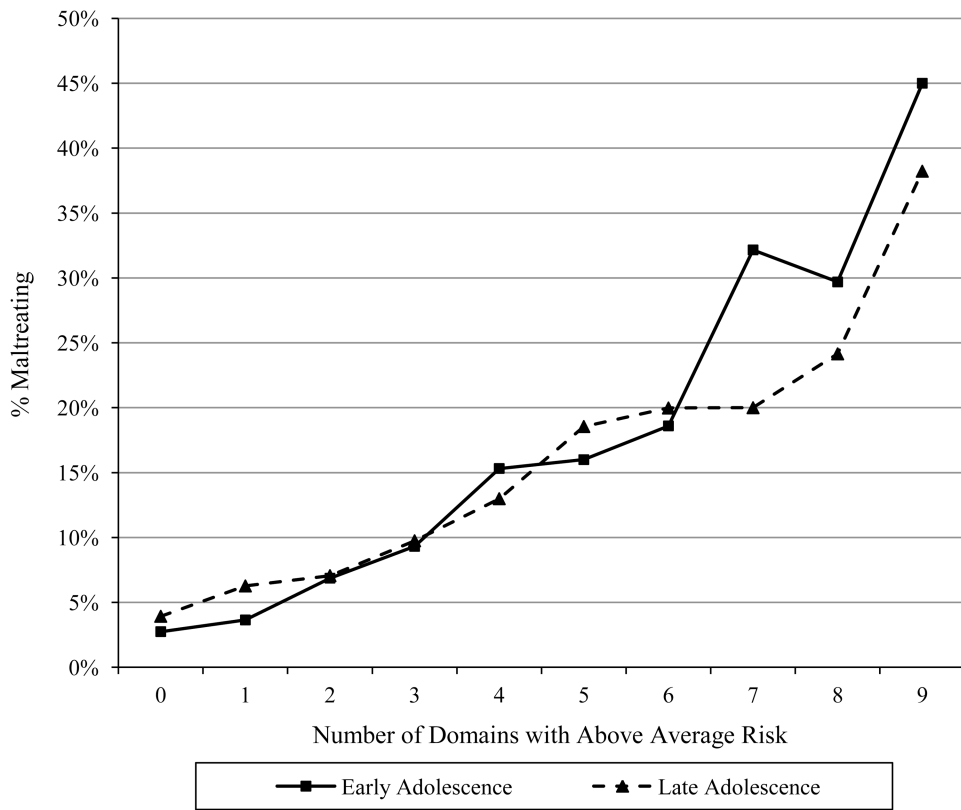
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**Fig. 1. Cumulative Risk for Maltreatment During Early Adolescence and Late Adolescence**



**Table 1**

Descriptive data for risk factors.<sup>a</sup>

Risk factor	Data source	Early Adolescence			Late Adolescence		
		Mean	(SD)	Range	Mean	(SD)	Range
<i>Area characteristics</i>							
Percent in poverty	U. S. Census	0.33	(.14)	0-100	--	--	--
Neighborhood disorganization	Parent	1.69	(.64)	1-3	1.64	(.62)	1-3
Poor neighborhood integration	Parent	2.24	(.67)	1-4	2.23	(.70)	1-4
Neighborhood drug use	Adolescent	2.19	(.96)	1-4	2.80	(.93)	1-4
<i>Family background/structure</i>							
Low parent education	Parent	11.35	(2.15)	6-18	--	--	--
Poverty-level income	Parent	0.32	(.46)	0-1	--	--	--
Teenage mother	Parent	19.07	(3.70)	12-41	--	--	--
Family transitions	Parent	1.37	(1.56)	0-8	--	--	--
<i>Parent stressors</i>							
Parent depressive symptoms	Parent	1.70	(.63)	1-5	--	--	--
Parental stress	Parent	2.17	(.53)	1-4	2.22	(.51)	1-4
Negative life events	Parent	1.04	(1.19)	0-7	1.13	(1.31)	0-7
Parent marijuana use	Parent	0.43	(.50)	0-1	0.06	(.23)	0-1
Parent alcohol use	Parent	0.16	(.37)	0-1	0.17	(.37)	0-1
<i>Exposure to family violence</i>							
Parental partner conflict	Parent	0.27	(.45)	0-1	0.06	(.24)	0-1
Maltreatment victimization	CPS	0.20	(.40)	0-1	--	--	--
Family hostility	Parent	1.61	(.54)	1-4	1.51	(.51)	1-4
<i>Parent-child relationships</i>							
Low attachment to parent	Adolescent	3.40	(.44)	1-4	3.42	(.42)	1-4
Low attachment to child	Parent	3.47	(.42)	1-4	3.49	(.47)	1-4
Inconsistent discipline	Parent	2.80	(.55)	1-4	2.81	(.44)	1-4
Low parent involvement	Parent	2.60	(.72)	1-4	1.47	(.57)	1-4
Poor supervision	Adolescent	3.63	(.40)	1-4	3.55	(.48)	1-4
<i>Education</i>							

Risk factor	Data source	Early Adolescence			Late Adolescence		
		Mean	(SD)	Range	Mean	(SD)	Range
Low commitment to school	Adolescent	3.08	(.36)	1-4	3.07	(.39)	1-4
Low college aspirations	Adolescent	3.57	(.70)	1-4	3.37	(.83)	1-4
Low college expectations	Adolescent	2.63	(.68)	1-3	2.60	(.73)	1-3
Low parent college expectations for adolescent	Parent	2.32	(.79)	1-3	2.39	(.85)	1-3
Low school grades	School	1.88	(.88)	0-4.5	--	--	--
Peer relationships							
Gang membership	Adolescent	0.34	(.48)	0-1	--	--	--
Delinquent peers	Adolescent	1.41	(.50)	1-4	1.35	(.56)	1-4
Unsupervised time with friends	Adolescent	1.99	(.62)	1-5	2.18	(.84)	1-5
Adolescent stressors							
Negative life events	Adolescent	2.87	(1.80)	0-8	1.65	(1.35)	0-8
Depressive symptoms	Adolescent	2.13	(.46)	1-4	2.01	(.48)	1-4
Low self-esteem	Adolescent	3.08	(.41)	1-4	3.26	(.44)	1-4
Internalizing problems	Parent	0.49	(.30)	0-2	0.42	(.31)	0-2
Antisocial behaviors							
Externalizing behaviors	Parent	0.47	(.34)	0-2	--	--	--
Aggression	Parent	--	--	--	0.37	(.36)	0-2
Delinquent beliefs	Adolescent	1.25	(.34)	1-4	1.50	(.49)	1-4
General delinquency	Adolescent	0.53	(.50)	0-1	0.39	(.49)	0-1
Problem marijuana use	Adolescent	0.06	(.40)	0-6	0.04	(.28)	0-7
Problem alcohol use	Adolescent	0.09	(.48)	0-6	0.10	(.43)	0-7
Precocious transitions							
Precocious sexual activity	Adolescent	--	--	--	0.32	(.47)	0-1
Precocious parenthood	Adolescent	--	--	--	0.19	(.40)	0-1
Precocious cohabitation	Adolescent	--	--	--	0.10	(.30)	0-1
Living independently from parent	Adolescent	--	--	--	0.14	(.34)	0-1
School dropout	Adolescent	--	--	--	0.27	(.44)	0-1

<sup>a</sup>For continuous variables, mean, SD, and range are presented for the variable before dichotomization.

**Table 2**

Prevalence and characteristics of involvement in maltreatment.

Variables	N	%
Child maltreatment		
No	714	87.5
Yes	102	12.5
Total	816	100.0
Number of incidents per individual		
1	73	71.6
2	10	9.8
3-5	15	14.7
6+	4	3.9
Total	102	100.0
Age at maltreatment by incident		
23 or less	43	24.2
24-27	45	25.3
28-31	44	24.7
32+	46	25.8
Total	178	100.0
Number of victims by incident		
1	102	57.3
2	34	19.1
3-4	33	18.5
5+	9	5.1
Total	178	100.0
Number of types of maltreatment by incident		
1	108	60.6
2	61	34.3
3	9	5.1
Total	178	100.0
Types of maltreatment by incident		
Neglect	157	88.2
Physical abuse	44	24.7
Sexual abuse	13	7.3
Other	35	19.7

**Table 3**Relationship between early adolescent risk factors and maltreatment.<sup>a</sup>

<b>Risk factor</b>	<b>OR</b>
Area characteristics	
Percent in poverty	0.99
Neighborhood disorganization	1.27
Poor neighborhood integration	1.44
Neighborhood drug use	1.63 <sup>*</sup>
Family background/structure	
Low parent education	2.10 <sup>***</sup>
Poverty-level income	1.52 <sup>*</sup>
Teenage mother	1.69 <sup>*</sup>
Family transitions	2.15 <sup>***</sup>
Parent stressors	
Parent depressive symptoms	1.40
Parental stress	1.11
Negative life events	1.92 <sup>**</sup>
Parent marijuana use	0.74
Parent alcohol use	1.58
Exposure to family violence	
Parental partner conflict	1.98 <sup>*</sup>
Maltreatment victimization	2.40 <sup>***</sup>
Family hostility	1.10
Parent-child relationships	
Low attachment to parent	0.96
Low attachment to child	1.90 <sup>**</sup>
Inconsistent discipline	1.46
Low parent involvement	1.00
Poor supervision	0.99
Education	
Low commitment to school	1.73 <sup>*</sup>
Low college aspirations	1.20
Low college expectations	1.60 <sup>*</sup>
Low parent college expectations for adolescent	2.24 <sup>***</sup>
Low school grades	2.25 <sup>***</sup>
Peer relationships	
Gang membership	2.01 <sup>***</sup>
Delinquent peers	1.48
Unsupervised time with friends	1.31
Adolescent stressors	

<b>Risk factor</b>	<b>OR</b>
Negative life events	1.96**
Depressive symptoms	1.10
Low self-esteem	1.49
Internalizing problems	1.60*
Antisocial behaviors	
Externalizing behaviors	1.75**
Delinquent beliefs	1.11
General delinquency	1.60*
Problem marijuana use	2.42*
Problem alcohol use	2.46**

<sup>a</sup>Discrete Time Survival Analysis, controlling for gender and area arrest rate.

\*  
p < 0.05.

\*\*  
p < 0.01.

\*\*\*  
p < 0.001.

**Table 4**Relationship between late adolescent risk factors and maltreatment.<sup>a</sup>

<b>Risk factor</b>	<b>OR</b>
Area characteristics	
Neighborhood disorganization	1.18
Poor neighborhood integration	1.52
Neighborhood drug use	1.36
Parent stressors	
Parental stress	1.47
Negative life events	1.26
Parent marijuana use	1.26
Parent alcohol use	1.66*
Exposure to family violence	
Parental partner conflict	2.11*
Family hostility	1.30
Parent-child relationships	
Low attachment to parent	0.72
Low attachment to child	1.64*
Inconsistent discipline	1.50
Low parent involvement	1.40
Poor supervision	0.77
Education	
Low commitment to school	1.29
Low college aspirations	1.99**
Low college expectations	1.61*
Low parent college expectations for adolescent	1.37
Peer relationships	
Delinquent peers	1.71*
Unsupervised time with friends	1.40
Adolescent stressors	
Negative life events	0.70
Depressive symptoms	1.26
Low self-esteem	0.94
Internalizing problems	1.64*
Antisocial behaviors	
Aggression	1.89**
Delinquent beliefs	0.86
General delinquency	1.56*
Problem marijuana use	1.66
Problem alcohol use	1.63
Precocious transitions	

<b>Risk factor</b>	<b>OR</b>
Precocious sexual activity	1.68 <sup>*</sup>
Precocious parenthood	3.90 <sup>***</sup>
Precocious cohabitation	4.03 <sup>***</sup>
Living independently from parent	3.10 <sup>***</sup>
School dropout	2.30 <sup>***</sup>

<sup>a</sup>Discrete Time Survival Analysis, controlling for gender and area arrest rate.

\* p < 0.05.

\*\* p < 0.01.

\*\*\* p < 0.001.

**Table 5**Relationship between each developmental domain and maltreatment.<sup>a</sup>

Developmental domain	OR	
	Early adolescence	Late adolescence
Area characteristics	1.30*	1.30*
Family background/structure	1.63***	--
Parent stressors	1.21*	1.30*
Exposure to family violence	1.53***	1.47*
Parent-child relationships	1.14	1.11
Education	1.35***	1.18*
Peer relationships	1.37**	1.42*
Adolescent stressors	1.34***	1.07
Antisocial behaviors	1.29***	1.25**
Precocious transitions	--	1.66***

<sup>a</sup>Discrete Time Survival Analysis, controlling for gender and area arrest rate.

\* p &lt; 0.05.

\*\* p &lt; 0.01.

\*\*\* p &lt; 0.001.



**Table 6**Multivariate relationship between developmental domains and maltreatment.<sup>a</sup>

Developmental domain	OR	
	Early adolescence	Late adolescence
Area characteristics	1.22	1.15
Family background/structure	1.40***	--
Parent stressors	1.03	1.15
Exposure to family violence	1.29	1.21
Parent-child relationships	0.89	0.92
Education	1.17	0.89
Peer relationships	1.15	1.21
Adolescent stressors	1.15	0.94
Antisocial behaviors	1.02	1.08
Precocious transitions	--	1.66***

<sup>a</sup>Discrete Time Survival Analysis, controlling for gender and area arrest rate.

\* p &lt; 0.05.

\*\* p &lt; 0.01.

\*\*\* p &lt; 0.001.