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## Unsafe at Any Age: Linking Childhood and Adolescent Maltreatment to Delinquency and Crime

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Nearly five decades have elapsed since Kempe and colleagues (1962) published their seminal work exposing the harm of physical abuse. In that time, criminologists and scholars from allied fields have confirmed that child maltreatment in its various forms invites negative behavioral consequences, including juvenile delinquency and adult crime (e.g., English, Widom, and Brandford 2002; Mersky and Reynolds 2007; Smith, Ireland, and Thornberry 2005; Smith and Thornberry 1995; Widom 1989). The resultant social costs of abuse and neglect are estimated to eclipse \$100 billion annually, over a third of which are borne by the juvenile and adult criminal justice systems (Wang and Holton 2007).

Despite consensus that exposure to maltreatment increases a child's risk of committing future delinquent and criminal acts, it is also recognized that many victims overcome early adversities. Rather than inevitably becoming "murderers and perpetrators of other crimes of violence (Curtis, 1963:386)," many maltreated children commit less serious offenses or avoid criminal activity altogether (McGloin and Widom 2001). Therefore, research should aspire to differentiate maltreatment victims who do not offend from victims who commit various types of violent and non-violent offenses. Knowledge generated may inform crime prevention and maltreatment intervention strategies.

One promising approach to this line of inquiry distinguishes victims by unique features of their abuse and neglect histories (e.g., type; severity). In this study we extend recent work that has considered whether the age at which maltreatment occurs (i.e., *timing*) predicts future criminality, including different types of delinquency and crime. Below we review theoretical and empirical literature that lays the groundwork for this study.

### THEORETICAL BACKGROUND

It is widely acknowledged that child maltreatment is associated with delinquency and crime, but it is uncertain whether offending varies as a function of the age at which a child experiences maltreatment. Two broad theoretical perspectives—developmental psychopathology and life course theory—have helped to guide previous research of this kind (see Ireland, Smith, and Thornberry 2002). Described briefly below, they offer

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countervailing hypotheses regarding the timing of maltreatment and its influence on delinquency and crime.

Developmental psychopathology asserts that early childhood experiences tend to have profound impacts on functioning because later development is shaped by the way earlier developmental structures are organized and integrated (Cicchetti 1993; Cummings, Davies, and Campbell 2000). Therefore, failure to complete early stage-salient tasks is likely to result in lasting dysfunction. Applied to child abuse and neglect, developmental psychopathology posits that early maltreatment often harms emergent developmental systems, portending significant disturbances. Abuse and neglect during the first years of life, for example, alters the structural and functional development of the brain (Teicher et al. 2003; Twardosz and Lutzker 2010). These impairments may correspond to compromised attachment and self processes, dysregulated emotion recognition and regulation, as well as decrements in cognition, language and learning (Cicchetti and Valentino 2006). Early maltreatment is also associated with poor social outcomes in children, such as aggression and peer deviance (Miller-Johnson, Loeber, and Hipwell 2009; Shields and Cicchetti 1998). Deficits in the preceding developmental domains, alone or in combination, may contribute to delinquency and crime.

Without discounting the influence of early childhood, life course theory emphasizes the importance of ongoing developmental transitions and posits that outcomes tend to be strongly linked to proximal events (Agnew 1997; Elder 1998; Sampson and Laub 2005). Therefore, adolescent maltreatment may be a more potent criminogenic influence than childhood maltreatment (Ireland et al. 2002; Stewart et al. 2008). Among the proposed mechanisms to explain why adolescent maltreatment precipitates criminality, borrowing from strain theory, being abused or neglected is expected to generate unwanted emotions and behaviors (Agnew 2001; Hollist, Hughes, and Schaible 2009). During adolescence, as autonomy, cognitive abilities, and social context expand (Garbarino 1989; Kaplow and Widom 2007), these experiences may trigger maladaptive individual or peer-based coping strategies (e.g., substance use) associated with delinquency (Eftekhari, Turner, and Larimer 2004; Wagner, Myers, and McIninch 1999).

## EMPIRICAL EVIDENCE

### General Offending

Exposure to abuse and neglect at any point prior to majority age is known to be associated with poor behavioral outcomes. The relationship between childhood maltreatment and later juvenile and adult offending is especially well documented (English, et al. 2002; Kakar 1996; Siegel and Williams 2003; Smith and Thornberry 1995; Topitzes, Mersky, and Reynolds 2011; Widom 1989). Despite receiving less empirical attention, adolescent maltreatment has also been repeatedly linked to later offending (Brezina 1998; Fagan 2005; Ireland, et al. 2002; Lemmon 1999).

Few studies have compared the relative impacts of childhood and adolescent maltreatment, and extant evidence has yielded mixed conclusions. Some research suggests that an earlier onset of childhood abuse and neglect is associated with correlates of delinquency, such as

externalizing problems and poor peer relationships (Bolger, Patterson, and Kupersmidt 1998; Keiley, et al. 2001; Manly et al. 2001). Conversely, Kaplow and Widom (2007) reported that, among maltreated children (ages 0–11), later victimization was associated with poorer psychosocial functioning. Adding further ambiguity, English and colleagues (2005) reported that the timing of maltreatment prior to age 8 had equivocal impacts on behavioral functioning, with effects varying by the type and chronicity of abuse and neglect.

Although the field has concentrated chiefly on childhood maltreatment some scholars have speculated that adolescent maltreatment is as harmful as childhood maltreatment, if not more so (Garbarino, Eckenrode, and Powers 1997; Ireland, et al. 2002). Supporting this hypothesis, recent studies have shown that adolescent-limited maltreatment and persistent maltreatment during childhood and adolescence increase the risk of youth conduct problems, whereas abuse and neglect experienced exclusively during childhood does not (Bright and Jonson-Reid 2008; Eckenrode et al. 2001; Ireland, et al. 2002; Stewart et al. 2008). A recent investigation of data from the Rochester Youth Development Study (RYDS) showed this pattern of findings applies to adult offending as well (Thornberry, et al. 2010).

### Offending Subtypes

Maltreatment exposure has been shown to result in different types of delinquency and crime, especially violent offending (English et al. 2002; Maxfield and Widom 1996; Mersky and Reynolds 2007; Smith and Thornberry 1995). Maltreatment victims also appear to be more likely than their non-maltreated peers to engage in drug and alcohol use and to be adjudicated or convicted for a drug-related offense (Dembo, et al. 1988; Ireland and Widom 1994; Lo and Cheng 2007). A slender body of evidence also indicates that prior victimization is related to property offending (Heck and Walsh 2000; Ireland, et al. 2002; Widom 1995).

To our knowledge, researchers affiliated with the RYDS have conducted the only tests of discrete offending types and their relation to maltreatment at different developmental stages. Ireland and colleagues (2002) discovered that childhood-limited maltreatment predicted violent offending in early adolescence but not late adolescence. Childhood victimization did not increase the risk of adolescent drug use or street crime, while adolescent maltreatment victims were at an elevated risk of violent offending and drug use in early adolescence as well as street crime in early and late adolescence. A follow-up study determined that, while both childhood and adolescent maltreatment were linked to drug use in early adulthood, only adolescent maltreatment predicted violent crime (Thornberry, et al. 2010).

## CONTRIBUTIONS OF THE CURRENT STUDY

This investigation uses data from a large panel study of economically disadvantaged, minority participants to discern the relative consequences of childhood maltreatment and adolescent maltreatment on later offending. In so doing it adds to a handful of studies employing similar designs (e.g., English, et al., 2002; Stewart et al. 2008; Thornberry, et al. 2010; Widom 1989) and generates evidence about a population that has received limited scholarly attention. Expanding upon previous research, which has predominantly focused on delinquency, the current study assesses both juvenile offending and adult crime through age

26. Analyses examine various types of delinquency and crime, offering uncommon insight into the contribution of maltreatment timing to the etiology of violent and non-violent offending.

## SAMPLE AND DATA

For this paper we analyzed data from the Chicago Longitudinal Study (CLS), a prospective investigation of 1,539 underprivileged, minority (93% African American) participants who were born in 1979 or 1980. The original sample included 989 children who attended one of 20 Child-Parent Center (CPC) preschools, a public program operating in high-poverty neighborhoods in the Chicago metropolitan area. Since 1967 the CPCs have provided educational, family support, health, and nutritional services to children for up to six years, including one or two years of preschool. A matched comparison group of 550 children attended other public schools offering full-day kindergarten programs in low-income neighborhoods. Prior CLS findings have shown that children and families in the comparison group were largely similar to CPC preschool participants (Reynolds and Robertson 2003; Reynolds and Temple 1995). CPC children were more likely to live in a high-poverty neighborhood and to have an unemployed mother, however, while comparison children were more likely to have three or more siblings and a mother who did not complete high school (see Reynolds 2000 for detailed description of the CPC program and CLS design).

Child maltreatment data were gathered in 1998 after CLS sample members reached adulthood. Validated records were obtained for 1,411 participants from archives maintained at the Chapin Hall Center for Children, including referrals to the Illinois Department of Child Services (DCFS) and petitions to Cook County Juvenile Court. Subjects were retained in the abuse and neglect sample if they were residents in the Chicago area until 1990 (age 10) or later.

Juvenile and adult offending data were collected from multiple sources. Self-reported arrest histories were collected in two waves, the first in 10<sup>th</sup> grade (age 15) and the second in early adulthood (age 22–24). In 10<sup>th</sup> grade subjects reported if they had been arrested in the past year. Respondents to the adult survey were asked if they had ever been arrested and the age at which they were first arrested. We aggregated the two waves of data to generate self-reported juvenile arrest histories for 1,292 participants and adult arrest histories for 1,071 participants.

Delinquency data for 1,406 youth were gathered from court records of petitions filed from 1987 to 1997 in Cook County, IL as well as Dane and Milwaukee Counties, WI. Adult arrest, conviction, and incarceration records were obtained from ongoing searches of county, state, and federal administrative databases through age 26 for 1,473 sample members. We recorded the date and type of offense for each juvenile and adult arrest along with the number of offenses for each participant. We used self-report data and official records to create measures reflecting the incidence, type, and frequency of juvenile and adult offending, as described below (see Table 1).

## MEASURES

### Juvenile Delinquency and Adult Crime

To measure the incidence of juvenile delinquency we combined two waves of survey data described above and created a dichotomous variable denoting if a participant reported having been arrested prior to age 18. Using juvenile court data we created a dichotomous variable indicating if a participant had a delinquency petition as well as a count variable summing all petitions for each participant (Range 0–17; Mean 0.63; SD 1.75). From official juvenile records we also derived three dichotomous measures corresponding to the incidence of different types of offending: (1) violent, (2) drug, and (3) property.<sup>1</sup> Finally, to test the association between maltreatment and exclusively non-violent offending, we created a trichotomous variable that distinguishes non-offenders from youth with at least one violent petition and youth who only had a petition for a non-violent offense.

We constructed a panel of dichotomous adult crime measures parallel to our delinquency measures. Using adult survey data, we created an arrest measure denoting if a participant reported being arrested after age 18. From archival data we generated three dichotomous measures of adult criminality: (1) any arrest, (b) any arrest conviction, or (c) any incarceration.<sup>2</sup> To assess offending frequency, we created a count measure summing all adult arrest convictions for each participant (Range 0–13; Mean 0.72; SD 1.63). We also used conviction records to create three variables corresponding to the incidence of violent, drug, and property crime, respectively. We then created a trichotomous measure differentiating non-offenders from: (a) adults convicted of a violent crime, and (b) adults convicted exclusively of a non-violent crime.

### Child Maltreatment

From DCFS and court records, we created a dichotomous measure reflecting whether a participant experienced indicated<sup>3</sup> maltreatment prior to age 18 (n=191; 13.5% of sample). We used this indicator to construct two sets of measures differentiating childhood maltreatment (< age 12) and adolescent maltreatment (age 12–17). First, we created a pair of overlapping variables, one reflecting any incidence of childhood maltreatment (n=133; 9.4% of sample), and another indicating any incidence of adolescent maltreatment from age 12 through 17 (n=78; 5.5% of sample). Second, we created mutually exclusive measures of childhood-limited and adolescent-only maltreatment. The former measure indicates if a participant had a verified maltreatment report prior to age 12, but no verified reports thereafter (n=113; 8.0% of sample). The latter measure reflects whether a participant had an initial verified maltreatment report after turning age 12 (n=58; 4.1% of sample). Finally, we created a measure of *persistent* maltreatment that signifies if a subject experienced at least one incident of indicated maltreatment prior to age 12 as well as at least one indicated maltreatment report after age 12 (n=20; 1.4% of sample).

<sup>1</sup>Violent offenses include assault, battery, robbery, forcible rape, and murder. Property offenses include, but are not limited to, burglary, larceny, theft, motor vehicle theft, arson, shoplifting, and vandalism. Drug offenses include the use, possession, manufacturing, or distribution of narcotics.

<sup>2</sup>We coded participants as incarcerated if they spent 30 consecutive days or more in a federal prison, state prison, or county jail.

<sup>3</sup>“Indicated” reports include substantiated allegations along with reports that have not been verified but where child protection agents have deemed that suspicion or risk of maltreatment is present.

## Covariates

We controlled for the following individual characteristics measured at or near the child's birth: sex, race/ethnicity, and low birth weight status (< 2500 grams). We also controlled for CPC preschool and school-age attendance because the CPC program has been linked to lower rates of abuse and neglect (Reynolds and Robertson 2003) as well as delinquency and crime (Reynolds et al. 2007; Reynolds, et al. 2001). Further, we covaried the following family measures: (a) mother did not complete high school, (b) mother unmarried at child's birth, (c) mother's first birth < age 18, (d) four or more children in household, and (e) residence in a high-poverty neighborhood (i.e., 40% or more residents in census tract below poverty level, 1980 Census). As a proxy of family poverty, we included a covariate indicating if a family received public assistance (Aid to Families with Dependent Children) in 1989–1990, the earliest years at which records were available.

Finally, although we retained a large majority of CLS subjects, selective attrition remains a potential threat to internal validity. Therefore, in all analyses we incorporated propensity score variables that measure the predicted probability of inclusion in the effective sample. Significant associations between a propensity score and an outcome would indicate that the sample differed from the original CLS composition.

## ANALYSIS STRATEGY

Our initial multivariate analyses tested if having an indicated maltreatment report prior to age 18 was associated with juvenile and adult offending. Next, we compared the delinquency and crime outcomes of maltreated and non-maltreated children, inclusive of any adolescent abuse or neglect experienced. Similarly, we examined whether offending patterns varied among adolescent victims and non-maltreated subjects, inclusive of any childhood abuse or neglect.<sup>4</sup> This analytical approach (Model 1) maximizes statistical power but sacrifices independence between childhood and adolescent maltreatment, because 20 participants had an indicated report during both developmental periods (i.e., persistent maltreatment). Therefore, we repeated analyses with mutually exclusive measures of childhood-limited and adolescent-limited maltreatment, entering these variables jointly in models along with a measure of persistent maltreatment. This approach (Model 2) maximizes the capacity to isolate the effects of maltreatment during a specific developmental period while sacrificing some statistical power. We do not report effects associated with persistent maltreatment due to its low base rate, which resulted in unstable coefficients.

Participants are included in analyses if we have verified their maltreatment history as well as their offending status for a given outcome. Effective sample sizes vary accordingly. We analyze dichotomous outcomes using binomial logistic regression and polytomous outcomes using multinomial logistic regression. Count variables of offending frequency are analyzed

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<sup>4</sup>Analyses include only non-maltreated participants in the reference group. For analyses of childhood maltreatment we covary the effects of adolescent-only maltreatment, and for analyses of adolescent maltreatment we control for the effects of childhood-only maltreatment.

using zero-inflated probability negative binomial regression.<sup>5</sup> In Tables 2–3 findings are reported as odds ratios (OR) with significance tests at the .05, .01, and .001 alpha levels.

We also perform two sets of sensitivity analyses. First, our records indicate that 8 CLS participants had a juvenile arrest petition record prior to their first indicated report of maltreatment. To address concerns regarding the temporal order of adolescent maltreatment and juvenile offending we replicate analyses after selecting out these participants. Second, we duplicate initial analyses after adding measures of self-reported *troublemaking behavior* from grades 3–6 and teacher-reported *acting out behavior* from grades 6–7.<sup>6</sup> In this way we aim to control for conduct problems that emerged prior to adolescence.

## RESULTS

### Juvenile Delinquency

Findings (not shown) revealed that having at least one indicated maltreatment report before turning age 18 was significantly associated with all measures of delinquency, including self-reported (OR = 1.73;  $p < .01$ ) and official incidence of arrest (OR = 3.01;  $p < .001$ ), as well as offending frequency ( $\mu = 1.07$  vs. 0.47;  $p < .001$ ). Results also showed that a history of abuse or neglect increased the odds of having an arrest petition for a violent offense (OR=2.89;  $p < .001$ ), drug offense (OR=3.03;  $p < .001$ ), and property offense (OR=2.21;  $p < .01$ ), respectively. Having an indicated maltreatment report also increased the odds of being categorized as an exclusively non-violent offender (OR=2.44;  $p < .01$ ).

Comparative analyses (see Table 2) demonstrated that childhood maltreatment and adolescent maltreatment were associated with most juvenile delinquency outcomes; we found no substantive discrepancies across our two main analytic strategies. Analyses of petition records revealed that experiencing childhood maltreatment significantly increased the odds of committing at least one juvenile infraction. Compared to non-maltreated participants, childhood maltreatment victims also engaged in more frequent offending and they were more likely to have a violent, drug, or property offense petition, respectively. Childhood maltreatment was not significantly associated with self-reported arrest status or having a petition only for a non-violent offense, however.

Adolescent maltreatment was associated with even larger standardized effects than childhood maltreatment on each marker of juvenile offending. Compared to their non-maltreated counterparts, adolescent victims were more likely to report having been arrested as a juvenile and to have an official arrest petition. Adolescent maltreatment was also associated with more frequent juvenile offending and with an increased probability of

<sup>5</sup>Count outcomes were highly skewed and overdispersed. Vuong tests confirmed that the zero-inflated probability (ZIP) estimations were a significant improvement over ordinary negative binomial regression. Coefficients from ZIP negative binomial regressions are interpretable as the change in the log of expected counts for the outcome (total offenses) associated with a one-unit change in the independent variable (non-maltreated=0; maltreated=1).

<sup>6</sup>Reynolds, Temple, and Ou 2010 described both measures in detail. *Troublemaking behavior* originates from student ratings of 4 items related to their behavior at school and home (e.g., “I get in trouble at home”; “I fight at school”). Scores for each year were summed and transformed into an average Z-score. *Acting out behavior* was measured using the Teacher-Child Rating Scale, a 6-item scale that asks teachers to rate a child’s classroom behaviors (e.g., “overly aggressive to peers (fights)”; “disruptive in class”). A summative, continuous variable was dummy coded to indicate if a child’s behaviors were at least 1 standard deviation above (i.e., worse than) average.

having at least one violent, drug, and property petition, respectively. Maltreated adolescents were also more likely than non-maltreated subjects to engage exclusively in non-violent offending.

### Adult Crime

Experiencing verified maltreatment prior to age 18 was significantly related to multiple crime outcomes, including incarceration (OR = 2.99;  $p < .001$ ), self-reported arrest (OR = 1.82;  $p = .013$ ), official arrest (OR = 1.58;  $p = .012$ ) and arrest conviction (OR = 2.41;  $p < .001$ ). Maltreatment status was also associated with a higher frequency of convictions ( $\mu = 1.05$  vs. 0.56;  $p < .001$ ). Furthermore, a history of indicated maltreatment increased the odds of being convicted for a violent offense (OR = 2.48;  $p < .001$ ) or drug offense (OR = 2.25;  $p < .001$ ), but not a property offense (OR = 1.63;  $p = .073$ ). The odds of having an exclusively non-violent record of adult crime also did not differ significantly between maltreated and non-maltreated participants (OR = 1.49;  $p = .063$ ).

Table 3 presents findings from comparative analyses, which revealed that childhood maltreatment was significantly associated with most adult crime outcomes, while adolescent maltreatment predicted a more restricted range of measures. Although results were fairly consistent across Models 1 and 2, there were some discrepancies which we report below.

Analyses revealed that childhood maltreatment forged a significant connection with the following general indicators of adult crime: self-reported arrest, officially recorded arrest, arrest conviction, offending frequency, and incarceration status. Experiencing childhood maltreatment also increased the odds of being convicted for a violent offense or a drug offense. We discovered only one meaningful discrepancy between modeling approaches—having a conviction for a property crime was associated with childhood-limited maltreatment but not childhood maltreatment inclusive of adolescent maltreatment.

Compared to the effects of childhood maltreatment, associations between adolescent maltreatment and adult crime were more tenuous. Adolescent maltreatment was not significantly associated with being arrested according to self-report or official records. Likewise, adolescent maltreatment did not increase the odds of being convicted for a violent or property crime. Adolescent maltreatment was significantly related to having at least one arrest conviction, however.

Among the discrepancies we uncovered across analytic approaches, adolescent-limited maltreatment was positively associated with offending frequency (Model 2), whereas adolescent maltreatment inclusive of childhood maltreatment was not significantly associated with offending frequency (Model 1). Adolescent-limited maltreatment also increased the odds of being convicted for a drug crime (Model 2), but adolescent maltreatment inclusive of earlier maltreatment was not significantly associated with drug offending (Model 1). Conversely, we found that incarceration status (Model 1) was positively related to our inclusive measure of adolescent maltreatment but not adolescent-limited maltreatment.



Associations between propensity scores and all juvenile and adult outcomes were non-significant, meaning the samples analyzed did not differ statistically from the full CLS sample. These findings help to mitigate concerns about the potential threat of selective attrition.

### Secondary Analyses

We reanalyzed all primary models after selecting out 8 participants with a delinquency petition prior to their first indicated maltreatment report. Results showed that the magnitude of effects associated with adolescent maltreatment decreased across analyses and some previously significant associations were rendered non-significant. Contrary to initial results, for instance, adolescent maltreatment inclusive of earlier maltreatment did not significantly increase the odds of having a juvenile petition for a drug offense ( $p=.087$ ). Likewise, neither adolescent maltreatment inclusive of earlier maltreatment ( $p=.182$ ) nor adolescent-limited maltreatment ( $p=.140$ ) significantly increased the odds of having a property offense petition. Finally, adolescent maltreatment inclusive of prior maltreatment was not significantly related to the frequency of juvenile offending ( $p=.051$ ). In a second line of robustness tests we controlled for self-reported troublemaking behavior and teacher-reported child acting out behavior (6–7). Covarying these indicators of pre-adolescent problem behaviors did not substantively alter our findings.

## DISCUSSION

The primary contributions of this paper extend from its examination of how delinquency and crime varies with the age at which maltreatment is experienced. We discovered that childhood maltreatment was associated with general indicators of juvenile offending along with each unique form of delinquency examined—violent, drug, and property. With the exception of property offending, linkages between childhood maltreatment and criminality persisted into adulthood. In this regard our results differ from those of Thornberry and colleagues (2010) who reported that childhood maltreatment led to internalizing problems in adulthood but not externalizing problems such as criminal offending. Further contrasting with findings from the RYDS (Ireland et al., 2002; Thornberry et al. 2010), our study revealed that childhood maltreatment predicted later offending irrespective of exposure to adolescent maltreatment.

Consistent with conclusions from the RYDS and other longitudinal investigations, exposure to adolescent maltreatment was associated with juvenile delinquency, even after parceling out the influence of childhood abuse and neglect. Effect size estimates suggest that adolescent maltreatment was a strong predictor of all delinquent outcomes examined, with odds ratio coefficients ranging from 2.35 to 5.55.

We found the relations between adolescent maltreatment and adult offending to be more tenuous than the robust associations reported by Thornberry et al. (2010). Across all models, adolescent maltreatment was significantly associated with being convicted of at least one crime in adulthood. Adolescent-limited maltreatment was linked to greater offending frequency and an increased risk of being convicted for a drug crime, associations that were non-significant when adolescent maltreatment was measured inclusive of prior childhood

maltreatment. These findings are counterintuitive given the expectation that recurring victimization should yield poorer outcomes than less persistent maltreatment. In keeping with this hypothesis, adolescent maltreatment was positively related to incarceration status, a relationship that was rendered non-significant once we controlled for childhood maltreatment. Tests of association between adolescent maltreatment and all remaining adult crime outcomes were non-significant.

Three reasons may partially explain why adolescent maltreatment effectuated a stronger connection with juvenile delinquency than adult crime. For one, some maltreated adolescents may have been raised in at least an average expected environment during childhood, developing capacities that buffered them from the effects of abuse and neglect (Cicchetti and Valentino 2006). Second, if the consequences of maltreatment are conditional on its recency as life course theory predicts, then analyses restricted to delinquent outcomes may overestimate the lasting significance of adolescent maltreatment. However, this hypothesis does not comport with our results for childhood maltreatment, which was associated with relatively stable effects throughout adolescence and adulthood. A final possibility is that our estimates of the adolescent maltreatment-delinquency connection are inflated. Unmeasured delinquency may have preceded adolescent maltreatment in some cases. Due to their temporal coincidence, the link between adolescent maltreatment and juvenile delinquency is more safely interpreted as correlational than causative.

Inferences from study results should be made in light of three limitations. First, considering the demographic composition of the CLS, results may not be generalizable to the broader population of children and adolescents in the United States. Second, although we examined exposure to maltreatment at age cut-points (ages 0–11; 12–17) that are developmentally salient, they also represent gross distinctions. Future investigations of maltreatment experienced during narrower periods of development may yield more precise implications.

Third, our use of administrative data for most study measures warrants certain caveats. Although we had the advantage of drawing from CPS and juvenile court data, official maltreatment records have well documented limitations (Smith, et al. 2008; Widom 1989). One shortcoming is the probable influence of false negatives (i.e., Type-II errors); many children who are maltreated never come to the attention of a child protective service agency. In addition, reported, investigated, and verified cases of maltreatment may differ from unsubstantiated or unreported cases in ways that are associated with criminality. It is also likely that some adolescent maltreatment victims were exposed to undetected childhood maltreatment and that some maltreated children experienced undocumented victimization as adolescents. Failure to fully account for persistent maltreatment may artificially magnify the estimated effects of maltreatment during a given developmental stage.

Despite these limitations, the significance of our study is enhanced by multiple strengths. To begin, most comparable investigations have been restricted to proximal effects of maltreatment on maladaptive behavior and delinquency; we were able to examine more distal associations with adult crime. In addition, our study adds new knowledge by evaluating a sample of impoverished, minority participants in an urban setting. Although the composition of the CLS is not representative of the general population, our findings have

implications for similar children and youth who are at an elevated risk of recorded maltreatment, delinquency, and crime.

Furthermore, methodological features of this investigation place it among the more rigorous studies to have examined the long-term consequences of maltreatment. Using prospective, longitudinal data from birth throughout early adulthood enhances our ability to establish temporal precedence and make predictive claims. Other features that increase confidence in our results include the use of: (a) naturalistic sampling (i.e., not selected or matched on maltreatment or offending status), (b) propensity score matching, (c) self-report and administrative measures of delinquency and crime, (d) controls for known correlates of maltreatment, delinquency, and crime, and (e) sensitivity analysis.

## CONCLUSIONS

Our data confirmed that childhood and adolescent maltreatment are strongly associated with various forms of delinquent offending. Childhood maltreatment was positively related to comparable measures of adult offending, while associations between adolescent maltreatment and adult crime were less robust. While our study offers slightly more convincing support for developmental psychopathology than life course theory, overall our findings do not adjudicate between the two perspectives. Instead, our results imply that increased involvement in the juvenile or criminal justice systems corresponds to being maltreated—at any age.

Provided subsequent studies discover differential effects by the timing of maltreatment, responses from the child protective, juvenile justice, and criminal justice systems should be tailored accordingly. Yet, based on the evidence at hand, we find little to recommend the child's age of victimization alone as a key determinant of how resources should be allocated. Rather, we agree with the recommendation that developmentally appropriate, evidence-based interventions are required for maltreatment victims of all ages (Stewart et al. 2008; Thornberry et al. 2010). Whereas most maltreatment prevention initiatives target expectant mothers and families with young children (Mikton and Butchart 2009; Reynolds, Mathieson, and Topitzes 2009), findings from this study and other similar investigations suggest that greater attention should be paid to preventing maltreatment throughout childhood and adolescence.

We look forward to further research aimed at clarifying whether the timing of victimization exerts a reliable influence on later offending. Toward this end, the field will be enhanced by studies that extend throughout the peak offending years of adulthood. Had we only examined juvenile offenses, our conclusions regarding the impacts of adolescent maltreatment would have largely comported with other recent studies. Moreover, future investigators should consider how timing interacts with other taxonomic features (e.g., type, severity; persistence) that differentiate maltreatment experiences and, in turn, influence delinquency and crime.

By the same token, research is needed to expose different offender profiles associated with childhood and adolescent maltreatment. Just as multiple forms of abuse and neglect have

known behavioral consequences, child maltreatment has been shown to give rise to multiple forms of violent and non-violent offending. To wit, we discovered a robust association between drug-related offending and prior maltreatment. Future research should be directed toward illuminating this connection and to differentiating the processes leading from maltreatment to drug use and drug selling, which our study did not address.

Finally, we look forward to more research that moves beyond main-effect analysis toward understanding the underlying processes linking maltreatment, delinquency, and crime. It may be that the overall effects of maltreatment are not age-graded, but that the mechanisms that connect maltreatment to criminality do differ according to the age at which the child is victimized. In this respect, both developmental psychopathology and life course theory may elucidate alternative processes through which childhood and adolescent maltreatment lead to delinquency and crime.

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**Table 1**

## Descriptive Statistics for Delinquency and Crime Outcomes

	N	n	Mean	SD
<b>Juvenile Offending</b>				
Any self-reported arrest	1292	327	.253	.435
Any delinquency petition	1406	294	.209	.407
Number of petitions	1406	--	0.63	1.75
Any violent petition	1406	156	.111	.314
Any drug petition	1406	156	.111	.314
Any property petition	1406	163	.116	.320
Non-violent petition only	1406	138	.093	.290
<b>Adult Crime</b>				
Any incarceration	1469	234	.159	.366
Any self-reported arrest	1071	371	.346	.476
Any official arrest	1473	628	.426	.495
Any arrest conviction	1473	396	.269	.444
Number of convictions	1473	--	0.72	1.63
Any violent conviction	1473	160	.109	.311
Any drug conviction	1473	227	.154	.361
Any property conviction	1473	110	.075	.263
Non-violent conviction only	1473	236	.160	.367



**Table 2**

Effects of Childhood and Adolescent Maltreatment on Juvenile Offending

Outcome	N	Model 1		Model 2	
		Any CAN 0-11	Any CAN 12-17	CAN 0-11 Only	CAN 12-17 Only
Any self-reported arrest	1226	1.37 (0.85; 2.19)	3.05*** (1.71; 5.43)	1.14 (0.68; 1.93)	3.00** (1.54; 5.87)
Any official court petition	1404	2.29*** (1.46; 3.60)	4.28*** (2.45; 7.48)	2.36*** (1.46; 3.83)	5.55*** (2.94; 10.49)
Number of petitions <sup>1</sup>	1404	0.68** (0.22; 1.14)	1.42*** (0.67; 2.17)	0.66** (0.18; 1.15)	1.57*** (0.71; 2.42)
Any petition for violent offense	1404	2.56*** (1.55; 4.23)	3.32*** (1.80; 6.11)	2.63*** (1.54; 4.47)	3.75*** (1.91; 7.38)
Any petition for drug offense	1404	2.78*** (1.60; 4.83)	2.81** (1.39; 5.68)	3.20*** (1.78; 5.75)	3.69** (1.68; 8.13)
Any petition for property offense	1404	1.97* (1.14; 3.39)	2.35* (1.21; 4.59)	2.13** (1.20; 3.78)	2.85** (1.37; 5.95)
Non-violent petition only <sup>2</sup>	1404	1.67 (0.88; 3.18)	3.88*** (1.91; 7.91)	1.72 (0.86; 3.42)	5.27*** (2.38; 11.64)

<sup>1</sup>CAN = Child Abuse and Neglect

<sup>1</sup>Coefficients obtained from zero-inflated probability (ZIP) negative binomial regression.

<sup>2</sup>Coefficients are odds ratios obtained from multinomial logistic regression. All other coefficients are odds ratios obtained from binomial logistic regression.

All coefficients are adjusted for sex, race/ethnicity, low birth weight status, mother's education, mother's marital status, mother's age at first birth, family size, residence in a high-poverty neighborhood, AFDC receipt, CPC participation (preschool or school-age), and a propensity score variable indicating the predicted probability of inclusion in a given sample.

\*  $p < .05$

\*\*  $p < .01$

\*\*\*  $p < .001$

**Table 3**  
Effects of Childhood and Adolescent Maltreatment on Adult Offending by Age 26

Outcome	N	Model 1			Model 2		
		Any CAN 0-11	Any CAN 12-17	CAN 0-11 Only	Any CAN 0-11	CAN 12-17 Only	CAN 12-17 Only
Any incarceration	1383	3.43 *** (2.03; 5.79)	2.55 * (1.27; 5.10)	3.29 *** (1.89; 5.74)	2.15 (0.98; 4.71)		
Any self-reported arrest	1011	2.06 * (1.18; 3.60)	1.62 (0.82; 3.22)	1.99 * (1.08; 3.67)	1.39 (0.62; 3.11)		
Any official arrest	1387	1.79 ** (1.18; 2.70)	1.22 (0.72; 2.07)	1.89 ** (1.21; 2.96)	1.19 (0.65; 2.18)		
Any arrest conviction	1387	2.56 *** (1.66; 3.97)	1.79 * (1.01; 3.16)	2.94 *** (1.84; 4.70)	2.09 * (1.09; 3.99)		
Number of convictions <sup>1</sup>	1387	0.69 *** (0.31; 1.08)	0.47 (-0.01; 0.95)	0.80 *** (0.38; 1.22)	0.61 * (0.49; 1.16)		
Any violent conviction	1387	2.92 *** (1.76; 4.85)	1.47 (0.70; 3.09)	3.32 *** (1.95; 5.64)	1.59 (0.69; 3.65)		
Any drug conviction	1387	2.30 ** (1.39; 3.82)	1.85 (0.94; 3.61)	2.56 ** (1.49; 4.38)	2.14 * (1.01; 4.56)		
Any property conviction	1387	1.75 (0.96; 3.20)	1.19 (0.49; 2.90)	1.94 * (1.04; 3.63)	1.36 (0.51; 3.58)		
Non-violent conviction only <sup>2</sup>	1387	1.38 (0.84; 2.25)	1.77 (0.89; 3.53)	1.43 (0.85; 2.41)	1.57 (0.85; 2.91)		

<sup>1</sup> Coefficients obtained from zero-inflated probability (ZIP) negative binomial regression.

<sup>2</sup> Coefficients are odds ratios obtained from multinomial logistic regression. All other coefficients are odds ratios obtained from binomial logistic regression.

All coefficients are adjusted for sex, race/ethnicity, low birth weight status, mother's education, mother's marital status, mother's age at first birth, family size, residence in a high-poverty neighborhood, AFDC receipt, CPC participation (preschool or school-age), and a propensity score variable indicating the predicted probability of inclusion in a given sample.

\*  $p < .05$

\*\*  $p < .01$

\*\*\*  $p < .001$