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## Comparing early adult outcomes of maltreated and non-maltreated children: A prospective longitudinal investigation

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### Abstract

Using prospective data from the Chicago Longitudinal Study, this investigation examined associations between child maltreatment and an array of outcomes in early adulthood. Findings from bivariate and multivariate analyses indicated that verified maltreatment victims fared significantly worse than participants without an indicated maltreatment report on indicators of educational and economic attainment, criminal offending, and behavioral and mental health. Results also revealed that, while many maltreated children appeared to function well on individual outcomes, a large majority did not achieve criteria for resilience when development was assessed across domains. For example, non-maltreated participants were more than twice as likely to attain five or more positive outcomes (38.2%) on an aggregate seven-item index as the maltreated group (15.7%). These findings suggest that child maltreatment is associated with extensive and enduring impacts, reinforcing the need to develop and implement effective maltreatment prevention and intervention strategies.

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Child maltreatment and its consequences has been the subject of formal scientific inquiry in the U.S. for nearly a half-century. In that time, the field has moved from primarily descriptive studies of behavioral maladjustment in physically abused children (e.g., Curtis, 1963; Kempe, Silverman, Steele, & Droegemueller, 1962) to predictive studies linking multiple forms of maltreatment to an array of deleterious outcomes. Extensive empirical research has shown that maltreated children often perform poorly relative to their non-maltreated peers on various indicators of physical, psychological, social-emotional, educational, and behavioral functioning (English, 1998; Miller-Perrin & Perrin, 2007). Compounding its toll on victims, child maltreatment is associated with externalities (e.g., hospitalization, child welfare services) that pass along substantial costs to society (Wang & Holton, 2007).

Despite the field's advances toward elucidating the direct and indirect impacts associated with child abuse and neglect, methodological limitations continue to restrict the knowledge base. For example, much of the extant evidence has been derived from studies using cross-sectional designs and retrospective data; analyses of prospective longitudinal data are less common (Leiter & Johnsen, 1994; Stone, 2007). Progress has also been slowed by the limited use of large samples, well-matched comparison groups, and statistical controls to

foster equivalence between maltreated and non-maltreated participants. Finally, research has focused disproportionately on the proximal impacts of abuse and neglect in childhood and adolescence. Although findings generally indicate that the consequences of child maltreatment persist into adulthood, rigorous studies of this kind are in the minority.

There are conceptual grounds on which to conjecture that the effects of maltreatment may differ among outcomes and over time. Prevailing developmental perspectives, including resilience theory, acknowledge that responses to abuse and neglect vary and that some maltreated children may function well in particular domains while having difficulty in other areas (Bolger & Patterson, 2003; Cicchetti & Toth, 1995). Further, some maltreated children may exhibit early disturbances but achieve greater levels of competence in adulthood, while others may experience harmful distal impacts without similar proximal consequences. Due partly to these individual differences, victims of abuse and neglect may meet criteria for resilience at certain developmental stages and not at others.

That some maltreated children are able to function well at all is seemingly remarkable considering that abuse and neglect often undermine key developmental functions and structures, including neurobiological, cognitive, attention, emotion regulation, attachment, and self systems (Cicchetti & Valentino, 2006). Yet, resilience theory posits that living organisms possess self-righting mechanisms that promote successful adaptation, meaning the capacity to succeed in the face of adversity may emerge from normal adaptive systems (Masten, 2007). Correspondingly, maltreated children who are otherwise exposed to environmental conditions that meet at least average expectations may be protected or buffered from harm. Therefore, maltreatment victims may achieve measurable standards of competence, not because they are invulnerable exemplars as once thought (Anthony, 1974), but because adaptive internal and external systems offered compensatory advantages.

Among the principal challenges to studying resilience, investigators must define the conditions that constitute adversity along with the criteria that connote adaptive functioning (Luthar, 2006; Masten, 2007). It is clear that abuse and neglect represent profound threats to healthy development, yet it is uncertain how successful adaptation to these adverse experiences should be operationalized. For example, there are differing views as to whether competence in a single sphere of development is indicative of resilience or if multiple outcomes and developmental domains should be assessed (Luthar, Cicchetti, & Becker, 2000). Scholars are gradually aligning with the assessment, however, that inferences of resilience are strengthened to the degree that individuals exhibit positive adaptation broadly (Cicchetti & Rogosch, 1997; Jaffee & Gallop, 2007; McGloin & Widom, 2001). Similar to the way etiological research has shifted from single-factor prediction models to multifactorial analyses, resilience-oriented investigations are increasingly being designed to examine how outcomes vary over time and across domains.

## **Contributions of the current study**

In this investigation, we use data from the Chicago Longitudinal Study (CLS) to examine the long-term impacts of child maltreatment. Our study contributes to the literature in three important ways. First, we extend research on the consequences of maltreatment by testing

associations with multiple outcomes at different points in emerging adulthood (age 18–24). Second, we analyze relations between maltreatment and select cut-points on a summative outcome index that reflect different thresholds of resilience. In so doing, we are able to further assess the aggregate effects of maltreatment across domains. Third, we address many of the methodological limitations found in previous research. We use prospective longitudinal data to investigate a large sample of disadvantaged children drawn from the general population. We also control for many child and family characteristics that correlate with maltreatment and the study outcomes, thereby reducing the likelihood that the estimated effects are spurious. Moreover, we analyze alternative model specifications to test the robustness of our estimates.

Below, we summarize the literature related to the long-term impacts of child maltreatment in the following areas: (a) educational and economic attainments, (b) criminal offending, (c) behavioral and mental health, and (d) resilience, or positive adaptation broadly.

## Background

### Educational and Economic Attainments

A sizeable body of research has shown that maltreated children are at risk of poor scholastic outcomes, such as lower achievement test scores and school grades as well as higher rates of absenteeism, grade repetition, and school dropout (See Stone, 2007 for review). Child maltreatment may also hinder long-term educational success, though only a handful of studies have analyzed secondary and post-secondary attainments. McGloin and Widom (2001) found that maltreated males and females were significantly less likely to earn a high school diploma than their non-maltreated counterparts. Likewise, Boden, Horwood, and Fergusson (2007) discovered that adults who retrospectively reported having experienced childhood physical or sexual abuse were less likely to have completed high school, attended college, or earned a college degree. These findings reinforced a previous retrospective study indicating that college students with a reported history of childhood abuse were more likely to drop out (Duncan, 2000). Recent evidence also suggests that youth placed in foster or kinship care are at risk of low educational attainments (Courtney & Dworsky, 2006; Pecora et al., 2006).<sup>1</sup>

Children who have been placed in out-of-home care also appear to fare poorly on indicators of personal economic standing, such as income, employment, and public aid receipt (Courtney & Dworsky, 2006; Pecora et al., 2006). In addition, maltreatment has been linked to many correlates of poor economic outcomes, such as school dropout, delinquency and crime, and employment disability (Leiter & Johnsen, 1994; Maxfield & Widom, 1996; Sansone, Dakroub, Pole, & Butler, 2005). However, few studies have directly examined the economic attainments of adults who experienced childhood abuse and neglect. McCord

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<sup>1</sup>Individuals who have resided in foster or kinship care may not be representative of all children who have experienced documented or undocumented maltreatment. While out-of-home placements are frequently precipitated by a verified maltreatment report, some children and youth are placed in care for other reasons (e.g. person in need of supervision). Further, the maltreatment experiences and environmental contexts of children who are removed from their homes may differ from children who are not removed from their homes. However, a recent study (Doyle, 2007) found no differences in employment or earnings between maltreated children who had been placed in out-of-home care and those who were never placed in care.

(1983) found no significant differences in vocational outcomes attributable to maltreatment, though the unconventional manner in which abuse and neglect were operationalized in this study limits the generalizability of its findings. In contrast, McGloin and Widom (2001) discovered that adults who had experienced child maltreatment reported higher rates of employment instability and unemployment than non-maltreated participants. Another more recent investigation found that indicated maltreatment was significantly correlated with economic attainments at the zero-order level, though these effects were rendered non-significant in multivariate analyses (Ou, Mersky, Reynolds, & Kohler, 2007).<sup>2</sup>

### Criminal Offending

Considerable attention has been paid to the behavioral consequences of child maltreatment. Much of this work has emerged from a *cycle of violence* perspective that explores the propensity for aggression and violence among physically abused children. Studies have repeatedly affirmed that physical abuse increases the likelihood of behavioral maladjustment, though exposure to other forms of maltreatment may contribute to poor behavioral outcomes as well (Hildyard & Wolfe, 2002; Putnam, 2003). For instance, the impacts associated with neglect may equal, or even exceed, the effects of physical abuse (English, Widom, & Brandford, 2002; Mersky & Reynolds, 2007).<sup>3</sup> Child abuse and neglect have also been shown to result in enduring behavioral consequences, including juvenile delinquency (Mersky, 2006; Smith & Thornberry, 1995; Widom, 1989; Zingraff, Leiter, Myers, & Johnsen, 1993). These findings point toward a likely association between child maltreatment and adult crime, though few studies have tested this hypothesis. Widom and colleagues found that children with a substantiated maltreatment record were more likely to be arrested as an adult than non-maltreated children, even after controlling for sociodemographic differences (English, et al., 2002; Maxfield & Widom, 1996). Two more recent studies have corroborated these findings (Smith, Ireland, & Thornberry, 2005; Topitzes, 2006).

### Behavioral and Mental Health

Numerous studies have shown that maltreated children are at an increased risk of poor behavioral and mental health outcomes in adulthood. The psychological symptoms and psychiatric diagnoses that have been linked to abuse and neglect are manifold, including depression, anxiety, somatization, dissociation, eating disorders, and personality disorders (De Bellis & Van Dillen, 2005; Horwitz, Widom, McLaughlin, & White, 2001; Kendler et al., 2000; Lansford et al., 2002; MacMillan et al., 2001; Springer, Sheridan, Kuo, & Karnes, 2007; Wise, Zierier, Krieger, & Harlow, 2001; Yates, Carlson, & Egeland, 2008). Maltreatment has also been shown to increase the risk of drinking-related problems in adolescence (Dube et al., 2006; Hamburger, Leeb, & Swahn, 2008; Kaufman et al., 2007) and adulthood (Brems, Johnson, Neal, & Freemon, 2004; Galaif, Stein, Newcomb, & Bernstein, 2001; Widom, DuMont, & Czaja, 2007). In addition, evidence indicates that a

<sup>2</sup>These findings should be interpreted cautiously due to the study's model specifications. Many of the predictors analyzed were measured after maltreatment (e.g. juvenile arrest; peer social skills). It is a strong possibility that effects of maltreatment were mediated by including these later measures in the analyses.

<sup>3</sup>There are many distinct types of neglect (e.g. educational; physical; supervisory). Few studies have considered whether unique forms of neglect are associated with differential effects, and their impacts relative to physical abuse are unclear.

history of maltreatment may predict tobacco use (Moran, Vuchinich, & Hall, 2004; Lau et al., 2005; Rodgers et al., 2004) and illicit drug use (e.g., Arellano, 1996; Moran et al., 2004; Widom, Marmorstein, & White, 2006). The above findings should be interpreted with caution, however, considering the abundant methodological limitations in these studies, such as the use of cross-sectional designs, small clinical samples, and retrospective reports of abuse and neglect (Malinosky-Rummel & Hansen, 1993; Widom et al., 2007).

Another important shortcoming to this literature is its almost exclusive emphasis on relations between child maltreatment and psychopathology. Little is known about how child maltreatment affects psychological well-being. It is possible that positive and negative indicators of functioning do not represent opposing poles along a continuum. Measures of mental health and dysfunction, though not necessarily orthogonal, may be conceptually and empirically distinct. It may be necessary, therefore, to examine these outcomes differentially. Studies have shown that various indicators of positive psychological functioning in children, such as hopefulness or optimism, are associated with parenting styles and behaviors (Hasan & Power, 2002; Rodriguez & Eden, 2008). Resilience-oriented investigations have also demonstrated that certain psychological characteristics (e.g., intelligence, ego resiliency) may act as protective or buffering mechanisms against the detrimental effects of abuse and neglect (Cicchetti, Rogosch, Lynch, & Holt, 1993; Moran & Eckenrode, 1992). Yet, we are unaware of any prospective studies that have examined the impacts of child maltreatment on psychological well-being in adulthood.

## Resilience

It is widely recognized that abuse and neglect have the potential to cause harm, yet less is known about the maltreated children who adapt successfully. Although still a nascent field of inquiry, recent studies have helped to quantify the proportion of maltreated children who can be classified as resilient. Estimates vary, of course, depending on the study design and how resilience is defined. Studies that measure resilience as competence manifesting in one domain and that rely on cross-sectional data typically report higher rates of resilience (Buckner, Mezzacappa, & Beardslee, 2003; Daining & DePanfilis, 2007) than studies that assess competence across domains and over time (Cicchetti & Rogosch, 1997; Jaffee & Gallop, 2007; Kaufman, Cook, Arny, Jones, & Pittinsky, 1994). There have been few evaluations of resilience in adults. Collishaw et al. (2007) found that roughly 45% of adults who retrospectively reported having experienced childhood sexual or physical abuse exhibited no lifetime psychopathology.<sup>4</sup> Using prospective data to examine associations between substantiated child maltreatment and adult functioning at different points in time, McGloin and Widom (2001) found that 22% of maltreated sample participants were classified as resilient in early adulthood, meaning that they had achieved six of the eight positive outcomes that were assessed. A follow-up study using the same data set but different operational measures indicated that approximately 30% of maltreated participants were classified as resilient (Dumont, Widom, & Czaja, 2007).

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<sup>4</sup>As noted by the authors, these findings should be interpreted cautiously due to the low base rate of self-reported abuse in the sample (n=44) and because abuse data were gathered retrospectively when participants averaged 44 years of age.

## Methods

### Sample and Data

This investigation uses data from the Chicago Longitudinal Study (CLS), a panel study of 1,539 minority children (93% African American; 7% Hispanic) from economically disadvantaged families. The original sample included 989 children who attended preschool in a Chicago Child-Parent Center (CPC) in 1983 or 1984. All other CLS participants (n=550) attended full-day kindergarten programs in Chicago public schools that were randomly selected from community areas comparable to those served by the CPCs.<sup>5</sup> The CPC program provides comprehensive educational and family-support services to children residing in high-poverty neighborhoods not served by Head Start or other early intervention programs. Eligible children may attend the CPCs up to six years, including one or two years of preschool. Previous findings have shown that CPC participants and non-participants were comparable on an array of background characteristics, including age, sex, race and ethnicity, family poverty, and participation in government-funded programs (Reynolds, 2000; Reynolds & Robertson, 2003).

CLS data have been gathered prospectively at multiple time points since kindergarten from several sources, including study participants, parents, teachers, and records from public databases (Ou, et al., 2007). Because different data sources were used to construct study measures, sample recovery rates vary. Table 1 presents unadjusted comparisons of the original CLS sample to the maltreatment sample and each outcome sample on a range of characteristics. Although the sample and attrition groups were similar overall, some significant differences were identified. As discussed below, we employ all background measures listed in Table 1 as covariates in our multivariate analyses in order to mitigate the potential threat of selective attrition to internal validity.

### Outcome Measures

**Education**—Educational attainment data were gathered from elementary, secondary, and postsecondary schools attended by participants and supplemented with self-reported data. Records of educational attainment were verified for 1,368 participants (88.9% of original sample) by August 2003. We used these data to construct two primary measures of educational attainment: (1) *high school completion* and (2) *four-year college attendance*. High school completion is a dichotomous variable indicating whether participants earned their high school diploma or completed a General Educational Development (GED) degree. Four-year-college attendance is a dichotomous variable indicating if participants earned at least one college credit at a four-year college or university.

**Income**—Employment and income data were collected for 1,288 participants (83.7% of original sample) from two sources: (a) records from the Illinois Department of Employment Security, and (b) self-reports from an adult survey. We examine a dichotomous measure, *above-average income*, indicating if a participant averaged at least \$3,000 in quarterly income between January 1, 2002, and March 31, 2004. We use \$3,000 as a quarterly

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<sup>5</sup>See Reynolds (2000) for detailed information about the CPC program and the CLS sampling methodology.

threshold because the average income in 2003 for African Americans, age 18–24, was \$12,006 (U.S. Census Bureau 2004).

**Crime**—Records of adult criminal offending were collected from public records and supplemented by survey responses. These data were used to construct a measure of adult offending, *any incarceration*, which reflects whether participants were sentenced to a county, state or federal correctional institution for at least 30 days. Models predicting adult incarceration include participants (N =1,413; 91.8% of original sample) whose criminal offending histories could be confirmed along with all participants who were verified residents in Illinois after the age of 18.

**Behavioral and Mental Health**—Survey data gathered from 1,142 participants (74.2% of original sample) at ages 22–24 were used to generate three dichotomous measures of behavioral and mental health: (1) *any substance misuse*, (2) *any depressive symptom*, and (3) *high life satisfaction*. Participants were coded for substance misuse if they responded affirmatively to at least one of the following survey items: (a) any substance abuse treatment, (b) any personal substance abuse problem, (c) smoking marijuana almost everyday at present, or (d) using other illicit substances a few times per week or more at present. Participants were coded for depression if they endorsed feeling one or more of the following a few times per week or almost everyday within the past month: (a) depressed, (b) hopeless, (c) lonely, (d) very sad, or (e) life isn't worth living. Together the five items, culled from the Derogatis Brief Symptom Inventory depression subscale (see Derogatis, 1993), showed good internal consistency reliability ( $\alpha=.84$ ). Respondents provided ratings of personal life satisfaction on a 5-item likert scale ranging from (1) poor to (5) excellent. Individuals who indicated satisfaction levels of (4) very good or (5) excellent were coded 1; all other participants were coded 0.

**Resilience**—We constructed a summative index of the seven primary outcomes described above. To create the index we reverse coded outcomes representing maladjustment (e.g. adult incarceration) so that a code of 1 denoted a positive value for each measure; we then summed across the seven outcomes. Subsequently, we dichotomized the index to indicate whether participants reached two discrete thresholds signifying resilient functioning: (a) *five or more positive outcomes* (N=1,260), and (b) *six or more positive outcomes* (N=1,411).<sup>6</sup>

## Explanatory Measure

**Child Maltreatment**—Child maltreatment records were collected from two databases maintained at the Chapin Hall Center for Children: petitions to Cook County Juvenile Court and referrals to the Illinois Department of Child Services (DCFS). The maltreatment sample (N=1,411) includes participants who, according to school records, resided in the Chicago metropolitan area in 1990 (age 10) or later. We aggregated the court and DCFS data to

<sup>6</sup>Valid outcome data were available for 1,122 sample members. We increased this sample size to 1,260 by assigning a code of 0 (i.e. non-resilient) to select individuals who could not meet the specified threshold of five or more positive outcomes even if they were assigned a positive value on all missing outcomes. By using the same measurement strategy to construct the outcome denoting six or more positive outcomes, we retained a larger sample (N=1,411) because the exclusionary criteria resulted in more sample members being defined as non-resilient.

create a dichotomous predictor denoting if a participant had one or more *indicated*<sup>7</sup> maltreatment reports prior to age 18. Participants were coded 1 (N=191; 13.5% of study sample) if they had an indicated report in at least one of the two data sources. This cumulative incidence rate roughly approximates estimates obtained for other similar populations (Aos, Lieb, Mayfield, Miller, & Pennucci, 2004; Smithgall, Gladden, Howard, Goerge, & Courtney, 2004).

### Covariates

Prior CLS investigations have linked CPC preschool participation and, to a lesser degree, CPC school-age participation to an array of salubrious outcomes, including lower rates of child maltreatment, crime, and depression along with higher rates of educational attainment (Reynolds & Robertson, 2003; Reynolds et al., 2007).<sup>8</sup> Therefore, we incorporate dichotomous measures of CPC preschool and school-age participation, respectively, as covariates. We control for several other variables measured at or near the child's birth that have known associations with maltreatment and poor developmental outcomes, including: (a) low birth weight status (< 2500 gms.), (b) mother ever a teen parent (< age 18), (c) mother not employed, (d) mother did not complete high school, (e) four or more children in the household, (f) single-parent household, (g) household AFDC receipt, and (h) high neighborhood poverty (40% residents below poverty level, 1980 Census). Analyses also control for sex and race/ethnicity. Data used to create these variables were gathered from multiple sources, including the Illinois Department of Public Health, Chicago Public Schools, Illinois Longitudinal Public Assistance Research Database, parent surveys, and student surveys. Data were imputed for approximately 10% of participants using an EM algorithm in LISREL (Schafer, 1997).

### Data Analysis

Effective sample sizes for multivariate analyses reflect participants for whom both child maltreatment records and outcome data were verified. We analyze dichotomous outcomes using multivariate probit regression, which generally yield findings comparable to logit estimations. Analyses of the depression scale are performed using negative binomial regression because the dependent variable approximates a Poisson distribution and has a large number of 0 values, resulting in a variance (31.71) that exceeds its mean (3.67). Analyses of an optimism scale, described below, are performed using ordinary least-squares regression. We report marginal effects in the text, which equal the adjusted percentage-point difference on a given outcome between the maltreated and non-maltreated groups. Marginal effect coefficients are used to calculate the percentage-change in each dichotomous outcome attributable to maltreatment. Significance tests are measured against 1% and 5% alpha-levels for all analyses.

<sup>7</sup>The state of Illinois defines verified maltreatment as "indicated" rather than "substantiated". Indicated cases include reports that could be substantiated along with maltreatment allegations that could not be substantiated, but where there was reason to suspect maltreatment or the risk of maltreatment (U.S. DHHS, 2006).

<sup>8</sup>In this study, associations between CPC program participation and young adult outcomes should not be interpreted as direct, main-effect coefficients because the program's impacts are partially mediated by the influence of child maltreatment, which is measured through age 17 (after CPC participation).



We also conduct analyses to test the robustness of our findings. First, we examine a series of secondary outcomes that are conceptually related to the outcomes analyzed in primary analyses. For educational attainment, we examine a dichotomous measure of *high school graduation* that differentiates participants who earned a high school diploma from those who did not. We also analyze a dichotomous criterion that reflects whether participants were engaged in *regular employment or college attendance* in early adulthood.<sup>9</sup> For criminal offending, we examine a dichotomous outcome indicating if a sample member had *any arrest* as an adult.<sup>10</sup> We also analyze three supplemental behavioral and mental health outcomes. We test the effects of maltreatment on *daily tobacco use*, using a single survey item that asked participants how often they use tobacco. Responses were dichotomized into daily use versus no use or less than daily use. We also examine associations between maltreatment and a *depression scale* (range 0–25) summing five items (described above) that range from (0) experiencing no depression symptom during the past month, to (5) experiencing one almost everyday. In addition, we examine associations between maltreatment and a *personal optimism scale* created by summing responses to five survey items, each with a response set ranging from (1) poor to (4) excellent. The items originated from a school health study (see Jessor, Donovan, & Costa, 1989) and assessed participants' perceived chances that they will: (a) graduate from college, (b) have a job that pays well, (c) have a job they enjoy, (d) have a happy family life, and (e) own their own home.

Second, we construct propensity scores using all sociodemographic indicators to predict the conditional probability of being selected into each effective study sample. All analyses were repeated using propensity scores as regression adjustments for potential selection bias. Third, we replicate all probit analyses using logit modeling to test for consistency between the two estimators. Finally, we test alternative models for each outcome that add two covariates measured in early childhood: *word analysis skills* in kindergarten and *social adjustment* in grades 1–3. Word analysis skills is a measure constructed from the word analysis subtest of the Iowa Test of Basic Skills ( $\alpha=.87$ ). The social adjustment measure was created using teacher ratings of children's classroom adjustment on a 6-item scale ( $\alpha=.90$ ). Both measures and their source data have been described in previous publications from the CLS (e.g. Reynolds, 2000). The impetus for adding these variables is to control for early developed abilities that might confound the estimated associations between maltreatment and the outcomes examined.<sup>11</sup>

<sup>9</sup>Individuals who earned at least one college credit by August 2003 or were employed for four or more quarters between January 1, 2002, and March 31, 2004, are coded one; all other participants are coded as zero (N=1,416). A strict measure of employment in early adulthood will exclude some individuals who are attending post-secondary schooling. Therefore, a measure was created to credit college attendance as an investment strategy that is likely to increase long-term earnings (Ou et al., 2007).

<sup>10</sup>Models used to predict adult arrest (N=1,418) include five additional participants who had adult arrest records but who were excluded from the incarceration sample because they died between the ages of 18 and 21.

<sup>11</sup>Bivariate analyses showed that social adjustment was significantly correlated with all primary and secondary outcomes ( $p<.01$ ). The measure of word analysis skills was significantly associated with all educational, occupational, and criminal offending outcomes ( $p<.01$ ) except above-average income ( $p<.05$ ). Word analysis scores were not significantly associated with any indicator of behavioral or mental health.

## Results

### Descriptive Analyses

Base rates for the predictor and outcome variables are shown in Appendix A. The findings portray the disadvantaged nature of the sample. For instance, the cumulative incidence of indicated maltreatment in the CLS was 13.5% ( $n=191$ ) by age 18. Two-thirds of the sample (67.0%) completed high school, though only slightly more than half (51.2%) earned a high school diploma. A small minority of participants (13.7%) earned at least one credit at a four-year college or university, and less than one-third (32.0%) averaged \$12,000 or more in annual earnings. In addition, more than one in five CLS participants (22.7%) were incarcerated by age 24 and nearly two in five (39.6%) were arrested.<sup>12</sup> Analyses also showed that 36.8% of participants attained five or more positive outcomes on the 7-item resilience index, while 13.8% attained at least six positive outcomes.

Table 2 displays estimates of unadjusted associations between maltreatment and study outcomes. Findings indicated that maltreatment was significantly associated with all primary outcomes below the 1% alpha-level, except for substance misuse ( $p=.069$ ) and life satisfaction ( $p=.025$ ). Results also showed stark differences on both aggregate measures of resilience ( $p<.01$ ). For example, nearly 40% of non-maltreated participants attained five or more positive outcomes, compared to less than 15% of individuals with a verified maltreatment history. A similar pattern emerged from analyses of secondary outcomes. Significant differences were evident for all outcomes below the 1% alpha-level, except for any arrest and the depression scale ( $p<.05$ , respectively).

### Multivariate Analyses

Results from primary multivariate analyses are shown in Table 3. Participants with a verified record of maltreatment completed high school (70.5% vs. 58.1%; 18% decrease) and attended a four-year college (13.1% vs. 4.0%; 70% decrease) at significantly lower rates ( $p<.01$ ) than non-maltreated individuals. Maltreated participants were also significantly less likely ( $p<.01$ ) to average at least \$12,000 in earnings as young adults (32.7% vs. 21.5%; 34% decrease). The maltreated group was also significantly ( $p<.01$ ) more likely to have been incarcerated by age 24 (13.9% vs. 31.5%; 127% increase). Finally, the maltreated group reported significantly higher ( $p<.05$ ) rates of substance misuse (9.2% vs. 15.8%; 72% increase) and depression (24.0% vs. 33.3%; 39% increase) between ages 22–24. Group differences for reported life satisfaction were not statistically significant ( $p=.08$ ).

Table 4 displays results from analyses estimating the effects of maltreatment on two dichotomous outcomes signifying resilience across seven domains. Maltreatment was negatively associated ( $p<.01$ ) with both resilience classifications. After controlling for covariates, 38.2% of the non-maltreated group achieved five or more positive outcomes compared to only 15.7% of the maltreated group (59% decrease). Comparable group

<sup>12</sup>Educational attainment and criminal offending rates differed considerably by sex. Female rates of high school completion (76.4%), graduation (60.7%), and college attendance (17.3%) were significantly higher than the rates of completion (57.3), graduation (41.6%), and college attendance (9.9%) for males. Male rates of incarceration (40.7%) and arrest (61.7%) are substantially higher than female rates of incarceration (5.4%) and arrest (18.0%).

differences were evident for attaining six or more positive outcomes (13.7% vs. 5.1%; 63% decrease).<sup>13</sup>

We performed supplementary analyses to test the robustness of our findings. First, we examined relations between maltreatment and a set of alternative outcome measures. As shown in Appendix B, all tests were statistically significant ( $p < .01$ ). Maltreated participants were less likely than non-maltreated participants to earn a high school diploma (53.7% vs. 37.2%; 31% decrease) and to have a history of employment or college attendance (53.0% vs. 41.0%; 23% decrease). The maltreated group was also more likely to have been arrested (36.3% vs. 48.0%; 32% increase). Moreover, maltreated participants reported higher rates of daily tobacco use (17.6% vs. 28.8%; 64% increase), higher depression scores ( $\mu = 3.58$  vs. 4.89) and lower levels of optimism for the future ( $\mu = 16.78$  vs. 15.78).

Second, we examined if estimates were affected by sample attrition by replicating analyses with propensity scores. Results were consistent with our initial models; significant findings from primary analyses remained so after making propensity score adjustments. Estimated associations were non-significant between propensity scores and study outcomes except for four-year college attendance. Thus, with this exception, we did not find evidence that attrition biased our models. Third, we repeated our primary analyses using a logit estimator. As expected, we found no substantive differences between logit and probit estimations. Finally, we tested alternative models parceling out the effects of word analysis skills and social adjustment. Findings were consistent with estimates obtained from models without these covariates. Associations between maltreatment and study outcomes were attenuated slightly in some analyses, but levels of statistical significance were generally consistent with prior analyses.

## Discussion

This investigation reaffirms that child maltreatment has the potential to generate extensive and enduring consequences. Results indicated that maltreatment was associated with adverse impacts on salient measures of early adult development. While many maltreatment victims fared well on select outcomes, most did not achieve criteria for resilience when functioning was assessed across domains.

Three main methodological features of the study enhance confidence in our findings. First, we used prospective longitudinal data, which offer well-known advantages relative to cross-sectional and retrospective data.<sup>14</sup> Second, we conducted our analyses on a large cohort of children who lived in high-poverty areas and attended public schools in Chicago. A large sample affords statistical power, which is important because maltreatment is a fairly uncommon occurrence. Additionally, maltreated and non-maltreated children in the sample were raised in comparable schools and neighborhoods, diminishing the likelihood that the

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<sup>13</sup>Analyses were conducted in STATA, which regularly suppresses marginal effect coefficients for highly skewed, dichotomous outcomes. Therefore, the adjusted means for the maltreated and non-maltreated groups are slightly lower than those obtained for unadjusted analyses.

<sup>14</sup>Although official records of abuse and neglect have well-known limitations, their use also avoids many of the reporting biases commonly found in retrospective data. This is particularly relevant given that maltreatment was measured beginning at birth. Plus, maltreatment reports were gathered from two administrative sources, enhancing the construct validity of the measure.

estimates were confounded by differential exposure to other ecological conditions. Third, findings were robust to multiple model specifications. Coefficients from unadjusted analyses were stable after covarying sociodemographic characteristics and measures of children's cognitive and social-emotional functioning. We also analyzed multiple outcome measures for each developmental domain. Consistency across conceptually similar outcomes enhances confidence in our findings.

### **Educational and Economic Attainments**

This study adds to prior knowledge of the lasting educational impacts associated with child maltreatment (Boden et al., 2007; McGloin & Widom, 2001). CLS participants with a verified record of maltreatment were significantly less likely to complete high school than individuals with no maltreatment record; group differences in graduation rates were even more pronounced. The discrepancy in high school graduation and completion rates is noteworthy, as diploma earners tend to fare better in their educational and economic attainments than GED earners (Heckman & LaFontaine, 2006). Therefore, the reported estimates for graduation may be a better gauge of the extent to which maltreatment hinders educational success. Furthermore, though most CLS participants did not attend a four-year college or university, the likelihood of engaging in post-secondary education was substantially reduced if a sample member experienced maltreatment. A mere 4% of maltreatment victims earned a single credit at a four-year institution by age 24. These findings suggest that the impacts of maltreatment on educational attainment extend beyond the primary and secondary grades, which is important because the value of educational attainment continues to accrue after high school. It is well known that the expected wages of college graduates exceeds that of high school graduates and that this difference increases over the life course (Ashenfelter & Rouse 1998).

Measures of economic welfare are among the most consistent predictors of maltreatment risk (Berger & Brooks-Gunn, 2005), but there is negligible evidence directly connecting maltreatment to future economic outcomes. Comporting with results reported by McGloin and Widom (2001), we found maltreatment was significantly associated with income decrements. Conceptually, our findings are consistent with research linking abuse and neglect to correlates of economic success (e.g., educational attainment, crime) as well as earlier consequences that predict labor market outcomes, such as poor academic achievement and behavioral adjustment (Brook & Newcomb 1995; Flouri & Buchanan 2002; Kokko & Pulkkinen, 2000). Previous studies have shown that labor force participation in early adulthood begets lasting employment and income effects (Arulampalam, Booth, & Taylor 2000; Gregg 2001), which, coupled with our findings, forecasts bleak economic prospects for maltreated children in the CLS.

### **Criminal Offending**

Research has shown that child maltreatment is a reliable predictor of maladaptive behavioral outcomes in childhood and adolescence, including juvenile delinquency. Recent studies have also identified maltreatment as an antecedent of adult crime (English et al., 2002; Smith et al., 2005; Topitzes, 2006). Corresponding with this evidence, we found that experiencing maltreatment in childhood significantly increased the risk of being arrested and incarcerated

as an adult. The findings for incarceration were particularly striking, as nearly a third of the maltreated group had been incarcerated by age 24, more than doubling the rate for the non-maltreated group. Extrapolating from national incarceration statistics for African Americans and Hispanics in the U.S. (Bonczar, 2003), comparatively the rates of incarceration in the CLS are high and the rates among maltreated participants are extraordinary.<sup>15</sup>

### Behavioral and Mental Health

Multivariate analyses indicated that a history of maltreatment increased the likelihood of substance misuse among CLS sample members. Results should be interpreted with the caveat that the criterion is heterogeneous, combining multiple self-reported markers of problematic substance use and abuse. Also, group differences were only marginally significant in unadjusted analyses. Nonetheless, many prior investigations have found that maltreatment is associated with increased substance use, which increases confidence in the findings reported here (e.g., Arellano, 1996; Widom et al., 2006). Our results also complement a growing body of literature indicating that maltreatment victims are more likely to use tobacco (Moran et al., 2004; Lau et al., 2005; Rodgers et al., 2004). Given the known effects of tobacco use on individual health and its related costs to society (Rasmussen, Prescott, Sørensen, & Sjøgaard, 2004), future economic impact studies that quantify costs attributable to maltreatment should consider incorporating estimated costs associated with tobacco use.

We also found that maltreatment was associated with increased depressive symptoms in early adulthood. Many other studies have identified similar effects, though prospective investigations of this kind are scarce (Widom et al., 2007). In addition, our study makes a unique contribution to the literature by estimating associations between maltreatment and measures that reflect positive mental health. Results indicated that maltreatment was inversely related to personal optimism in early adulthood. Maltreated participants also reported lower levels of life satisfaction than non-maltreated participants, though the difference was not significant at the .05 alpha-level. Overall, the findings imply that child maltreatment has the potential to impact mental health in early adulthood, and that these effects may be discernible for outcomes that represent dysfunction or well-being.

### Resilience

Participants were deemed to have exhibited resilience if they achieved a positive status in early adulthood on five or six outcomes on a 7-item index. We analyzed two cut-points on the index because there is no consensus as to the number or proportion of positive outcomes an individual should achieve in order to be classified as resilient. We found that between 5% and 16% of the maltreatment group met the criteria for resilience. It should also be noted that most non-maltreated participants did not meet the criteria for resilience in the study, which reflects the high level of adversity faced by most sample members. Still, a

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<sup>15</sup>Prospective estimates based on 2001 national data suggest that, if rates remained unchanged, 32.2% of black males and 17.2% of Hispanic males in the U.S. could expect to go to prison in their lifetime. The lifetime likelihood of incarceration was 5.6% for black females and 2.2% for Hispanic females (Bonczar, 2003). By comparison, the unadjusted rates of incarceration by age 24 among males in the CLS were roughly 38% for the non-maltreated group and 64% for the maltreated group. Approximately 3.6% of non-maltreated females were incarcerated compared to more than 12% of non-maltreated females.

substantially higher proportion of non-maltreated adults met the criteria for resilience than did adults with a record of maltreatment, suggesting that maltreatment was associated with harmful and pervasive effects above and beyond exposure to other risks that were endemic in the sample.

### Limitations

Our findings should be interpreted taking into account five limitations. First, indicated CPS and court reports are not representative of all maltreatment experiences.<sup>16</sup> Second, the CLS sample is comprised exclusively of African American and Hispanic children who were raised in urban, high-poverty neighborhoods. Therefore, results may not be generalizable to dissimilar populations. Third, previous CLS studies have shown that selective attrition is an unlikely threat to internal validity (e.g., Ou et al., 2007; Reynolds, 2000), yet attrition cannot be ruled out as a potential source of bias in our study. Sensitivity tests using propensity scores yielded results consistent with primary analyses, mitigating this concern to some degree. Fourth, despite controlling for numerous individual and family characteristics, other sources of unmeasured heterogeneity may share in explaining the estimated effects of abuse and neglect, such as biological and heritable factors (Cicchetti, Rogosch, & Sturge-Apple, 2007; Jaffee, et al., 2005). Last, we restricted our analyses to assessing a global measure of maltreatment. Future analyses will need to unpack maltreatment into nosological categories (e.g. type; timing; chronicity) to test for differential patterns of effect.

### Implications

This investigation contributes to understanding the scope, magnitude, and duration of impacts associated with child maltreatment. We found that maltreatment was negatively related to stage-salient measures of adaptation in early adulthood. Prior research corroborates these findings, as few children appear to avoid the deleterious effects of maltreatment entirely (Bolger & Patterson, 2003; Egeland, 1997; Malinosky-Rummell & Hansen, 1993).

While the outcomes of maltreated children in the sample are alarming, we would be remiss if we did not acknowledge that CLS participants without an indicated maltreatment report also appear to be faring poorly. As shown in Table 2, our data indicate that slightly more than half of non-maltreated students graduated from high school and less than one-third earned an average annual income of \$12,000 from age 22–24. Plus, only 15% of non-maltreated sample members earned a single credit at a four-year college by age 24, indicating that their poor short-run economic outcomes were not likely to be abated through educational investments. In addition to these educational and economic concerns, roughly two-fifths of non-maltreated participants were arrested by age 24 and more than one-fifth were incarcerated. Not surprisingly, perhaps, less than two-fifths reported having a high level

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<sup>16</sup>Official records probably underestimate the true rate of abuse and neglect. Children with an indicated report may experience different conditions than children whose maltreatment experiences are never reported, investigated, or indicated. Measures based on CPS and court records may be influenced by factors other than maltreatment (e.g. reporting biases) that affect the chances a child or family will be reported or investigated (Mersky, Berger, Reynolds, & Gromoske, 2009). Verified reports also do not capture the relative quality of parenting among families who were never reported for suspected maltreatment or families who were reported but not investigated or indicated for maltreatment. It should be noted, however, that underestimating maltreatment likely yields conservative estimates of its effect because maltreated children are thereby included in the reference (i.e. non-maltreated) group.

of life satisfaction. These sobering statistics suggest that economically disadvantaged, urban minority populations face pervasive and persistent threats to development. It is likely that large-scale service and policy shifts are needed to redress inequalities underlying these conditions.

That maltreatment was significantly associated with long-term consequences in this high-risk sample, however, speaks to its apparent durability as a developmental influence, reinforcing the need to prevent maltreatment before it occurs. While the state of maltreatment prevention is underdeveloped, due partly to a dearth of high-quality program evaluations, several promising strategies have been identified (Reynolds et al., in press). Among primary prevention models, home visitation has received the most empirical attention and support (Bilukha et al., 2005; Olds et al., 1997). Yet, overall the evidence on home visitation programs is mixed (Chaffin, 2004; Duggan et al., 2007). Other approaches to preventing abuse and neglect warrant consideration as well, including comprehensive health services (Brayden et al., 1993), parent training (Lundahl, Nimer, & Parsons, 2006), school-based instruction and skill-building (Davis & Gidyez, 2000), center-based preschool (Reynolds & Robertson, 2003), and multilevel family support services (Sanders, et al., 2003). Certain social policies may also yield prevention effects, including strategies to increase the economic welfare of low-income populations (Paxson and Waldfogel, 2003).

Taking a more optimistic view, results from this investigation and many prior studies illustrate that some children are able to function well despite being maltreated. Few maltreated children in the CLS appeared to achieve competence across domains in emerging adulthood, but our expectations for resilience may be stringent. In other words, the criteria we used to embody resilience may reflect exceptional functioning as opposed to simply 'doing okay' (Masten & Powell, 2003). Looking at individual outcomes, we found that many maltreated children were able to function competently. For example, most maltreated children completed high school and avoided criminal involvement. It is also important to acknowledge that competence within or across domains is contextually situated. The fact that the majority of maltreated children did not engage in post-secondary education or achieve economic self-sufficiency should be interpreted in light of the participants' social and economic circumstances. Indeed, resilience was uncommon among non-maltreated sample members, reinforcing the point that maltreatment is one of a host of hazards to which children in CLS were exposed. In sum, many factors likely contributed independently and interdependently to the consequences associated with child maltreatment (Belsky, 1993; Cicchetti & Toth, 1995).

Accumulating evidence indicating that the impacts of child maltreatment emerge from complex processes across multiple contexts has increased the demand for interventions that target an array of risk and protective factors, particularly those that are modifiable. Many approaches have been shown to promote the welfare of maltreated children. For example, individual-centered clinical interventions, such as trauma-focused therapies, have been linked to developmental gains in abused children (Cohen, Mannarino, Berliner, & Deblinger, 2000). Several intervention models have been shown to improve parent and child behaviors, including parent-child interaction therapy, infant-parent psychotherapy and psychoeducational parenting (Cicchetti, et al., 2006; Chaffin & Friedrich, 2004). Group

therapies may also be effective in promoting improved peer interactions and social relations (Fantuzzo et al., 1996). Multi-component programs such as the Positive Parenting Program (Sanders, Cann, & Markie-Dadds, 2003) and Project 12-Ways/SafeCare (Gershater-Molko, Lutzker, & Wesch, 2002) that deliver services in a variety of settings also appear promising. The fact that the field has identified a variety of efficacious models operating in different contexts, including clinical, home, peer, and community settings, illustrates that there are many potential entry points and modes that can be used to intervene successfully with maltreated children and their families.

While our results point toward the need to prevent maltreatment and to intervene where maltreatment has already occurred, additional investigations of CLS data are planned that will have more direct implications for tailoring such programmatic efforts. For instance, we need to learn more about endogenous and exogenous conditions that influence the relation between maltreatment and its long-term consequences. In addition to moderation analyses, future research will also need to identify the mechanisms that lead from maltreatment to both maladaptation and resilience. Person-centered and variable-centered analyses may be equally revealing in this regard.

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## Appendix A. Description of Predictor and Outcome Variables

Variable	N	Mean	SD	Min. Value	Max. Value
<b>Predictor</b>					
Indicated maltreatment, age 0–17	1411	.135	.342	0	1
<b>Primary Outcomes</b>					
High school completion	1368	.670	.470	0	1
Four-year college attendance	1368	.137	.344	0	1
Above-average income	1249	.320	.467	0	1
Any incarceration	1413	.226	.418	0	1

Variable	N	Mean	SD	Min. Value	Max. Value
Self-reported substance misuse	1137	.131	.338	0	1
Self-reported depressive symptom	1134	.249	.432	0	1
Self-reported life satisfaction	1141	.370	.483	0	1
<b>Resilience Outcomes</b>					
5 positive outcomes, 7-item index	1260	.368	.483	0	1
6 positive outcomes, 7-item index	1411	.138	.345	0	1
<b>Secondary Outcomes</b>					
High school graduation	1368	.514	.500	0	1
Any employment or college attendance	1416	.511	.500	0	1
Any arrest	1418	.396	.489	0	1
Regular tobacco use	1125	.201	.401	0	1
Depression scale	1134	3.67	5.63	0	25
Optimism scale	1137	16.70	3.23	5	20

## Appendix B. Multivariate Analyses Predicting Secondary Adult Outcomes

Predictors	High school graduation	Employment or college attendance	Any arrest	Daily tobacco use	Depression scale	Optimism scale
Any maltreatment, age 0–17	-.420**	-.303**	.301**	.372**	.464**	-1.00**
Any CPC preschool	.101	.157	-.058	-.039	-.043	.308
Any CPC school-age	.053	-.060	-.008	-.027	.057	-.208
Sex (Female=1)	.543**	.593**	-1.29**	-.437**	-.060	.800
Race/Ethnicity (Black=1)	-.098	-.251	.220	.081	.188	-.258
Low birth weight	-.057	.164	-.002	.088	.016	-.230
Mother ever a teen parent	-.108	-.031	.028	.093	-.082	.206
Mother not employed	-.228*	.082	.036	.078	.239*	-.414
Mother did not complete HS	-.239**	-.287**	.216*	.090	.095	-.111
4 or more children in household	-.182	-.089	.147	.353**	.096	-.498
Single-parent household	-.124	-.057	.147	.118	-.016	-.513*
AFDC receipt	-.536**	-.246*	.108	-.014	.104	-.017
High-poverty neighborhood	-.001	-.169*	-.004	.029	-.062	.116
Observations	1327	1362	1341	1062	1071	1074
Pseudo R <sup>2</sup>	.083	.071	.185	.044	--	.028 <sup>l</sup>

\*  $p < .05$ ;

\*\*  $p < .01$

<sup>l</sup> Adjusted R-squared statistic reported from OLS regression.

Table 1

## Characteristics of the Original and Primary Study Samples

Characteristics	Original Sample	Maltreatment Sample	Education Sample	Employment Sample	Crime Sample	Well-being Sample
CPC preschool participation	64.3	64.8	64.9	65.4	64.6	65.7
CPC school-age participation	55.2	57.7*	56.9*	56.0	56.2*	56.4
Sex (Female=1)	50.2	50.2	51.0	54.4*	51.2*	54.3*
Race/Ethnicity (Black=1)	93.0	93.1	93.3	93.0	93.1	94.1*
Low birth weight	11.8	12.2	12.1	12.2	12.2	12.0
Mother ever a teen parent	35.5	37.1*	36.1	35.8	36.4*	36.5
Mother not employed	66.3	66.2	66.0	65.2*	65.8	65.6
Mother did not complete HS	54.3	54.2	53.8	53.4	54.0	52.5*
4 or more children in household	16.6	16.4	16.9	17.5	17.3*	17.6
Single-parent household	76.5	77.6*	76.8	75.8	76.6	75.0*
AFDC receipt	62.7	62.7	62.4	61.1*	62.3	61.1*
High-poverty neighborhood	45.9	46.1	46.1	46.0	46.0	45.7
Sample Size	1539	1411	1368	1249	1413	1142

Pearson  $\chi^2$  significance tests were conducted for the primary study group and its corresponding attrition sample.

\*  $p < .05$

**Table 2**

## Unadjusted Differences Between Maltreated and Non-Maltreated Groups on Adult Outcomes

Variable	N	Any Maltreatment	No Maltreatment	Test Statistic
<b>Primary Outcomes</b>				
High school completion (%)	1327	.539	.689	15.66**
Four-year college attendance (%)	1327	.039	.151	16.27**
Above-average income (%)	1184	.204	.333	10.25**
Any incarceration (%)	1337	.350	.207	18.06**
Any substance misuse (%)	1074	.18.6	.12.4	3.86
Any depressive symptom (%)	1071	.349	.242	6.81**
High life satisfaction (%)	1077	.277	.380	5.24*
<b>Resilience Outcomes</b>				
5 positive outcomes, 7-item index (%)	1198	.149	.395	34.92**
6 positive outcomes, 7-item index (%)	1329	.051	.155	13.81**
<b>Secondary Outcomes</b>				
High school graduation (%)	1327	.348	.537	21.96**
Employment or college attendance (%)	1362	.397	.531	11.41**
Any arrest (%)	1341	.483	.389	5.74*
Regular tobacco use (%)	1062	.299	.185	9.16**
Depression scale (Mean) <sup>1</sup>	1071	4.81	3.59	5.25*
Optimism scale (Mean) <sup>1</sup>	1074	15.70	16.79	12.83**

<sup>1</sup>Test statistics derived from F-tests; all others are Pearson  $\chi^2$ .

\*  
 $p < .05$

\*\*  
 $p < .01$



**Table 3**

## Multivariate Analyses Predicting Primary Adult Outcomes

Predictors	High school completion	Four-year college attendance	Above-average income	Any Incarceration	Any substance misuse	Any depressive symptom	High life satisfaction
Any maltreatment, age 0–17	-.336 **	-.625 **	-.342 **	.602 **	.325 *	.274 *	-.223
Any CPC preschool	.183 *	.229 *	-.063	-.164	-.231 *	-.059	.113
Any CPC school-age	.033	.009	-.067	.071	.001	.013	-.104
Sex (Female=1)	.598 **	.396 **	.106	-1.52 **	-1.02 **	-.026	.122
Race/Ethnicity (Black=1)	-.271	-.190	-.642 **	.080	.047	.276	-.242
Low birth weight	-.054	.026	.125	-.078	-.037	-.058	-.224
Mother ever a teen parent	-.117	-.018	-.025	.141	.192	.035	.117
Mother not employed	.001	-.081	.067	-.148	.026	.251 *	-.050
Mother did not complete HS	-.310 **	-.316 **	-.225 **	.128	.001	.030	-.243
4 or more children in household	-.226 *	-.082	-.139	.119	-.052	.091	.017
Single-parent household	-.036	-.154	-.095	-.097	-.232	.016	-.064
AFDC receipt	-.493 **	-.277 *	-.142	.320 *	.058	.079	-.081
High-poverty neighborhood	.041	-.038	-.115	-.059	-.054	-.005	.039
Observations	1327	1327	1184	1337	1074	1071	1077
Pseudo R <sup>2</sup>	.101	.084	.036	.231	.132	.020	.020

\*  $p < .05$ ;\*\*  $p < .01$

**Table 4**

## Multivariate Analyses Predicting Resilience on a 7-Item Outcome Index

Predictors	Five or more positive outcomes	Six or more positive outcomes
Any maltreatment, age 0–17	-.707 **	-.541 **
Any CPC preschool	.198 *	.049
Any CPC school-age	-.012	.051
Sex (Female=1)	.478 **	.338 **
Race/Ethnicity (Black=1)	-.402 *	-.522 **
Low birth weight	-.019	-.082
Mother ever a teen parent	.130	-.041
Mother not employed	-.159	-.081
Mother did not complete HS	-.365 **	-.409 **
4 or more children in household	-.115	-.161
Single-parent household	-.185	-.052
AFDC receipt	-.206	-.190
High-poverty neighborhood	-.061	.036
Observations	1198	1329
Pseudo R <sup>2</sup>	.091	.077

\*  
 $p < .05$ ;\*\*  
 $p < .01$ 

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