A 12-Year Prospective Study of the Long-term Effects of Early Child Physical Maltreatment on Psychological, Behavioral, and Academic Problems in Adolescence

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Objective: To determine whether child physical maltreatment early in life has long-term effects on psychological, behavioral, and academic problems independent of other characteristics associated with maltreatment.

Design: Prospective longitudinal study with data collected annually from 1987 through 1999.

Setting and Participants: Randomly selected, community-based samples of 585 children from the ongoing Child Development Project were recruited the summer before children entered kindergarten in 3 geographic sites. Seventy-nine percent continued to participate in grade 11. The initial in-home interviews revealed that 69 children (11.8%) had experienced physical maltreatment prior to kindergarten matriculation.

Main Outcome Measures: Adolescent assessment of school grades, standardized test scores, absences, suspensions, aggression, anxiety/depression, other psychological problems, drug use, trouble with police, pregnancy, running away, gang membership, and educational aspirations.

Results: Adolescents maltreated early in life were absent from school more than 1.5 as many days, were less likely to anticipate attending college compared with nonmaltreated adolescents, and had levels of aggression, anxiety/depression, dissociation, posttraumatic stress disorder symptoms, social problems, thought problems, and social withdrawal that were on average more than three quarters of an SD higher than those of their nonmaltreated counterparts. The findings held after controlling for family and child characteristics correlated with maltreatment.

Conclusions: Early physical maltreatment predicts adolescent psychological and behavioral problems, beyond the effects of other factors associated with maltreatment. Undetected early physical maltreatment in community populations represents a major problem worthy of prevention.

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ANNUALLY, ACCORDING to the United States Department of Health and Human Services (Washington, DC), approximately 3 million children are referred to local child protective service agencies as possible victims of physical abuse, emotional abuse, sexual abuse, or neglect.1 Of these, approximately 25% of cases involve physical abuse. The number of reported cases is presumed to underestimate the actual prevalence and incidence of child maltreatment.2 Despite the scope of this problem, the long-term effects of early physical maltreatment remain unclear.

Retrospective accounts of adolescents and adults who had been abused when they were children suggest that physical maltreatment can have long-term negative consequences.3,4 However, because participants in retrospective studies generally are selected from clinical samples in treatment, it is unclear whether they accurately represent the population that had been maltreated as children.3,6 It is possible that relatively few adolescents and adults who had been maltreated as children continue to experience problems and that it is only a small proportion of those who do that end up in treatment and, consequently, retrospective studies of abuse.

Cross-sectional and short-term longitudinal studies have demonstrated that physical maltreatment is related to problems that arise in close temporal proximity to the occurrence of the abuse, such as juvenile delinquency, psychopathology, and disrupted social relationships.7,8 It is not clear from these studies, however, whether early physical maltreatment plays an enduring role in the development of later adjustment problems in adoles-

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PARTICIPANTS AND METHODS

PARTICIPANTS

During kindergarten preregistration for 2 cohorts of children in 1987 and 1988, parents at public schools in 3 geographic sites (Nashville and Knoxville, Tenn, and Bloomington, Ind) were approached randomly and asked to participate in a longitudinal study of child development.12,14 The 13% of students who did not preregister at these schools were contacted via telephone, letter, or on the first day of school and asked to participate. Of those approached, 75% agreed to participate, resulting in a sample of 585 children who were first assessed during the summer before kindergarten matriculation or within the first weeks of the school year. This sample did not differ in any detectable way from the rest of the community populations.12,14 The sample was 52% male (48% female) and 82% European American, 16% African American, and 2% from other ethnic backgrounds. Children were re-assessed annually, with internal review board approval at each time point. Twelve years later (when most of the sample had completed 11th grade), 79% of nonmaltreated and 77% of maltreated children continued to participate. The grade 11 maltreated sample included 19 white girls, 19 white boys, 7 minority girls, and 8 minority boys; the nonmaltreated sample included 172 white girls, 175 white boys, 33 minority girls, and 30 minority boys. Compared with the original sample of 585, the 463 remaining families were of slightly higher socioeconomic status but participants and nonparticipants did not differ by race, single-parent status, mothers’ reports of children’s internalizing or externalizing behaviors in kindergarten, or abuse status.

MEASURES

During the summer before children entered kindergarten, detailed interviews regarding children’s developmental history were conducted with mothers in their homes. Mothers responded to a variety of questions regarding the child’s misbehavior, discipline practices, and whether the child had ever been physically harmed by an adult. Following this discussion, interviewers paused to rate privately the probability that the child had been severely harmed, using a criterion of intentional strikes to the child by an adult that left visible marks for more than 24 hours or that required medical attention. A score of 0 was assigned if maltreatment had definitely not or probably not occurred, and a score of 1 was assigned if maltreatment had probably occurred, definitely occurred, or if authorities had been involved. Agreement between independent raters for this classification was 90% (κ=0.56).13 Sixty-nine children (11.8% of the sample) were classified as having experienced early physical maltreatment, a rate comparable with other reports using national samples.15 All parents signed statements of informed consent before participating in the study and were aware that cases of maltreatment made known to the researchers would be reported as appropriate. Discussion of each child classified as maltreated was held in close collaboration with experts at relevant local agencies to determine which cases should be reported to the Department of Health and Human Services.13 Authorities had been involved with 7 of the 69 children classified as physically maltreated, and 6 new cases were reported to agencies; the other cases were determined not to be cases of ongoing abuse and imminent danger (and thus were not reportable in Tennessee and Indiana at that time).

In the course of the developmental interview, mothers were also asked questions about other risk factors that potentially act as confounds if not considered in analyses of the effects of maltreatment. Socioeconomic status was based on an index computed from parental education and occupation levels (August B. Hollingshead, PhD, unpublished data, 1979, available from the Department of Sociology, Yale University, New Haven, Conn). Families were excluded if maltreatment was reportable in Tennessee and Indiana at that time.

RESULTS

Two (maltreated vs not maltreated) × 2 (gender) × 2 (white vs minority) analyses of variance were con-
coded as headed by a single parent on the basis of mothers’ reports of who lived in the household at the time of the initial assessment. Family stress was assessed by averaging responses to 10 questions regarding whether different types of major stressors (eg, death of a family member, divorce) had occurred and how these changes affected the child. Maternal social support was coded following questions regarding mothers’ social contact and who was available to help them in times of need. Child exposure to violence was coded after mothers answered questions about the kinds of conflicts, arguments, or violence the child was exposed to between her or his parents, others in the home, and outside the home. Three aspects of child temperament (ie, resistance to control, unadaptability, and difficult temperament) were assessed using the 16-item Retrospective Infant Characteristics Questionnaire. Finally, mothers were asked to describe the child’s health during the prenatal through early postnatal period. Interviewers then rated whether the child was healthy at birth, had minor or brief problems, or had major health problems.

Children’s official school records from 9th through 11th grades were available. Children’s official school records were available for each academic year, when most of the sample was in the 9th through 11th grades; if a child had been retained a grade, these records might have corresponded to a lower grade. From these records, it was possible to determine adolescents’ average grades and standardized test percentiles in mathematics and language arts across grades 9 through 11. The number of days absent and number of times suspended during 9th through 11th grades also were documented in these records and were averaged across years.

When their children had finished 11th grade, mothers completed the 113-item Child Behavior Checklist. For each item, the mother indicated whether the behavior was not true, somewhat or sometimes true, or very or often true (scored as 0, 1, or 2, respectively) of her child.

As shown, adolescents who had been maltreated early in life had lower grades and standardized test scores in language arts, were absent from school almost twice as many days, and were suspended from school more than twice as many times as adolescents who had not been maltreated. However, with the exception of school absences, all of these effects could be accounted for by risk factors associated with maltreatment rather than maltreatment per se.

In grade 11, mothers reported that adolescents who had experienced early maltreatment had levels of aggression, anxiety/depression, dissociation, delinquent behaviors, PTSD, social problems, thought problems, and social withdrawal that were on average twice as high as those of their nonmaltreated counterparts. The effects of maltreatment on all of these psychological and behavioral problems as reported by adolescents’ mothers could not be explained away by other risk factors (with the lone exception of delinquent behavior). However, adolescents who had been maltreated did not differ from those who had not been maltreated on these dimensions based on their own reports; these variables are not shown in the Table and were excluded from further analyses. On the Adolescent Behavior Questionnaire, adolescents who had been maltreated reported more behavior problems than did their nonmaltreated counterparts (although this effect was accounted for by other risk factors rather than abuse per se) and were less likely to anticipate attending college (a little better than a 50% chance vs a high or very high chance) even after controlling for other risk factors.

The magnitude of the effects of early maltreatment on several adolescent problems depended on the adolescent’s gender and ethnicity. Maltreatment × gender and maltreatment × ethnicity interactions were tested for all dependent variables; only interactions significant after controlling for ecological and child covariates are shown in the figures. As shown in Figure 1, boys and girls who
had been maltreated were more likely to experience ad-
justment problems compared with nonmaltreated ado-
lescents, but the effects of early maltreatment were stron-
ger for girls than for boys. Although not shown in Figure
1, significant maltreatment × gender interactions for dis-
sociation (F(1, 377) = 5.40, P < .05), PTSD (F(1, 377) = 14.39,
P < .001), social problems (F(1, 377) = 5.99, P < .05), thought
problems (F(1, 377) = 7.82, P < .01), and social withdrawal
(F(1, 377) = 5.48, P < .05) replicated the pattern of findings de-
picted for aggression and anxiety/depression. Figure 2
illustrates all significant maltreatment × ethnicity inter-
actions, controlling for ecological and child covariates.
This figure indicates that for school absences, the nega-
tive effect of maltreatment was stronger for minority than
white children. In addition, minority adolescents who
were maltreated were suspended more often and had more
behavior problems than did minority adolescents who
were not maltreated; the effect was in the opposite di-
rection but not significant for white adolescents.
These findings indicate that physical maltreatment in the first 5 years of life places a child at risk for a vari-
ety of psychological and behavioral problems during ado-

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Not Maltreated</th>
<th>Maltreated</th>
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<th>Not Maltreated</th>
<th>Maltreated</th>
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<tr>
<td>Grades 9-11 School Records (Not Maltreated, n = 387; Maltreated, n = 50)</td>
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<td>Mathematics grade (1 = F, 13 = A)</td>
<td>8.06 (0.17)</td>
<td>6.91 (0.49)</td>
<td>3.24</td>
<td>7.65 (0.25)</td>
<td>7.39 (0.64)</td>
<td>0.15</td>
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<td>Language arts grade (1 = F, 13 = A)</td>
<td>8.64 (0.17)</td>
<td>7.04 (0.54)</td>
<td>7.63†</td>
<td>8.21 (0.23)</td>
<td>7.70 (0.59)</td>
<td>0.70</td>
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<tr>
<td>Total mathematics percentile</td>
<td>67.97 (1.07)</td>
<td>64.51 (3.07)</td>
<td>3.37</td>
<td>67.55 (1.59)</td>
<td>63.12 (4.42)</td>
<td>0.96</td>
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<tr>
<td>Total language arts percentile</td>
<td>70.49 (1.00)</td>
<td>64.73 (3.21)</td>
<td>5.58‡</td>
<td>70.10 (1.51)</td>
<td>65.72 (3.98)</td>
<td>1.14</td>
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<td>No. of days absent</td>
<td>10.27 (0.65)</td>
<td>20.47 (3.06)</td>
<td>21.63§</td>
<td>12.40 (0.94)</td>
<td>19.33 (2.36)</td>
<td>8.14†</td>
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<td>No. of times suspended</td>
<td>0.58 (0.11)</td>
<td>1.19 (0.38)</td>
<td>5.65‡</td>
<td>0.73 (0.15)</td>
<td>1.23 (0.38)</td>
<td>1.64</td>
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<table>
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<tr>
<th>Subscales</th>
<th>Not Maltreated</th>
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<th>Not Maltreated</th>
<th>Maltreated</th>
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<tr>
<td>Aggression</td>
<td>5.72 (0.27)</td>
<td>10.02 (1.01)</td>
<td>23.64§</td>
<td>6.06 (0.40)</td>
<td>8.15 (0.91)</td>
<td>4.80‡</td>
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<td>Anxiety/Depression</td>
<td>3.07 (0.16)</td>
<td>5.73 (0.75)</td>
<td>34.40§</td>
<td>2.67 (0.27)</td>
<td>5.32 (0.61)</td>
<td>16.89§</td>
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<td>Dissociation</td>
<td>1.68 (0.11)</td>
<td>3.38 (0.43)</td>
<td>28.63§</td>
<td>1.58 (0.16)</td>
<td>2.80 (0.37)</td>
<td>10.01†</td>
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<td>Delinquent Behavior</td>
<td>2.02 (0.12)</td>
<td>3.40 (0.42)</td>
<td>17.80§</td>
<td>1.87 (0.19)</td>
<td>2.59 (0.44)</td>
<td>2.51</td>
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<tr>
<td>Posttraumatic Stress Disorder</td>
<td>4.70 (0.21)</td>
<td>8.22 (0.77)</td>
<td>31.19§</td>
<td>4.34 (0.33)</td>
<td>7.01 (0.75)</td>
<td>11.50†</td>
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<tr>
<td>Social Problems</td>
<td>1.35 (0.09)</td>
<td>3.11 (0.40)</td>
<td>33.06§</td>
<td>1.35 (0.16)</td>
<td>2.65 (0.36)</td>
<td>12.25†</td>
</tr>
<tr>
<td>Thought Problems</td>
<td>0.32 (0.04)</td>
<td>0.84 (0.19)</td>
<td>22.74§</td>
<td>0.27 (0.06)</td>
<td>0.70 (0.14)</td>
<td>9.45†</td>
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<td>Social Withdrawal</td>
<td>2.32 (0.12)</td>
<td>3.98 (0.45)</td>
<td>18.06§</td>
<td>2.18 (0.19)</td>
<td>3.31 (0.43)</td>
<td>6.23‡</td>
</tr>
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</table>

| Grade 11 Mother Reports (Not Maltreated, n = 392; Maltreated, n = 52) |
| Subscales | Not Maltreated | Maltreated | F  | Not Maltreated | Maltreated | F  |
| Aggression | 5.72 (0.27) | 10.02 (1.01) | 23.64§ | 6.06 (0.40) | 8.15 (0.91) | 4.80‡ |
| Anxiety/Depression | 3.07 (0.16) | 5.73 (0.75) | 34.40§ | 2.67 (0.27) | 5.32 (0.61) | 16.89§ |
| Dissociation | 1.68 (0.11) | 3.38 (0.43) | 28.63§ | 1.58 (0.16) | 2.80 (0.37) | 10.01† |
| Delinquent Behavior | 2.02 (0.12) | 3.40 (0.42) | 17.80§ | 1.87 (0.19) | 2.59 (0.44) | 2.51 |
| Posttraumatic Stress Disorder | 4.70 (0.21) | 8.22 (0.77) | 31.19§ | 4.34 (0.33) | 7.01 (0.75) | 11.50† |
| Social Problems | 1.35 (0.09) | 3.11 (0.40) | 33.06§ | 1.35 (0.16) | 2.65 (0.36) | 12.25† |
| Thought Problems | 0.32 (0.04) | 0.84 (0.19) | 22.74§ | 0.27 (0.06) | 0.70 (0.14) | 9.45† |
| Social Withdrawal | 2.32 (0.12) | 3.98 (0.45) | 18.06§ | 2.18 (0.19) | 3.31 (0.43) | 6.23‡ |

| Grade 11 Adolescent Reports (Not Maltreated, n = 405; Maltreated, n = 53) |
| No. of drugs tried | 1.18 (0.07) | 1.00 (0.17) | 0.02 | 0.95 (0.11) | 0.69 (0.26) | 0.89 |
| No. of behavior problems | 0.28 (0.03) | 0.45 (0.10) | 9.04† | 0.29 (0.04) | 0.36 (0.10) | 0.40 |
| Chances will go to college (1 = low, 5 = high) | 4.36 (0.05) | 3.56 (0.18) | 22.16§ | 4.36 (0.07) | 3.79 (0.17) | 11.01§ |

*Data are given as mean (SE) unless otherwise indicated. Adjusted covariates include socioeconomic status, single-parent status, family stress, maternal social support, child exposure to violence, child temperament, child health, and harsh parental treatment during adolescence.
†P < .01.
‡P < .05.
§P < .001.

Figure 1. Representative significant maltreatment × gender interactions from analyses of covariance. School absences were obtained from official school records. Aggression and Anxiety/Depression subscale scores are from the mothers’ reports. Note: Although not shown here, interactions were significant for subscales of Dissociation, PTSD, Social Problems, Thought Problems, and Social Withdrawal. These effects replicated those shown for Aggression and Anxiety/Depression. The bar represents the group mean with SE.
lescence. Although on average, adolescents who had been maltreated experienced more problems than did their nonmaltreated counterparts, one may wonder whether the same group of children who had been maltreated displayed a pervasive set of maladaptive outcomes or whether different maltreated children display different maladaptive outcomes. To examine this question, we created a variable reflecting the number of problems adolescents experienced, including (1) aggression at clinically deviant levels and (2) anxiety/depression at clinically deviant levels (each 1 SD or more above the nationally normed mean as recommended by Achenbach18); (3) school suspension; (4) trouble with the police; (5) pregnancy or impregnating someone; (6) running away from home; and (7) gang membership. Thus, adolescents could experience as few as 0 or as many as 7 problems.

As shown in Figure 3, cross-tabulations of this problem count by early maltreatment revealed that 74% of adolescents who had been maltreated experienced at least 1 adjustment problem compared with only 43% of nonmaltreated adolescents. Twenty-one percent of maltreated adolescents experienced 3 or more problems compared with 7% of nonmaltreated adolescents. Thus, maltreatment in the first 5 years of life almost doubles the risk of any problem and triples the risk of experiencing problems in multiple domains during adolescence ($\chi^2 = 26.11$, $P < .001$).

This prospective study of a community-based sample provides support for the role of physical maltreatment in the first 5 years of life in the development of psychological and behavioral problems during adolescence, above and beyond other risk factors related to maltreatment. It does not seem to be the case that the effects of early physical maltreatment on psychological and behavioral problems are short-lived. Rather, the effects persist over at least a 12-year period. The effects range from externalizing to internalizing outcomes and touch 3 of 4 children who had been maltreated. The long-term effects of early physical maltreatment seem to be worse for girls than for boys and for minority than white adolescents, although the latter finding should be interpreted with caution because the sample of maltreated minority children was small. If replicated, this finding regarding ethnic differences in the effects of physical maltreatment will contribute to a growing body of literature on culture-specific ways in which parenting behaviors may affect child outcomes. There is evidence that parents’ use of physical discipline is related to problem behaviors for European American children but that there is no relation between physical discipline and problem behaviors for African American children.23,24 Our findings suggest that this link is limited to physical discipline and does not apply to physical maltreatment.

Because these effects were found in a community rather than clinical sample, it cannot be argued that differences between maltreated and nonmaltreated children were distorted by including only cases of maltreatment serious enough to have required intervention. Furthermore, although 13 of the 69 maltreated children did have experiences with social service agencies, most of the sample did not; we have minimized the confounding of experiences with social service agencies and the experience of maltreatment by not drawing the sample from cases involved with child protective services. Finally, because this is a prospective study, our findings are not inflated by retrospective biases. All of these methodological advances address limitations in
whether early emotional abuse, sexual abuse, and neglect are risk factors. Further research will be needed to determine whether child physical maltreatment early in life has long-term effects on psychological, behavioral, and academic problems in a community sample, independent of other characteristics associated with maltreatment. We found that physical maltreatment within the first 5 years of life predicts psychological and behavioral problems at least 12 years later, controlling for other risk factors associated with maltreatment. These findings have not confounded the experience of maltreatment with social service agency involvement and are not marred by retrospective biases. Thus, they represent a methodological advance that highlights the need for practitioners and social service system managers to design treatments for physically maltreated young children that will be effective in preventing the maladaptive outcomes for which they are at risk.

What This Study Adds

Despite the scope of the problem of child maltreatment, the long-term effects of early physical maltreatment remain unclear. This study was conducted to determine whether child physical maltreatment early in life has long-term effects on psychological, behavioral, and academic problems in a community sample, independent of other characteristics associated with maltreatment. We found that physical maltreatment within the first 5 years of life predicts psychological and behavioral problems at least 12 years later, controlling for other risk factors associated with maltreatment. These findings have not confounded the experience of maltreatment with social service agency involvement and are not marred by retrospective biases. Thus, they represent a methodological advance that highlights the need for practitioners and social service system managers to design treatments for physically maltreated young children that will be effective in preventing the maladaptive outcomes for which they are at risk.

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REFERENCES