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.5,6 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-
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. The 15% 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. The sample was 52% male (48% female) and 82% European American, 16% African American, and 2% from other ethnic backgrounds. Children were reassessed 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, 173 white boys, 33 minority girls, and 30 minority boys. Compared with the original sample of 585, the 463 continuing 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% (k=0.56). 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. 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. 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

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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 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.16,17 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.18 For each item, the mother indicated whether the behavior was not true, somewhat/sometimes true, or very or often true (scored as 0, 1, or 2, respectively) of her child. 

Items were summed to create subscales of Aggression, Anxiety/Depression, Dissociation, Delinquent Behavior, Post-Traumatic Stress Disorder (PTSD), Social Problems, Thought Problems, and Social Withdrawal.18-20 Some items in the Dissociation and PTSD scales are also included in other Achenbach subscales. Correlations between the Dissociation and PTSD scales and the other subscales range from 0.53 to 0.82; correlations among the other subscales range from 0.44 to 0.70. Because the constructs represented by the different scales have been examined separately in the literature, we kept these scales despite the redundancy in some of the items. Mothers also indicated how often in the last year the push, grabbed, shoved, or hit the child.21 This rating was included as an additional control variable to parse the effect of ongoing harsh maternal treatment.

In the summer after 11th grade, adolescents completed the Youth Self-Report Form of the Child Behavior Checklist, with scales comparable with those completed by their mothers.22 In addition, they completed the Adolescent Behavior Questionnaire constructed for this study to indicate the frequency with which they engaged in a series of problem behaviors. A scale reflecting the number of drugs they had tried was the sum of whether they had ever (1) smoked or chewed tobacco; (2) smoked marijuana; (3) “huffed” or inhaled a substance; (4) tried crack or cocaine; (5) tried LSD (lysergic acid diethylamide) or heroin; (6) used alcohol; or (7) tried any other method to get high (possible range, 0-7 drugs tried). Dichotomous responses in 4 domains were summed to reflect whether the adolescent had (1) been in trouble with the police; (2) gotten pregnant or impregnated someone; (3) run away from home; and (4) whether they were currently in a gang (possible range, 0-4 behavior problems). Finally, adolescents indicated whether the chances they would go to college were very low, low, about 50:50, high, or very high (scored as 1-5, respectively).

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 adjustment problems compared with nonmaltreated adolescents, but the effects of early maltreatment were stronger for girls than for boys. Although not shown in Figure 1, significant maltreatment × gender interactions for dissociation (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 depicted for aggression and anxiety/depression. **Figure 2** illustrates all significant maltreatment × ethnicity interactions, controlling for ecological and child covariates. This figure indicates that for school absences, the negative 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 direction 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 variety of psychological and behavioral problems during ado-


| Outcome | Unadjusted | | | Covariates Adjusted | | |
|---|---|---|---|---|---|
| Grades 9-11 Official School Records (Not Maltreated, n = 387; Maltreated, n = 50) | | | | | |
| Mathematics grade (1 = F, 13 = A) | 8.06 (0.17) | 6.91 (0.49) | 3.24 | 7.65 (0.25) | 7.39 (0.64) | 0.15 |
| Language arts grade (1 = F, 13 = A) | 8.64 (0.17) | 7.04 (0.54) | 7.63† | 8.21 (0.23) | 7.70 (0.59) | 0.70 |
| Total mathematics percentile | 67.97 (1.07) | 64.51 (3.07) | 3.37 | 67.55 (1.59) | 63.12 (4.42) | 0.96 |
| Total language arts percentile | 70.49 (1.00) | 64.73 (3.21) | 5.58‡ | 70.10 (1.51) | 65.72 (3.98) | 1.14 |
| No. of days absent | 10.27 (0.65) | 20.47 (3.06) | 21.63§ | 12.40 (0.94) | 19.33 (2.36) | 8.14† |
| No. of times suspended | 0.58 (0.11) | 1.19 (0.38) | 5.65‡ | 0.73 (0.15) | 1.23 (0.38) | 1.64 |

| Grade 11 Mother Reports (Not Maltreated, n = 392; Maltreated, n = 52) | | | | | |
| Subscales | | | | | |
| Aggression | 5.72 (0.27) | 10.02 (1.01) | 23.64§ | 6.06 (0.40) | 8.15 (0.91) | 4.08‡ |
| 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) | 33.98§ | 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§ |

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.

*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.
minority experience as few as 0 or as many as 7 problems. 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 ($\chi^2 = 26.11$, $P < .001$).

COMMENT

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. 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...
previous research on the effects of child physical maltreatment.3,6,9

An inherent limitation of correlational studies is that without random assignment, which obviously cannot be implemented in comparisons of children who have and have not been maltreated, the possibility that omitted variables are responsible for the observed associations can never be eliminated entirely. For example, physical maltreatment is sometimes comorbid with emotional abuse, sexual abuse, or neglect. We did not assess, and therefore cannot control for, these other types of maltreatment. Particularly in the case of academic achievement and problems, many of the effects of maltreatment were accounted for by risk factors that we did assess and that are correlated with the experience of maltreatment. Physical maltreatment per se seemed less important in the prediction of academic outcomes than the constellation of other risk factors associated with maltreatment. However, because these other risk factors reflect real circumstances of maltreated children’s lives, maltreatment should not be assumed to be unimportant in the development of academic achievement or conduct at school. An additional limitation of this study is that the distinction between children who had been maltreated and those who had not was made without knowledge of the chronicity, severity, or timing of the maltreatment. One would expect more psychological, behavioral, and academic problems for children whose history was characterized by maltreatment that was chronic, severe, or both. Furthermore, maltreatment classification was made on the basis of maltreatment within the first 5 years of life. There is evidence that maltreatment in early childhood is more strongly related to subsequent adjustment problems than is later maltreatment25; thus, focusing on the effects of maltreatment during this period is of particular interest. Nevertheless, in our analyses, children who were not maltreated in their first 5 years but were subsequently maltreated would have been classified with the nonmaltreated participants. Including these children in the nonmaltreated group would likely have the effect of attenuating differences between the nonmaltreated and maltreated groups. Our findings of differences between them are, therefore, especially impressive.

Although maltreated adolescents and nonmaltreated adolescents did not differ in their self-reported psychological and behavioral problems on the Youth Self-Report Form of the Child Behavior Checklist, they did differ in their self-reported likelihood of attending college and, before controlling for the covariates, in the number of behavior problems they experienced. However, mothers reported more differences between the maltreated and nonmaltreated adolescents in grade 11 than did the adolescents themselves. Because mothers were also the source of information about the children’s abuse status before kindergarten, one must consider the possible effects of method variance on these findings. Nevertheless, it is impressive that early physical maltreatment remained a significant predictor of a range of psychological and behavioral problems after controlling for other important child and family risk factors. Further research will be needed to determine whether early emotional abuse, sexual abuse, and neglect similarly affect long-term adjustment and whether these findings generalize to reports of adjustment made by other individuals.

A task facing researchers is to elucidate psychological, social, and biological mechanisms through which the adverse effects of physical maltreatment occur. Because the adverse effects are wide-ranging, it is likely that characteristics of children will moderate outcomes. We doubt that the risks associated with physical maltreatment are engendered through a single instance of trauma. Rather, we believe that the mechanisms through which risk operates are likely to include (1) impaired relationships with adults and peers that preclude maltreated children from developing social competencies; (2) acquired social-cognitive problems, such as hostile attributional biases and problem-solving deficits; and (3) acquired physiological emotion dysregulation, which impairs intrapersonal as well as interpersonal functioning. Future studies are needed to support or refute these hypotheses.

A task facing practitioners and social service system managers is to design treatments for physically maltreated young children that will be effective in preventing the maladaptive outcomes for which they are at risk. No such treatment has yet been documented through rigorous tests. Public health practitioners should also try to discover noniatrogenic ways of screening and detecting young children who have been physically maltreated so that effective treatments can reach this at-risk population. Finally, the task facing policy makers is to create conditions across society that reduce the likelihood of physical maltreatment occurring in the first place. The findings reported here suggest that this need is urgent and will affect the next generation of adolescents.

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