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The timing of child physical maltreatment: A cross-domain growth analysis of impact on adolescent externalizing and internalizing problems

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Abstract

In a sample of 578 children assessed in kindergarten through the eighth grade, we used growth modeling to determine the basic developmental trajectories of mother-reported and teacher-reported externalizing and internalizing behaviors for three physical maltreatment groups of children—early-harmed (prior to age 5 years), later-harmed (age 5 years and over), and nonharmed—controlling for SES and gender. Results demonstrated that the earlier children experienced harsh physical treatment by significant adults, the more likely they were to experience adjustment problems in early adolescence. Over multiple domains, early physical maltreatment was related to more negative sequelae than the same type of maltreatment occurring at later periods. In addition, the fitted growth models revealed that the early-harmed group exhibited somewhat higher initial levels of teacher-reported externalizing problems in kindergarten and significantly different rates of change in these problem behaviors than other children, as reported by mothers over the 9 years of this study. The early-harmed children were also seen by teachers, in kindergarten, as exhibiting higher levels of internalizing behaviors. The later-harmed children were seen by their teachers as increasing their externalizing problem behaviors more rapidly over the 9 years than did the early- or nonharmed children. These findings indicate that the timing of maltreatment is a salient factor in examining the developmental effects of physical harm.

Childhood physical maltreatment is a risk factor that has been linked to numerous negative developmental outcomes such as externalizing behavior problems (Dodge, Pettit, & Bates, 1997) and internalizing emotional difficulties (Holmes & Robins, 1987; Toth, Manly, & Cicchetti, 1992). However, wide variation in individual responses to physical harm exist, and relatively little attention has been paid to the maltreatment variables that may account for such individual differences (Carlson, Furby, Armstrong, & Schlaes, 1997; Moran & Eckenrode, 1992). For example, most previous research has examined children who had been maltreated during the first few years of life, but similar work has not yet been conducted with youth harmed

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for the first time at later developmental periods. In fact, due to limited sample availability and other methodological difficulties, studies typically aggregate into a single sample children of widely varying ages, with histories of maltreatment at different points in development. To gain a comprehensive understanding of the sequelae of maltreatment, however, the age at maltreatment must be assessed in order to examine how the experience affects competencies and long-term adaptation (Cicchetti & Lynch, 1995; van der Kolk, 1987). The goal of the current prospective study was to examine developmental outcomes in children as a function of the timing of the experience of physical maltreatment.

Early Versus Later Maltreatment Experiences

Theoretically, there is much support for the hypothesis that children harmed during the first few years of life may show the most long-term developmental deficits (Carlson et al., 1997). Parent–infant relationships characterized by warmth, consistency, and reciprocity are required for infants to develop a secure attachment (Sroufe, 1989). In the case of maltreating families, an absence of contingent responsiveness typically exists which can impair the infant's ability to develop feelings of security, self-worth, and trust in others, which are essential for successful social and emotional adaptation throughout development (Ainsworth & Crittenden, 1989; Crittenden, 1985). Some evidence exists that attachment security in nonabused children is often stable across months of development (Sroufe, 1989). In samples of abused children, attachment *insecurity* has also been found to be quite stable over time (Cicchetti & Barnett, 1991; Schneider–Rosen, Braunwald, Carlson, & Cicchetti, 1985). If early emotional bonds are insecure or disorganized, as is often the case for abusive families (Barnett, Ganiban, & Cicchetti, 1999; Carlson, Cicchetti, Barnett, & Braunwald, 1989), and if these bonds are stable, it follows that maltreatment would have more deleterious effects at this time of life as opposed to at a later developmental period when the attachment relationship has already been formed and strengthened. Cicchetti (1989) has suggested that maltreatment may have its greatest impact when self-esteem and self-control processes are developing. A crucial predictor of whether or not children may develop psychopathology is the accomplishment of the skills involved in stage-salient tasks for each developmental period. Attachment security (and accompanying emotion regulation) is one such task where successful resolution of relationship issues is necessary for future adaptation (Cicchetti, 1989).

Apart from attachment issues, young children cannot behaviorally avoid harmful situations, and they may not have the cognitive skills necessary to cope with maltreatment, so the degree of stress they experience could be great. It has been shown that infants and toddlers are more often the victims of serious abuse and injury due to their inability to discuss issues with stressed parents, as well as their more defenseless stature (Strauss & Gelles, 1986). In this case, early abuse would likely cause more harm developmentally than would later maltreatment, with which the child has more cognitive and physical resources to cope (Carlson et al., 1997; Gomes–Schwartz, Horowitz, & Cardarelli, 1990).

Additionally, Dodge and Price (1994) have shown that children's social information processing patterns are generally formed during the first 8 years of life and become stable by that age. Early maltreatment may adversely affect this development, specifically leading to hostile attribution biases and social problem solving deficits, which, in turn, are related to later aggressive behavior (Dodge, Bates, & Pettit, 1990). In contrast, maltreatment at a later age may be less detrimental, because more healthy processing patterns have already been developed. Similarly, Moran and Eckenrode (1992) argue that children who have been maltreated in early childhood may be unable to develop a sense of personal control. Children who are maltreated in later childhood may have already developed an internal locus of control and may be able to defend themselves psychologically against the consequences of maltreatment.

On the other hand, not all theory points in the direction of worse effects for younger victims of abuse; according to Conte and Schuerman (1987), physical harm at later ages might have particularly adverse consequences. Older children are able to reflect consciously on the meaning of the maltreatment. With advancing age comes greater cognitive awareness and self-reflection, thus perhaps enhancing the risk that stressors will lead to self-blame or anger, leading to more internalizing or externalizing outcomes. For example, Peters (1988) found that sexual abuse at later ages was correlated with more psychological dysfunction and depression than was sexual abuse in early childhood. It is unclear in this study whether later age of abuse was also related to more chronic abuse experiences. However, Keiley and Martin (2000), in a secondary analysis of Widom's (1995) data, did find clear evidence for the negative impact of later harm. Children who had been abused just prior to adolescence were more at risk for arrest as juveniles than those than had been abused very early in their lives.

Although there is some evidence that later abuse may lead to more deleterious outcomes, a stronger theoretical basis exists from which to hypothesize that early maltreatment is related to more negative developmental outcomes than the same type of harm occurring at later ages. Older children have developed stable attachment patterns, senses of self, and more mature forms of information processing, and have more control over their environments. They have acquired the kinds of social and cognitive skills necessary to better cope with maltreatment (Carlson et al., 1997). However, investigations of the impact of age of maltreatment onset have rarely been conducted empirically. In one of only a handful of available studies, Nash, Zivney, and Hulsey (1993) found that an earlier age of sexual abuse (before age 7 years) was related to more "psychological impairment," as indicated on projective Rorschach tests, regardless of how close in time to the last abuse incident the testing took place. Similarly, Famularo, Fenton, Kinscherff, Ayoub, and Barnum (1994) found that the onset of maltreatment was earlier for children exhibiting posttraumatic stress disorder symptoms than for more well-adjusted abused children, and Kirby, Chu, and Dill (1993) showed that early age of abuse onset was related to high levels of dissociation in inpatients. Moreover, Bolger, Patterson, and Kupersmidt (1998) have shown that children abused earlier had lower self-esteem scores and were less likely to have reciprocally nominated best friends than children harmed later in life. These studies provide a sound empirical basis for exploration of these issues, as they suggest that if earlier maltreatment leads to more detrimental outcomes, very early identification and intervention may be crucial for preventing long-term negative sequelae. They also point to the importance of specifying more clearly the characteristics of samples of "maltreated children," as results may differ by age of maltreatment onset, which has rarely been a variable of focus in previous work. The specific question under examination in the present study is whether or not children harmed at earlier developmental periods exhibit higher levels of externalizing and internalizing problems than children harmed later in life.

Methodological and Analytical Issues

Most research on child maltreatment examines social service referral cases, or children who have had contact with other governmental agencies. These children may represent a biased sample of the population of maltreatment cases, either because their abusing parents have relatively few resources to avoid agency identification or because the children display extreme behavioral problems, which render them readily identifiable to authorities. A need exists, therefore, to study samples of maltreated children who are not necessarily reported to agencies and are representative of the more ordinary levels of experiences of harsh physical treatment (Dodge et al., 1997). In order to increase the generalizability of findings regarding the sequelae and timing of child physical maltreatment, community samples of children still residing in their families of origin are needed (Silverman, Reinherz, & Gianconia, 1996). Moreover, it has been stressed by Cicchetti and Lynch (1995) and Burchinal (1999) that prospective, longitudinal studies are necessary for accurate examinations of the impact of maltreatment. Magnusson and

Allen (1983) argue that individual differences in the timing of stressors, as well as their rates of change during important points of development, make cross-sectional assessments unreliable. They suggest performing measurements throughout transition periods and beyond, when possible adjustment problems may level out.

In order to advance the field in terms of understanding the causes, consequences, and treatment of child abuse, it is necessary to delineate the within-group differences on several taxonomic categories such as type of abuse, severity, frequency or chronicity, out-of-home placement characteristics, and developmental period in which the maltreatment occurred (Cicchetti & Barnett, 1991). The current study takes steps in this direction by controlling for the first four variables (all children suffered relatively moderate levels of harsh physical discipline at only one identifiable reporting period and still continued to live at home with parents). The fifth variable is systematically investigated by examining two groups of children harmed at earlier versus later developmental periods.

The current study follows a large, community sample of children prospectively. This type of prospective design, which allows for premaltreatment data to be collected and uses innovative growth modeling techniques, fills a large gap in the body of previous maltreatment work, thereby making methodological and analytical advances in the examination of the long-term sequelae of child physical harm. One prior study of these data (Keiley, Bates, Dodge, & Pettit, 2000) focused on the impact of peer rejection in kindergarten on children's externalizing and internalizing behaviors as rated by mothers and teachers over 8 years. The results indicated that the development of externalizing and internalizing behaviors was related to sociometric status, controlling for gender, race, and socioeconomic status. In particular, the child's rejection status had an effect on the growth of mother- and teacher-reported externalizing behavior and mother-reported internalizing behavior.

However, growth modeling of developmental patterns in maltreatment samples has rarely been utilized in past work. Willett, Ayoub, and Robinson (1991) did use growth modeling to show that treatment plans can improve functioning in families at risk for maltreatment and that maltreatment itself can impede treatment progress. In the only other extant study of which we are aware, Marshall and English (1999) found that families with high levels of maltreatment recidivism often consisted of parents with a history of very early abuse in their own childhoods. This suggests possibly worse outcomes for children experiencing early onset maltreatment, in terms of repeatedly continuing the cycle of abuse with their own children. However, neither of these studies prospectively examined maltreated children. Also, growth modeling techniques have never been used to illustrate the developmental trajectories of maltreated children's externalizing and internalizing behaviors patterns over time. In order to design efficiently targeted and more effective interventions for maltreated children and their families, these techniques can be used to illuminate the initial status, rate of change, growth, and continuity of problem behavior trajectories (Dodge, 1993; Loeber & Farrington, 1994; Willett, Singer, & Martin, 1998). Specifically, latent growth modeling (Willett, 1994; Willett & Sayer, 1996) can be used to examine initial status and rates of change in children's externalizing and internalizing problems. The current study attempts to do so with a community sample of physically harmed children.

The Current Study

In the current study, 585 preschool boys and girls were recruited as a community sample. Harsh physical treatment was assessed by maternal interview or questionnaire regarding two eras of childhood (before age 5 and between 6 and 9 years), and children were followed prospectively. We were able to ask mothers about maltreatment each year between children's ages 6 and 9

years and to follow the children longitudinally to examine psychosocial outcomes in eighth grade.

Maternal report of physical harm has many advantages as well as disadvantages over other procedures typically used, such as identification by social service agencies. First, because parents may be ashamed, or may cover up maltreatment information, it is unlikely that a parent would overreport harm incidents (Weiss, Dodge, Bates, & Pettit, 1992). In this case, we are probably including only true cases of maltreatment in our sample, but we may also be including maltreated children in our normal treated group. This, however, would make any differences found regarding the impact of harm even more robust. On the other hand, because this is an assessment of children still living at home, we may be including less severe cases, or legally unsubstantiated cases (Dodge et al., 1997). However, because this is a community sample of harmed children, it is probably more representative of the "typical" maltreatment case than are most studies. Because most cases of maltreatment go unreported, and most harmed children do not have contact with social service agencies, the generalizability of our findings to the population of maltreated children may be greater than other studies (Dodge et al., 1997). Barnett, Manly, and Cicchetti (1993) emphasize that, while using samples of only severe or publicly identified cases can be useful, findings may not generalize to the bulk of the families experiencing maltreatment. These authors suggest we examine more typical populations so that we may illuminate trends that have broader applications.

Based on the theoretical and empirical evidence outlined above, we hypothesized that children experiencing physical harm by significant adults at the earliest era (before age 5 years) would exhibit more negative outcomes than children harmed later. Specifically, we hypothesized that the early maltreatment group would exhibit more externalizing behavior problems and more internalizing emotional distress than children physically harmed after the critically important early childhood period. In addition, we expected that the earliest harmed children would exhibit both higher initial levels of externalizing and internalizing problems, and rates of change significantly different from the later and nonharmed groups over time, as illustrated by fitting multiple domain growth models. We also hypothesized that the children maltreated later in life (after age 5 years) would exhibit more deficits in psychosocial functioning than the group of children who had never been maltreated. In addition, we were able to examine children's externalizing and internalizing problems in two contexts: home and school. Teachers' and mothers' reports were both examined and were expected to illuminate different behavior patterns across the two contexts. Since this is the first study of this kind, there is no previous literature on which to base hypotheses regarding the rates of change in children's behaviors, as assessed by teachers versus mothers. However, based on the fact that teachers and mothers interact with children in different contexts and have different levels of exposure to children in each age group, we did expect the two types of reporters to exhibit differences in their perceptions of children's behavioral rates of change over time.

Method

Participants

Data were collected as part of the Child Development Project (Dodge, Bates, & Pettit, 1990), a multisite, longitudinal study of children's social adaptation during which families were interviewed and sent questionnaires once a year, every year, beginning just prior to kindergarten, through eighth grade. At the last data point, 85% of the original sample continued to participate. Subjects were recruited at three sites (Nashville and Knoxville, Tennessee, and Bloomington, Indiana) during kindergarten preregistration in the spring of 1987 and 1988. Parents were randomly approached by research staff as they registered their child and were asked to participate in a longitudinal study of child development. Because approximately 15% of the children at the targeted schools typically did not preregister, 15% of the subjects were

recruited on the 1st day of school through letter or phone call. About 75% of those approached agreed to participate.

In all, parents of 585 children agreed to participate. Fifty-two percent of the children were male, 18% ethnic minorities (16% African American, 2% other), and 35.8% were from single-parent homes. The Hollingshead Four-Factor Index of Social Status (Hollingshead, 1979) indicated that the mean socioeconomic status (SES) of the families was 39.5 (*SD* = 14.1), predominantly middle class, with 26% of the families in one of the two lowest status categories (IV and V). In the present study, 67 children were classified as having an age of maltreatment onset before the age of 5 years and were classified as the "early" maltreatment group. The basis of classification will be discussed below. Twenty-two children were reported to have an age of maltreatment onset between the ages of 6 and 9 years and were placed into the "later" maltreatment group. For 6 children, harm was reported during more than one assessment period. They were placed into the "early" maltreatment group because the first report of harm occurred before the age of 5 years. Boys and girls were equally likely to meet maltreatment criteria, and minorities comprised 34% of the maltreatment sample.

A subsample of the larger sample was utilized in the multiple-domain growth model (Willett & Sayer, 1996) using the structural equation modeling program MX, which allows for the inclusion of respondents with missing data, by using maximum likelihood estimation (McArdle, 1997; McArdle, & Bell, 1999; McArdle & Hamagami, 1991; McArdle, Prescott, Hamagami, & Horn, 1998). Seven respondents had no mother- or teacher-reported externalizing or internalizing behaviors and were dropped from the analyses, leaving a total sample of 578. Of these, 64 were in the "early" maltreatment group (96% of the total "early" maltreatment group) and 22 of the "later" maltreatment group (100% of the total "later" maltreatment group). The remainder of the subsample (n = 492) were reported to have suffered no maltreatment.

Procedure

During the summer before the children began kindergarten or early in the fall, mothers were interviewed for about 90 min in their homes regarding the children's developmental history. Questions pertaining to the possibility of physical harm were asked after rapport had been built with the mothers. The interviewer asked, after a section on child misbehavior and parent discipline, whether pr not the child had ever been disciplined by an adult (mother, father, grandparent, or parent's significant other) severely enough to leave bruises or cause him or her harm. The interviewer probed all responses, allowing the parent to recall exactly what incident (s) had occurred. After the questioning period, the interviewer made private 5-point ratings (from *definitely not harmed* to *definitely harmed*) for the likelihood that the child had been physically harmed, to the point of bruises or injuries, by a significant adult in the child's life. Those children who received an interviewer rating of 3 or higher were included in the "harmed" group.[1] For 56 randomly selected cases, an independent coder scored the audio-recorded interviews as a check on intercoder agreement of harm status. Agreement was 90% (κ = .56, $p < .001$). Prior to this interview, parents had been informed about the types of questions to be asked and were told that the interviewers were legally obligated to report any suspicions of physical danger to the child. This statement was emphasized in the context of wanting to help the family. Six mothers did report concurrent abuse by male significant others and were helped in locating social services. Three of these cases were investigated and resolved by social service agencies. Several other ambiguous cases of harm were discussed with local expert clinical

[1]Six children in the sample appeared to be at imminent risk and were reported to local child protective service agencies. Parents had been warned that we would be obligated to report the most severe cases of maltreatment. In these six cases, the parents were guided through the process of receiving services by the researchers. Any case in which risk was difficult to assess was resolved through discussions with local expert child abuse consultants (Dodge et al., 1997).

consultants and were resolved through additional discussion with parents. All other reports of harm were judged to be nonconcurrent.

After this initial interview, mothers were mailed questionnaires each year for 4 years, asking questions about family conflicts and child discipline. Again, they were asked whether the child had been harmed (in the past 12 months only) to the point of bruising or injury by a significant adult in the child's life. The disparity in methods for assessing physical harm from the first interview period (oral) to subsequent years (written) is a limitation of the current study. However, in assessing harm status, both methods involved the same questions being asked and information was similarly obtained from mothers regarding salient incidents for their children.

Measures

Externalizing and internalizing problems—At each year from kindergarten to eighth grade, the Child Behavior Checklist (CBCL; Achenbach, 1991a) was administered to parents and the Teacher Report Form (TRF; Achenbach, 1991b) to teachers. These instruments are standard measures of child and adolescent behavior problems and have been shown to be reliable and valid indicators. They contain items rated as *not true*, *somewhat true*, or *very true*. The present study employed problem behavior raw scores for the externalizing and internalizing second-order factors.

Child behavior and parental discipline—To investigate whether or not early child behavior or parental practices discriminated between the three harm groups, several measures of transactional relationship properties were examined at Year 1. During the initial interview, mothers were asked to retrospect about their children's misbehavior and their parenting practices from both child's birth to age 4 years and during the year prior to kindergarten (age 4–5 years). Mothers reported whether their children's misbehaviors (e.g., hits people, is resistant, breaks rules, etc.) occurred (1) or did not occur (0). The seven individual behaviors were composited into an average scale score of *misbehavior* at each time period. The parents also reported whether they had used particular parenting practices to correct their children's behavior (1) or had not used these practices (0). These individual parenting items were also composited into three average scale scores: *constructive parenting practices* (talking, sending to room, withdrawing privileges, having child make amends, giving extra chores, giving rewards for good behavior), *moderate practices* (scolding, yelling, shaming) and *punitive practices* (shaking, spanking). After mothers described parenting practices, the interviewer rated the parents' discipline practices from birth to age 4 years and from age 4–5 years on a 5-point scale, with "1" meaning *nonrestrictive*, *mostly positive guidance*; "3," *generally moderate*, *sometimes physical discipline*; and "5," *severe*, *strict*, *often physical discipline*. These items were composited into an average scale score of interviewer-rated "punitive parenting practices."

Family characteristics—After the initial interview with mothers, the interviewers were asked to review the stressors (e.g., moving, medical difficulties, death, divorce or separation, financial instability, legal problems, sibling addition or deletion, extended family stress) that the mothers said had occurred during the child's first 5 years. From their review of the stressors, the interviewers rated the "level of stress" the families had endured during those years on a scale of 1 (*minimal stress*) to 5 (*severe stress*). A "family composition" variable was also created, indicating whether the child was living with two care-givers (mother and husband or boyfriend) or a single parent at the beginning of kindergarten.

Results

Child behavior and parental discipline

Through examining analyses of variance, no differences in child misbehavior as reported by parents were found between the nonharmed, early harmed, or later harmed children from birth to age 4 years. However, parents of early harmed children (M = .26) reported more child misbehavior at age 4–5 years than did the parents of nonharmed children (M = .19). Parents of later harmed (M = .24) children were not significantly different from the other two sets of parents in reporting child misbehavior between the ages 4 and 5 years, F (2, 576) = 4.97, p < .007.

In an analysis of variance, parents of nonharmed (M = .50) children reported using fewer punitive parenting practices (shaking, spanking) at age 4–5 years than did the parents of later harmed (M = .66) children. The parents of early harmed children (M = .55) were not significantly different in punitive parenting practices than either of the other two groups, F (2, 575) =5.28, p < .005. No differences existed between the abuse groups on the other parenting practices at either developmental period. Parents of nonharmed (M = 2.55) and later harmed (M = 2.77) children were rated by the interviewers as providing more positive guidance for their children from birth to age 5 years than were the parents of early harmed children, F (2, 575) = 44.31, p< .0001.

Family characteristics

In an analysis of variance, families of nonharmed children (M = .2.92) were rated by interviewers as being less stressed than the families of later harmed (M = 3.45) or early harmed (M = 3.63) children, F (2, 578) = 19.26, p < .0001. In a chi-square analysis, fewer nonharmed (21%) and later harmed (27%) children lived in single-parent homes than did early harmed (48%) children, χ^2 (2) = 20.48, p < .0001.

Variables controlled in growth models

Because the early-harmed (M = 31.74) children were of lower socioeconomic status than nonharmed (M = 40.69) and later harmed (M = 36.70) children, F (2, 569) = 12.49, p < .001, and because SES was significantly related to the outcomes of interest, the effects of SES were controlled in the analyses. Since the maltreatment subsample size was limited, effects could not be examined by gender; therefore, gender was also controlled.

Growth model

Using the structural equation modeling program MX, a multiple-domain growth analysis (Willett & Sayer, 1996) was conducted in which growth in externalizing behavior problems as reported by mothers and teachers (two domains) was modeled over 9 years (kindergarten to eighth grade). Similar growth models were fit for internalizing behavior problems—mother- and teacher-reported—over the same 9 years. We took the natural logarithm of each of these raw outcome measures in order to attend to the violation of assumptions inherent in the highly skewed raw scores of the CBCL and the TRF.

By examining individual growth curves for a representative sample of respondents from varying levels of SES, males and females, we determined that the individual growth model (the “within person” or “Level 1” model) that best represented the change in these reported behavior problems (as rated by the mothers and teachers) was linear. That is, we decided that the most applicable model of individual change in these domains was a straight line over time; thus, the Level 1 growth model for each domain contained two individual growth parameters: (a) an intercept parameter representing initial status and (b) a slope parameter representing rate of change. Each child’s intercept and slope in each domain would be estimated. We allowed

the errors of internalizing and externalizing logged raw scores of the CBCL and the TRF to be heteroscedastic (varying across time periods and raters). After fitting the baseline "no predictors of change" model and determining that interindividual variation did exist in the growth parameters (estimated slopes and intercepts for the four domains), we investigated whether this heterogeneity in growth parameters was systematic. That is, we fit a "between person" or "Level 2" model by entering gender and SES to determine if either was systematically related to the growth parameters. The addition of gender and SES did improve the fit of the model. Finally, we entered maltreatment group to determine if the growth parameters were systematically related to maltreatment group (early, later, and nonharmed). The variable that denoted "early" harm was allowed to predict both the intercepts and the slopes of each of the four domains, but the variable that denoted "later" harm was only allowed to predict the slopes in each domain. The rationale behind this decision was that the level of externalizing behavior problems (mother- or teacher-rated) at kindergarten (intercept at age 5 years) for any child harmed after the age of 5 years could not be predicted by the later harming of the child.

Growth analysis: Model fit

The final fitted models with maltreatment group, controlling for SES and gender, fit the data ($\chi^2/df = 2.23$ for externalizing[2]—mother and teacher; $\chi^2/df = 3.20$ for mothers' internalizing; $\chi^2/df = 2.56$ for teachers' internalizing[3]). Table 1 presents the estimated growth parameters for externalizing and internalizing behavior problems (logged) as rated by mothers and teachers for the non-, early, and late harmed children. We can note that the mothers consistently rated their children as initially higher on externalizing behavior (logged) than did the teachers (estimates of the average intercepts for mother-reported [2.22, 2.38, 2.22] and teacher-reported [1.22, 1.63, 1.22] logged externalizing behavior in Table 1). At the same time, the average intercept for teacher-reported externalizing behavior for early-harmed children (1.63) is significantly different from the average intercepts for both groups of the other children (1.22).[4] Another way of explaining this relationship is to note the correlation between the estimate of the intercept for the teacher-reported externalizing behavior and the variable indicating early harm ($r = .15$***; see applicable table for correlation throughout).

On average, the trajectory for a child's mother-reported externalizing behavior is related to whether a child was harmed early in life ($r = .09$**). As can be seen from the estimates of the average slopes for the different maltreatment groups in Table 1, mothers are reporting a decline in externalizing behaviors in their children over the 9 years of this study (all of the estimates of the average slopes are negative), but the average slope for children who were harmed *early* in life is significantly less negative (−.019) than the average slopes for the nonharmed (−.039) and later harmed (−.057) children. In contrast, on average a child's trajectory in teacher-reported externalizing behavior is related to whether he or she was harmed *later* in life ($r = .08$*), controlling for SES and gender. As can be seen in Table 1, teachers are reporting that children's externalizing behavior problems are increasing over the 9 years (the average slopes for the different maltreatment groups are all positive), but the later harmed children have trajectories that are increasing more rapidly than the early or nonharmed children. The average

[2]Structural equation models are deemed to fit the data if the ratio of the estimated chi-square statistic to the degrees of freedom is less than 5 (Wheaton, Muthen, Alwin, & Summers, 1977) or 3 (Carmines & McIver, 1981).

[3]The cross-domain model for internalizing behaviors with all of the predictors in the model would not converge. In order to include as many respondents as possible, we opted for fitting separate models for the mother- and teacher-reported internalizing domains, rather than dropping cases with large amounts of missing data to gain convergence. We were able to fit a cross-domain model for internalizing behaviors with no predictors in the model. We obtained information from this model about the relationships among the estimated slopes and intercepts for mother-reported and teacher-reported internalizing behavior.

[4]When making comparison about the initial status of behaviors in these four domains, we must take into consideration that we only allowed the "laser harm" variable to predict the slopes, not the intercepts. As a result, the comparison group for statements about the intercept are both the nonharmed and later-harmed children.

slope estimates for children who were harmed later in life (.061) is significantly larger than the average slope estimates for the nonharmed (.017) or early harmed (.022) children.

Neither the slopes of teacher-reported nor mother-reported internalizing behavior problems were significant; that is, for an average child in this sample these behaviors were not changing over the 9 years. However, the slopes of mother-reported internalizing behavior did differ according to maltreatment group. The correlation between the estimate of the slope for mother-reported internalizing behavior and the variable indicating later harm is .08 ($p < .10$). The trajectories for the later harmed group (slope of .034) are increasing more rapidly than are those for the early harmed (slope of .019) and nonharmed groups (slope of .005). Differences between maltreatment groups also exist in the initial levels of teacher-reported internalizing behavior. Teachers' reports of internalizing behavior problems (logged) in kindergarten are quite different for the early harmed children (1.65) than for the other children (1.35). Another way of explaining this relationship is to note the correlation between the estimate of the intercept for the teacher-reported internalizing behavior and the variable indicating early harm ($r = .21$***). Mothers' reports of their children's internalizing behavior problems (logged) in kindergarten are similar across maltreatment groups: 1.68, 1.86, 1.68. The relationships among the estimated growth parameters and maltreatment group are also depicted as fitted trajectories for prototypical children in each maltreatment group in Figure 1 and Figure 2.

Fitted growth trajectories across three maltreatment groups

In Figure 1a, we can see that, on average, the children who were harmed early in their lives had higher scores on externalizing behavior in kindergarten as reported by their mothers than either the later-harmed or nonharmed children, but this was not a significant difference, controlling for SES and gender. These prototypical early harmed children changed very little in the level of their externalizing behavior problems (as reported by their mothers) over the 9 years (significant difference in slopes for early harmed vs. later and nonharmed, $r = .09$**). However, the prototypical children who were not harmed or were harmed later than age 5 years did show a significant decrease in their mother-reported externalizing behavior problems during the same time, controlling for SES and gender. On average, all of the children's mother-reported externalizing behavior decreased over the 9 years; the externalizing behavior of the children who were harmed early did not decrease very rapidly or very much during that time, while the externalizing behavior (mother-reported) of the other children (later and nonharmed) decreased much further and more rapidly.

On average, teacher-reported externalizing behavior was higher in kindergarten for the early-harmed children than it was for the later and nonharmed children (significant difference in intercepts, $r = .15$***), controlling for SES and gender (Figure 1b). Similarly, a significant difference existed in the slopes of teacher-reported externalizing behavior, controlling for SES and gender ($r = .08$*). That is on average the teachers reported an increase in externalizing behavior for all of the children over the 9 years, but the nonharmed and early harmed children's increases were minimal. On average, the children who were harmed early in their lives were always higher on teacher-reported externalizing behavior problems than were the children who were not harmed at all or those who were harmed later in their lives. On average, the children who were harmed after the age of 5 years were similar to nonharmed children in kindergarten but had the most rapid teacher-reported change in their externalizing behavior problems from that time until eighth grade.

Figure 2a illustrates mother-reported internalizing behavior for prototypical children (controlling for SES and gender) of each maltreatment group. Differences in the intercepts and slopes for mother-reported internalizing behavior are nonsignificant across these groups. On average, as reported by mothers, the children in each maltreatment group were similar in their internalizing behavior problems in kindergarten and across the 9 years. However, a trend did

exist for the later harmed children: they had more rapidly increasing trajectories over the 9 years than did the early or nonharmed children (r = .08†). All of the children had slightly increasing trajectories, but the trajectories for the later harmed children approached the level of the trajectories of the early harmed children by the end of the 9 years.

In Figure 2b, we can see that on average the children who were harmed early were initially higher on teacher-reported internalizing behavior problems than were the later- and nonharmed children (significant difference in intercepts, r = .21***). No differences existed in the slopes for the different maltreatment groups for teacher-reported internalizing behavior problems.

Variances in the growth parameters

In Table 2, we can see that for mother's reports of externalizing and internalizing behavior problems and teacher's reports of externalizing behavior problems the children differ widely in their growth trajectories, controlling for SES, gender, and maltreatment status. The variances of the estimates for the slopes and intercepts are all highly significant. Less heterogeneity exists in the growth trajectories of the children's teacher-reported internalizing behavior. Children differ widely in kindergarten, but less variation is evident in their changes in internalizing behavior over the 9 years. Even after allowing SES, gender, and maltreatment group to predict variance in the growth parameters, significant variance still exists in these parameters to be predicted by other variables not in the model.

By controlling for SES and gender and adding maltreatment group to the model, we were able to predict 3.4% of the variance of the intercepts of the children and nearly 4% of the variance of their slopes of mother-reported externalizing behavior (see Table 2). For the teacher-reported behavior problems, we were able to predict over 15% of the variance in the intercepts of the children and over 5% of the variance of their slopes for externalizing behavior problems. SES, gender, and maltreatment group predicted about 13% of the variance in the intercepts of the children's teacher-reported internalizing behavior, but we predicted 0% of their slopes. These three variables—SES, gender, and maltreatment group—predicted the variation in the children's intercepts (2%) and slopes (0%) of mother-reported internalizing behavior very poorly.

Within-domain relationships

Table 2 also contains the estimates of the correlations between the intercepts and slopes in each domain (within-domain relationships). The intercepts and slopes of the children's mother-reported externalizing behavior problems were not related (r = −.08). This indicates that the child's level of mother-reported externalizing behavior in kindergarten was not related to the child's later trajectory, as reported by his or her mother. That is, a child who was high on mother-reported externalizing behavior in kindergarten could have a trajectory that increased, decreased, or remained stable over the next 9 years. In contrast, the intercepts and slopes of the children's teacher-reported externalizing behavior problems were highly related (r = −.44***). Where a child started in teacher-reported externalizing behavior in kindergarten did influence the child's later trajectory, as reported by his or her teachers. That is, if a child was high on teacher-reported externalizing behavior in kindergarten, his or her teacher-reported externalizing behavior grew less rapidly over time than did that of a child whose externalizing behavior was rated lower by the teacher at kindergarten. Those children whose externalizing behavior was rated lower by their teachers at kindergarten had rates of development of externalizing behavior (as seen by the teachers) that were a bit more rapid over the 9 years.

In terms of internalizing behavior problems, the within-domain relationships were similar to those for teacher-reported externalizing behavior. The intercepts and slopes of the children's mother-reported internalizing behavior problems were related (r = −.23**), and the same was

true for the intercepts and slopes of the children's teacher-reported internalizing behavior (r = −.31**). Where a mother reported her child to be in terms of internalizing behavior in kindergarten was related to the child's growth in later internalizing behavior. Those children who began with more mother-reported internalizing behavior had trajectories that increased less rapidly than those children who began with less mother-reported internalizing behavior. The same was true for children who began with more teacher-related internalizing behavior.

Across domain relationships

Table 3 contains the estimated correlations among the growth parameters across the two externalizing and two internalizing domains. A positive relationship exists between the children's level of externalizing behavior in kindergarten as seen by mothers and as seen by teachers (r = .33***, estimated correlation between the intercepts of mother-reported and teacher-reported externalizing behavior), controlling for SES and gender. Children who were rated high on externalizing behavior problems by their mothers were similarly rated by their teachers and vice versa for those who were rated low in kindergarten. A similar relationship exists between the children's level of mother-reported and teacher-reported internalizing behavior in kindergarten (r = .27**), controlling for SES and gender. Children who were low on mother-reported internalizing behavior in kindergarten were also seen by their kindergarten teachers as low on internalizing and vice versa for the children who were rated high on internalizing.

Children who are seen by their mothers as exhibiting more externalizing behavior over time are similarly seen by their teachers (r = .24*), controlling for SES and gender, and vice versa for the children who are decreasing their externalizing behavior (mother- and teacher-reported) over time. An even stronger relationship exists between the children's mother-reported and teacher-reported internalizing slopes (r = .46***). Children who are seen by their teachers as exhibiting more internalizing behavior over time are similarly seen by their mothers, and vice versa for the children who are decreasing their internalizing behavior over time as seen by the two raters.

A marginal relationship exists between the child's initial status on teacher-reported externalizing behavior in kindergarten and the child's later trajectory in mother-reported externalizing behavior (r = .20†), controlling for SES and gender. Children who are seen by their teachers as high on externalizing behavior at kindergarten are later reported by their mothers to be rapidly increasing their externalizing behavior problems, and vice versa for those children rated low by teachers on externalizing behavior problems in kindergarten. Interestingly, the reverse is not true. Where the children are on externalizing behavior problems at kindergarten as reported by their mothers has no effect on how the teachers rate their externalizing behavior in later years (r = −.11).

Discussion

These results provide support for the hypothesis that the earlier children experience harsh physical treatment by significant adults, the more likely they are to experience adjustment problems in early adolescence. The current findings indicate that over multiple domains early physical maltreatment is related to more negative sequelae than the same type of maltreatment occurring at later periods. In addition, the fitted growth models revealed that the early harmed group exhibited somewhat higher initial levels of teacher-reported externalizing problems in kindergarten and significantly lower rates of improvement in these problem behaviors as reported by mothers over the 9 years of this study than other children. The early harmed children were also seen by teachers, in kindergarten, as exhibiting higher levels of internalizing behaviors. However, the later harmed children were seen by their teachers as increasing their externalizing problem behaviors more rapidly over the 9 years than the early or nonharmed

children. These findings indicate that the timing of maltreatment is a salient factor in examining the developmental effects of physical harm.

Externalizing behavior problems

The results of the growth modeling indicated that children harmed early had a higher and more stable level of mother and teacher-reported externalizing behaviors over the 9 years than did the later and nonharmed children. Interestingly, in this growth analysis the teachers, not the mothers, reported that the later abused children had the most rapidly increasing levels of externalizing behavior problems over the 9 years than did the early or nonabused children. In fact, by eighth grade (Year 9) the levels of externalizing behavior that the teachers reported for the early and later harmed children were quite similar. It is difficult to discern the mechanisms underlying these group differences. Future work in this area may be able to clarify whether child behavior changes, mother behavior changes, or social–ecological factors can account for children's shift from nonharmed to harmed status over the elementary school years. Determining which variables can be predictive of later physical harm is essential, so that proper prevention efforts can be implemented. Further research is needed to examine what family, child, or contextual variables may lead to the harming of older children. Perhaps family context or child behavioral variables at home and at school can be identified in future work that may be able to illuminate the patterns of risk for children who will be harmed later in life.

In terms of variables that might distinguish the early and later harmed groups in the current sample, perhaps families who harm their children later in life experience similar, but lower level, stressors, and the children exhibit similar, but lower level, adjustment problems as those who experience early maltreatment. Some support exists for this argument in our data, as the later harmed group's mean scores on family stress and child misbehavior fell in between those of the never harmed and early harmed children, though these trends did not reach statistical significance. In the first 5 years of life, mothers of later harmed children were reported to use levels of positive guidance while disciplining their children that were similar to levels of nonharming mothers. In fact, most of the parenting variables available during the initial interview period did not distinguish between the three harm groups. However, nonharming mothers did use fewer punitive parenting practices than the later harming mothers, which may indicate that although mothers who harm their children later in life exhibit many positive parenting practices, their levels of stress and levels of child misbehavior, which are similar to early harmed children, may eventually lead to dependence on more coercive punishment techniques. The escalation of corporal punishment into later harm has been consistently documented by Strauss and colleagues (e.g. Strauss & Gelles, 1986). In fact, it may be necessary for future work to move beyond static mother and child variables, as we have used here, and to use a more transactional framework for examining family dynamics. The data available in the current study simply did not allow for a sophisticated analysis of transient versus chronic vulnerability and protective factors. We were not able to determine whether certain variables protected some children from later harm while other families succumbed to dynamic stressors or lack of resources. We were not able to identify the type of transactional information that would be necessary to delineate the children who would be harmed later in life. Cicchetti and Lynch (1993) remind us that we must attempt to understand those enduring and transient vulnerability and protective factors that may hinder or help children in negotiating important stage-salient tasks such as attachment to parents and success with peers. These variables can change over time and can differ across levels of social ecology. Our growth models are a step in the right direction, because they allow us to suggest some possible mediating factors or underlying mechanisms for the relationships found.

One mechanism that might help explain the differences between the early, later, and nonharmed children in terms of the development of externalizing behavior problems is the possible

difficulties caused by having mothers report both harm and behavior problems. In the growth analysis, the mothers of early harmed children clearly saw them as remaining very stable in their levels of externalizing behavior problems over the 9 years. Having reported a child as harmed earlier in his or her life and not currently, the mother may have felt she could realistically report her child's behavior problems without concern for any outside interference. After reporting that a child had been physically harmed beyond the age of 5 years, the mother may have felt invested in establishing that her child was not affected by the harm, for fear of being reported to social services. A possible support for this hypothesis is the discrepancy between the growth trajectories of these later harmed children as reported by the mothers and the teachers. While the mothers of later harmed children continued to report declining behavior problems over the 9 years, which was similar to the decline in behavior problems reported by the mothers of nonharmed children, teachers noted that later harmed children's externalizing behavior increased more rapidly over the same period of time. Interestingly, later harmed children who were seen by their mothers as decreasing in externalizing behaviors were also seen by mothers as marginally increasing in internalizing problems. Alternatively, these later harmed children may have suppressed their misbehavior at home, where they would be harshly punished for it. Future work in this area would certainly benefit from more in-depth transactional analyses that build upon the questions we have raised here.

In sum, the hypothesis that early harm can be more detrimental to children's functioning than later harm was generally supported by the results. Early harm was related to higher initial levels of externalizing problems that did not change much over time. However, our results also suggest that later harmed children are certainly at risk, according to teachers, of increasingly problematic externalizing behaviors as they approach adolescence and, according to mothers, of increasingly problematic internalizing problems. The literature has long supported the idea that children who exhibit aggressive behavior early in their lives have been more likely to maintain these aggressive levels of behavior over the life span (Caspi, Elder, & Bern, 1987; Loeber & Dishion, 1983; Patterson, Debaryshe, & Ramsey, 1989). Clearly, early harmed children are more likely to develop externalizing behavior problems and maintain them over the years, regardless of the context examined—home or school.

In fact, for both mothers and teachers a positive relationship existed between their assessments of externalizing behavior problems in kindergarten and the later trajectories of these behaviors. If a child was reported by his or her mother as exhibiting high levels of externalizing at entrance to kindergarten, the teacher was likely to rate that child similarly. The slopes of teacher and mother ratings also were significantly related, indicating that if the mother reported that her child was exhibiting fairly high, but stable, levels of externalizing behavior problems over the 9 years, teacher reports were similar. If the mother reported the behavior as increasing over the 9 years, then the teacher often did as well. Hence, some consistency between the reporters was found. These findings support previous observations that children who exhibit externalizing or internalizing behaviors at home often have difficulty with these behaviors at school (Hinshaw, Lahey & Hart, 1993; Keiley et al., 2000).

Although there was some consistency in reporting by mothers and teachers, when a teacher reported that a child was high on externalizing behaviors in kindergarten, the mother was often more likely to report that her child's behavior was getting more unruly over time; however, if a mother reported that her child was having difficulty controlling his or her behavior at entrance to kindergarten, teachers after kindergarten did not necessarily see these children as becoming more difficult over time. A couple of possible explanations might be proposed for these differences across teachers' and mothers' reports. First, it is possible that teachers who are dealing with difficult children in kindergarten are communicating this difficulty to the parents, who then may begin to struggle with the child in a manner that only increases these externalizing behavior problems. This may be indicative of a coercive family interaction cycle

that has been described by Patterson (1995). A second possible explanation for these differences has been a long-standing one. Researchers have often questioned the validity of mother versus teacher reports of children's behavior, or at least how to establish the validity of these reports (Bates, Pettit, Dodge, & Ridge, 1998). Are the differences due to the specificity of the behaviors that the child is exhibiting in the two domains—home and school? Or, are the two raters—mothers and teachers—biased in different directions? Or, in this case, are the children decreasingly problematic at home but increasingly so at school? Clearly, more research is needed in this area.

Internalizing behavior problems

On average, the pattern of development of internalizing problem behaviors, whether rated by mothers or teachers, is stability. Although children who were harmed early in their lives were higher on teacher-reported internalizing behavior in kindergarten than were the non- or later harmed children, over time the trajectories were almost as stable as the trajectories for the latter two groups. Interestingly, although only marginally significant, the mothers of children harmed after they had entered kindergarten saw them as increasing their internalizing behaviors over the 9 years. Thus, mothers of later harmed children saw them as becoming a bit more depressed, withdrawn, and anxious, while at the same time exhibiting less externalizing behaviors. Again, having the mothers as informants of both children's behavior—internalizing and externalizing — and of physical harm may have an impact on the emergence of this pattern. An alternative hypothesis might be that these later harmed children, who are better able to reflect consciously on the meaning of the harm and its consequences, might be dealing with more fear than rage (Conte & Schuerman, 1987). Moran and Eckenrode (1992) mention that later harmed children have a tendency to defend themselves from the "meaning" of their experiences. Their cognitive defense may well be to pull inward in some manner and evidence internalizing symptoms.

On average, the mothers and teachers were in agreement on the levels of internalizing symptoms that children had in kindergarten. They also agreed on the development of these symptoms over time. The children who were seen by their mothers as internalizing in kindergarten were seen the same way by the teachers. The children who were seen as increasing their internalizing behaviors over time by their mothers were seen similarly by the teachers. As with externalizing behavior problems, a degree of agreement existed between reporters in regard to where the children start and what trajectories they develop; however, there was, by no means, complete agreement. Disagreement between raters has often been discussed in past research (Bates et al., 1998; Tinsley, Holtgrave, Erdley, & Reise, 1997). As Tinsley et al. (1997) emphasize, further research is needed to confirm whether a reporter by construct interaction is in effect, or whether one or more reporters are biased. It is also possible that children do behave differently across contexts. Further investigation into these issues is clearly indicated.

Summary of developmental trajectory patterns for maltreatment groups

When examining the trajectories of the early harmed children, a pattern emerges. On average, these children are *always* rated higher in externalizing and internalizing behavior problems, no matter who the observer is, than either the later or nonharmed children. These early harmed children also show quite stable patterns of externalizing and internalizing behavior problems over time. The levels of their behavior over the 9 years are always higher than those of the non- or later harmed children.

The later harmed children are seen differently by teachers and by their mothers in terms of their externalizing behaviors in particular. Mothers see their later harmed children as becoming less difficult over time, while the teachers see these children as becoming more difficult over time. By eighth grade, the teachers are rating the externalizing behavior problems of later

harmed children as nearly equal to those of the early harmed children. Clearly, both early and later harmed children are at risk for the development of externalizing difficulties, and quite possibly internalizing ones as well.

Study limitations and future directions

This study has several advantages over past work on physical maltreatment in that it is a prospective longitudinal examination of the effects of harm over a 9-year period. In addition, we were able to examine developmental trajectories using growth modeling. Therefore, we were able to obtain preliminary data illustrating, perhaps for the first time, initial levels and rates of change in child internalizing and externalizing behavior problems as a function of physical harm during two different developmental periods. Understanding variations within harm groups will provide better information about the outcomes and possible prevention or intervention foci related to maltreatment. This focus allows for an understanding that multiple pathways exist for maltreated children's developmental "outcomes." In addition to these strengths, several limitations of the study must also be addressed. We did predict some of the variance in most of the growth parameters, but much of the variance is left to be explained by other predictors. Although some variables gathered early in the children's lives (parental discipline practices, stress levels, child misbehavior) revealed some differences between the three harm groups, there was no consistent pattern that suggested definite mediators of the relationship between timing of harm and developmental trajectories. Nevertheless, having a picture of the basic developmental trajectories of these externalizing and internalizing behaviors may aid in the design and implementation of properly targeted prevention and intervention programs for maltreating or at-risk families, as they do indicate that higher than average stress levels and punitive parenting practices can overshadow the general use of positive discipline. This may eventually lead to physical maltreatment at later ages. Our data also suggest overall worse sequelae for children harmed before the age of 5 years.

Another limitation is that there was a disparity in physical harm data collection techniques from the initial prekindergarten interview with mothers to the subsequent annual maternal questionnaire method. However, both methods of data collection rely solely on maternal report of physical harm. The consistency both in reporters and in the nature of questions asked may lessen the possibility of confounding influences. Thus, it is unlikely that the results reported herein are simply artifacts of data collection methods.

The use of parental report of maltreatment in itself poses some problems in recall, bias, and even lying (Dodge et. al., 1990). Therefore, it was not possible to determine definitively that these children were only harmed during the periods reported by mothers. We cannot draw firm conclusions about the lack of chronic harm inflicted on the children in this sample. However, official social service records of the type used in other maltreatment studies are also subject to reporter bias as well as inaccurate recall and reporting. In addition, these agency reports may be associated with other confounds, such as the effects of stigmatizing children (vs. maltreatment per se) and intervention effects (Widom, 1989). It is unlikely, in the case of the present study, that mothers would overrepresent maltreatment incidents, and if they underreported physical harm this phenomenon would only serve to weaken any relationships found. Thus, if parental report of harm is an invalid method, our results regarding the impact of physical harm may actually be underestimates of the true effects (Dodge et al., 1990). In fact, one of the strengths of this study is the use of parental reports from a randomly chosen community sample wherein the maltreated children more closely resemble the typical case, which is not reported to authorities. Future work should employ both community and social service delivered samples, in order to better address the question of generalizability. In addition, larger samples of more ethnically diverse populations of maltreated children are needed in order to be able to perform analyses by ethnicity and gender and to draw conclusions about

culturally sensitive prevention efforts that may be helpful in ameliorating negative outcomes for majority and minority youth. The current sample sizes precluded our ability to examine issues related to ethnicity. Our data collection also did not address other types of maltreatment (sexual, neglect), differential effects due to perpetrator identity, or other qualitative issues that Cicchetti and Barnett (1991) have aptly suggested are necessary for a comprehensive understanding of these issues.

Finally, the current study defined "early" harm as occurring before age 5 years, while other studies have differentially defined "early" as anywhere from infancy to preadolescence. A more consistent definition of early versus later harm is needed in future work in order to clarify the relationship between timing of maltreatment onset and long-term outcomes. Moreover, the current authors treated time as a static variable and delineated discrete time periods for physical harm as reported by parents. In some cases, however, especially in agency-referred cases, and if maltreatment is more severe, harm may occur over the long term, and one's reactions to early maltreatment would no doubt affect subsequent experiences of abuse as well as long-term coping and adjustment (Carlson et al., 1997). Since only six of the harmed children in our sample had harm reported on more than one occasion, we could not examine whether or not these children experienced developmental trajectories different from either the early or later harmed groups. Future research must disentangle the effects of age of onset, and chronic versus episodic harm.

Conclusions

Ours is the first examination of the differences in relationships between the slopes and intercepts of externalizing and internalizing behaviors of physically harmed children, across and within the contexts of home and school. This kind of in-depth exploration is unique to cross-domain growth modeling. From this work, a more complex picture emerges about the developmental trajectories of children harmed both early and later in life. This new knowledge may help in the development of well-targeted interventions focused on the particular patterns of behaviors at particular points in time.

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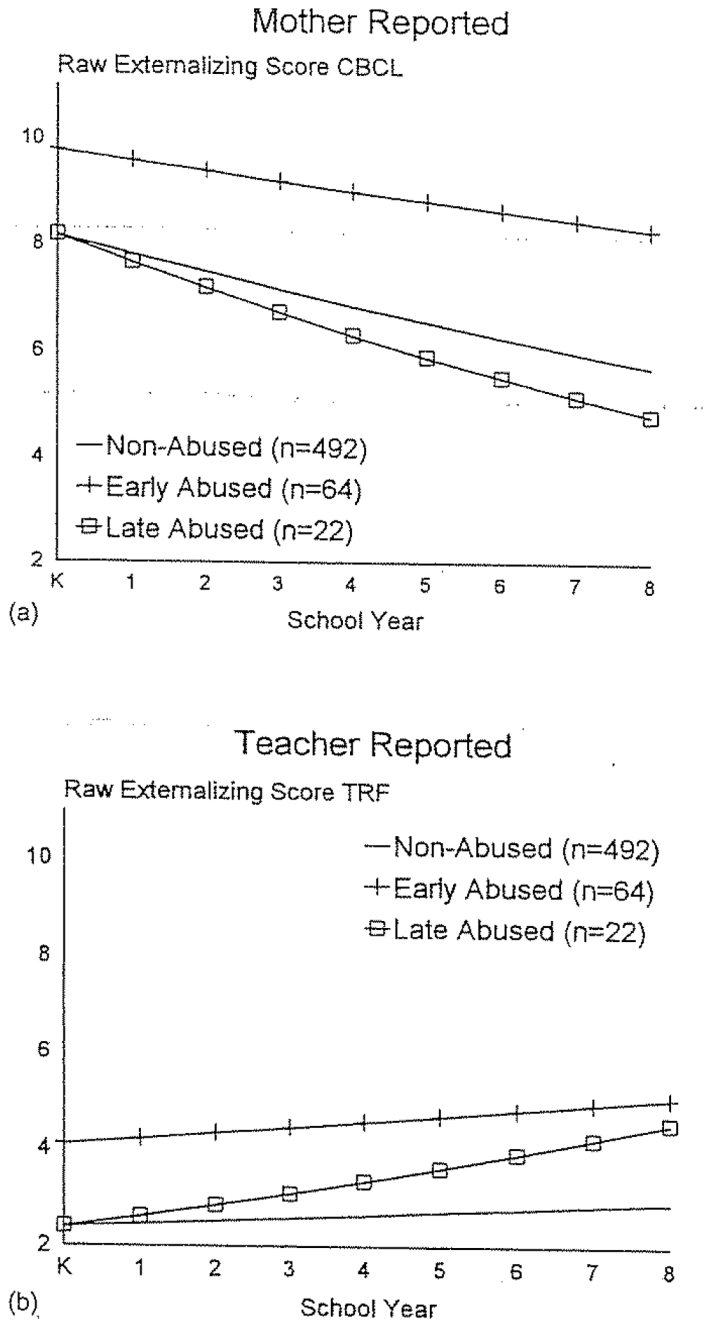

Figure 1.
Development of (a) mother-reported and (b) teacher-reported externalizing behavior by abuse group, controlling for SES and gender (n = 578).

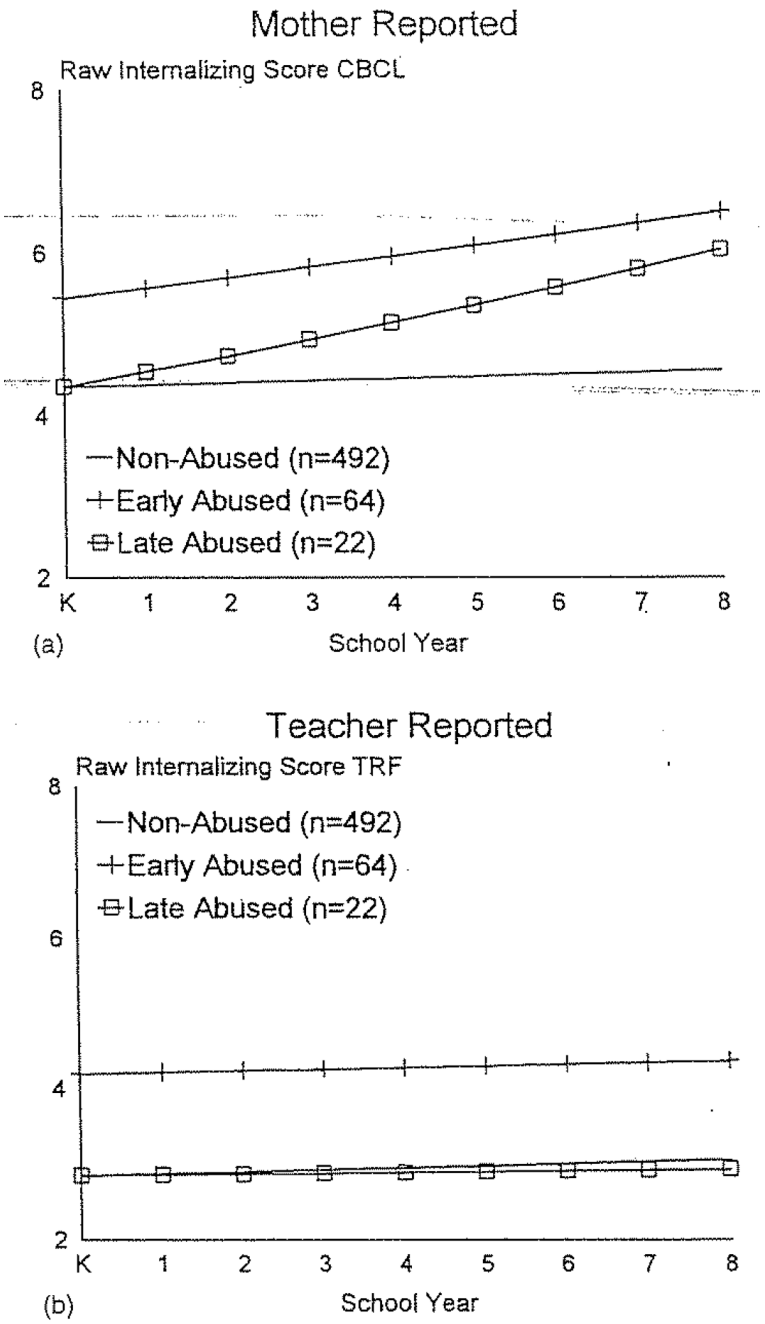

Figure 2.
Development of (a) mother-reported and (b) teacher-reported internalizing behavior by abuse group, controlling for SES and gender (n = 578).

Table 1

Estimated average growth parameters in logged externalizing and internalizing behavior problems—rated by mothers and teachers—controlling for SES and gender, by maltreatment group

Domain	Maltreatment Group	True Status[a] at Kindergarten	Rate of True Change[a]
Externalizing (log): Mother reported	Nonharmed	2.22***	−.039**b
	Early-harmed	2.38***	−.019**c
	Later-harmed	2.22***	−.057**b
Externalizing (log): Teacher reported	Nonharmed	1.22***d	.017*f
	Early-harmed	1.63***e	.022*f
	Later-harmed	1.22***d	.061*g
Internalizing (log): Mother reported	Nonharmed	1.68***	.005†h
	Early-harmed	1.86***	.019†h
	Later-harmed	1.68***	.034†i
Internalizing (log): Teacher reported	Nonharmed	1.35***j	.007
	Early-harmed	1.65***k	.004
	Later-harmed	1.35***j	.003

Note: Estimated coefficients with different superscripts in each domain are significantly different from each other: *b* and *c*, estimated correlation between early-harm and slope is .09, $p < .01$; *d* and *e*, estimated correlation between early harm and intercept is .15, $p < .001$; *f* and *g*, estimated correlation between later harm and slope is .08, $p < .05$; *h* and *i*, estimated correlation between later harm and slope is .08, $p < .10$; *j* and *k*, estimated correlation between early harm and intercept is .21, $p < .001$.

[a] In classical test theory, when describing the psychometric properties of scores, a distinction is made between the "observed" score and "true" score. In latent growth modeling, we continue to make this distinction because we are interested in changes in the underlying "true" score, not the "observed" score. Consequently, for each of the four domains we estimated the "true" initial level at kindergarten (intercept) and the rate of "true" change (slope). It is important to keep in mind that the "true" initial level at kindergarten, the intercept, is not the "observed" score the child obtained in kindergarten but an estimate of where his or her estimated trajectory intersects the axis when time is zero, which is kindergarten (Willett, 1994).

† $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 2

Estimated within-domain heterogeneity in the individual growth parameters in externalizing and internalizing behavior problems as rated by mothers and teachers, controlling for SES, gender, and maltreatment group

Domain	Variance in True Status at Kindergarten (% of Variance Predicted by SES, Gender, & Maltreatment Group)	Variance in Rate of True Change (% of Variance Predicted by SES, Gender, & Maltreatment Group)	Correlation of True Status at Kindergarten and Rate of True Change
Externalizing (log): Mother	0.3543*** (3.4)	0.0049*** (3.9)	−.08
Externalizing (log): Teacher	0.7377*** (15.7)	0.0105*** (5.4)	−.44***
Internalizing (log): Mother	0.3994*** (2.0)	0.0055** (0)	−.23**
Internalizing (log): Teacher	0.2051*** (12.5)	0.0035* (0)	−.31**

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 3

Estimated cross-domain relationships among the individual growth parameters in externalizing and internalizing behavior problems as rated by mothers and teachers, controlling for SES, gender, and maltreatment group

Domain	Intercept: Externalizing (log), Mother	Slope: Externalizing (log), Mother	Intercept: Internalizing (log), Mother	Slope: Internalizing (log), Mother
Intercept: Externalizing (log), teacher	.33***	.20†		
Slope; Externalizing (log), teacher	−.11	.24*		
Intercept: Internalizing (log), teacher			.27**	.05
Slope: Internalizing (log), teacher			−.09	.46***

† $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.