
Maltreatment of boys and the development of disruptive and delinquent behavior

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Abstract

Data from a longitudinal, inner-city community sample were used to examine the prevalence of child maltreatment in males and to relate this to disruptive and delinquent child behavior. By age 18 years, almost one fourth of the families had been referred to Children and Youth Services (CYS). Investigation by the CYS resulted in substantiated maltreatment of 10% of the participants, mostly for physical abuse and neglect. Almost all maltreatment was perpetrated by people living in the same house as the victim. Maltreatment was related to the boys progressing on three pathways in disruptive and delinquent behavior: authority conflict pathway, overt pathway, and covert pathway. Two thirds of the victims showed authority conflict problems, and almost all of the maltreated boys displayed behaviors characteristic of the overt and covert pathways. Victims, compared to matched controls, were more likely to have engaged in behaviors characteristic of the authority conflict and the overt pathways but less strongly engaged in behaviors associated with the covert pathway. Victims were also more likely than controls to have a referral to juvenile court. Most of the CYS contact tended to precede or co-occur with onset of overt and covert problem behavior, but about half of the onset of authority conflict behaviors tended to precede contact with CYS.

The fact that maltreated children have a higher prevalence of engaging in delinquent acts is well known. However, very few studies have investigated this prospectively in a community sample and have related the timing of maltreatment to the onset of disruptive and delinquent behavior. Since most delinquent youth show earlier disruptive behavior, it is also not clear to what extent the timing of maltreatment is related to the onset of disruptive behavior. For the purpose of this article, we consider disruptive behavior as oppo-

sitional behavior and conduct problems not usually leading to police involvement, such as annoying others, lying, and stealing small amounts from home. Not all disruptive and delinquent behaviors are alike, and it remains to be seen whether maltreatment is associated equally with overt and covert forms of disruptive and delinquent behavior. Arguments have been made to distinguish between these problem behaviors and conflicts with authority figures (Loeber, Wung, Keenan, Giroux, Stouthamer–Loeber, van Kammen, & Maughan, 1993). Again, it is unclear to what extent maltreatment can be prospectively linked to such behaviors. These issues are addressed in the present paper which is based on follow-up data from the oldest sample in the Pittsburgh Youth Study.

Reports of the number of children that are maltreated have increased sharply according to the National Incidence Studies by the National Center of Child Abuse and Neglect (1996). The official reports, collected from

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child protective services and from other agencies, in the three National Incidence Studies (NIS) show that based on the harm standard (having already experienced either physical, emotional, or behavioral injury), 3.1 children per 1,000 were estimated to be physically abused in 1980 (NIS-1), compared to 4.3 and 5.7 in the reports of data gathered in the years 1986 (NIS-2) and 1993 (NIS-3), respectively (Warner-Rogers, Hansen, & Hecht, 1999). The incidence of various forms of neglect (physical, emotional, or educational) had almost doubled from the time of NIS-2 to NIS-3. Based on the harm standard in NIS-3, 5.0 children per 1,000 experienced physical neglect, whereas 3.2 and 5.9 children per 1,000 suffered from emotional or educational neglect, respectively.

The increases of maltreatment may partly reflect an actual increase in the incidence of maltreated children. Part of the increase, however, may reflect changes in definitions, such as what kind of physical discipline is considered abuse or what are the minimal conditions of supervision and care. Another reason may be that the public has become more aware of their responsibilities as reporting agents, resulting in more call-ins. Not all call-ins, however, result in a substantiated case of maltreatment. The National Research Council reported in 1993 that more than half of the call-ins were substantiated by the authorities. A later report, based on figures from the National Committee to Prevent Child Abuse (Lung & Daro, 1996), estimated the confirmed figure to be one third.

The numbers of officially substantiated maltreatment cases, staggering as they are, are certainly underestimates of actual maltreatment taking place, because not all maltreatment comes to the attention of agencies. Straus, Hamby, Finkelhor, Moore, and Runyan (1997), in a self-reported population survey of parents, reported that the incidence rate of physical abuse was 5 times greater than that found in the NIS-3 wave. Even this figure is sure to be an underestimate because parents may have been reluctant to admit child abuse.

Incidence figures cannot easily be translated into prevalence, which means that the

total volume of children experiencing maltreatment before age 18 years is difficult to estimate. Self-report data of victims while they are still underage are not often collected because of reporting responsibilities. However, MacMillan, Fleming, Troome, Boyle, and Wong (1997) found that 3.9% of males age 15 years or older had ever been subjected to sexual abuse. A recent study of inner-city youth (Ireland, Smith, & Thornberry, 2000) documented that by age 18 years, 16% of the males and 26.6% of the females in their inner-city sample had a substantiated case of maltreatment. Regardless of which index of maltreatment is used or what aspect of maltreatment we consider, the potential harm done to children is of considerable concern (Cicchetti & Toth, 1995).

In addition to the direct, immediate harm done to children, the long-term effect of child maltreatment on children's future lives and on their interactions with others can be serious. One of the negative life outcomes related to maltreatment may be delinquency. Widom's (1989) and Ireland and Widom's (1994) reviews of the research literature found a fairly consistent relationship between maltreatment and delinquency. Later research studies have confirmed this finding (Kakar, 1996; Kelley, Thornberry, & Smith, 1997; Widom, 2000). For example, data from the Rochester Youth Development Study showed that maltreatment of boys and girls before age 12 years was predictive of the frequency of later delinquency, of officially recognized delinquency, self-reported violence, as well as moderately serious self-reported delinquency (Kelley, Thornberry, et al., 1997; Smith & Thornberry, 1995). The authors found, however, that maltreatment was not related to the prevalence of self-reported serious delinquency and was not related to minor delinquency and general delinquency. Widom (2000) reported a significant higher likelihood of victims of abuse or neglect to be arrested compared to their control group. She points out, however, that a substantial number of victims do not go on to become delinquents. Maltreatment is also reported to increase the likelihood of being a gang member, independent of demographic

factors (Thompson & Braaten–Antrim, 1998). However, Henggeler, McKee, and Borduin (1989) did not support the link between maltreatment and delinquency and suggested that other behavioral and family variables may be able to explain the link between neglect and delinquency.

As is already clear from the above, there is no agreement whether maltreatment is related to all forms of delinquency in a similar manner. This is particularly the case for violent delinquency. The idea that violence engenders violence is not always supported. For instance, Widom (1994), stated that research had demonstrated a relation between childhood victimization and later delinquency but not necessarily to violent delinquency. Olds, Hill, and Rumsey (1998), in making a case for early intervention, claimed that abused and neglected children are at risk for later violent crime. In addition, as mentioned, Kelley, Thornberry, et al. (1997) found a relation between childhood maltreatment and self-reported violent delinquency. Thus, although scholars generally agree that there is a link between maltreatment and delinquency, it is not clear whether this applies to all forms of delinquency.

Research has shown that disruptive child behavior often precedes the development of delinquency (Hawkins et al., 1998; Loeber & Dishion, 1983). Does this mean that maltreatment is related to different forms of disruptive behavior and delinquency on different developmental levels of seriousness? The developmental relation between disruptive and delinquent behavior has been articulated in a triple pathway model (Figure 1), consisting of the authority conflict pathway, the overt pathway, and the covert pathway. The pathways were carefully constructed on the basis of a number of factor analytic studies. We subjected these studies to a meta-analysis (multidimensional scaling) in order to find the major “underlying” dimensions (Frick et al., 1993; Loeber & Schmaling, 1985). The two meta-analyses shared a basic overt–covert dimension on which most antisocial behaviors could be positioned. However, behaviors related to non-compliance were situated in the middle of this dimension. Noncompliance, truancy, running

away from home, and staying out late at night, compared to violence or theft, are less characterized by the victimization of others. For that reason, we decided to keep these behaviors (labeled “authority conflict”) separate.

As a next step in developing the pathways, we examined the clustering of behaviors within each step of the pathways on the basis of similarity of age of onset curves. The onset curves within a pathway step were comparable and were distinct from the onset of curves of behaviors characteristic of other steps in the pathways (Loeber et al., 1993).

Each pathway contains a number of steps of behaviors of increasing severity, but an increasingly smaller number of children progress to the more serious steps (Kelley, Loeber, Keenan, & DeLamatre, 1997; Loeber et al., 1993; Loeber, DeLamatre, Keenan, & Zhang, 1998; Loeber, Wei, Stouthamer–Loeber, Huizinga, & Thornberry, 1999; Tolan & Gorman–Smith, 1999). The steps in the authority conflict pathway are (a) stubborn behavior, (b) defiance or disobedience, and (c) authority avoidance, such as truancy, staying out late, and running away, some of which may be status offenses. The authority conflict pathway applies to boys up to age 12 years, because after that age truancy becomes more common. Because most maltreatment happens in the home, one could expect that conflict with authority figures such as parents is likely to happen. Another hypothesis, however, is that the threat of maltreatment reduces authority conflict. The steps in the overt pathway are (a) minor aggression, (b) physical fighting, and (c) violence such as attacking to seriously hurt or kill, rape, or strong-arming. The covert pathway has the following steps: (a) minor covert behaviors, (b) property damage, (c) moderately serious delinquency, and (d) serious delinquency such as burglary and auto theft. This pathway applies to boys up to age 15 years.

The pathway steps are developmentally linked in that the likelihood of engaging in a particular step is significantly increased by engaging in the previous step of a pathway (Le Blanc, Côté, & Loeber, 1991; Loeber et al., 1993, 1998; Loeber, Keenan, & Zhang,

1997; Tolan, Gorman-Smith, & Loeber, 2000). Many boys who engage in the most serious behaviors in a pathway will have engaged in behaviors characteristic of earlier steps. The pathways are not mutually exclusive; a given boy can display behaviors from each of the three pathways. Actually, the higher the level reached in a particular pathway, the more likely he is involved in another pathway as well. Thus participants can score high in none, some, or all pathways. The most likely serious groups are those who commit serious property crimes and those who commit serious property *and* violent crimes (Farrington, 1991; Loeber & Stouthamer-Loeber, 1998).

The triple pathway model allows an examination of whether maltreatment is differentially related to each pathway and to different severity levels within each pathway. Knowledge of the onset of behaviors within pathways also permits linking it to the timing of maltreatment.

Most often, the relation between disruptive and delinquent behaviors and Children and Youth Services (CYS) contact has been studied with a particular temporal order in mind: maltreatment followed by behavior problems (Ireland & Widom, 1994; Kelley, Thornberry, et al., 1997; Widom, 2000). However, few studies have examined the temporal order between maltreatment, disruptive behavior, and delinquency. Although much maltreatment may occur early in life, some of it will occur after disruptive and delinquent behavior develops. The temporal ordering may shed light on how much CYS involvement is potentially causally implicated in later disruptive or delinquent behavior and how much of it co-occurs with disruptive/delinquent acts.

In this article we will examine the following questions: (a) How high is the documented maltreatment up to age 18 years in an inner-city male sample? (b) Is maltreatment equally related to delinquency and to authority conflicts as outlined in the pathway steps? And is it equally related to violent as well as nonviolent forms of delinquency? (c) What is the temporal order between maltreatment and the occurrence of disruptive and delinquent child behavior?

Methods

Subjects

Data from the oldest sample of the Pittsburgh Youth Study were used. The sample consists of 506 males who were first assessed when they were in seventh grade in Pittsburgh public schools. Participant selection and measures have been described in detail by Loeber, Farrington, Stouthamer-Loeber, and van Kammen (1998) and are only briefly summarized here. Of those families of participants randomly selected from the seventh grade enrollment, 83.9% consented to participate. The initial screening data, collected from the boys themselves, their parents, and teachers, were used to develop a sample with an overrepresentation of boys who had already demonstrated some disruptive behavior (at least three antisocial or delinquent behaviors). For that purpose, 250 boys of the risk group of most antisocial boys were selected and an equal number of the nonrisk group were included in the follow-up sample. Thus, an enriched sample was created; however, data can be weighted to represent the original population values. The weights that were used were .6485 for the risk group and 1.3626 for the nonrisk group. The weights had been adjusted to result in the same *N* as the actual interviewed sample to prevent overestimation of significance levels. The average age of the sample at first follow-up was 13.8 years; 57.5% were African American, while the remainder were White. A sizeable proportion of the sample (44.9%) lived with a single parent, and more than one third received public assistance (36.2%). The attrition rate was low; at age 19.5 years (10th assessment wave) the participation rate was 89.7%. The average participation across the waves was 93.2%, ranging from 100 to 88.5%.

Measures and variables

The maltreatment data used in this paper were collected from the CYS records. Information was gathered on any referral of the families of participants made to the CYS offices of Allegheny County. This information covered the

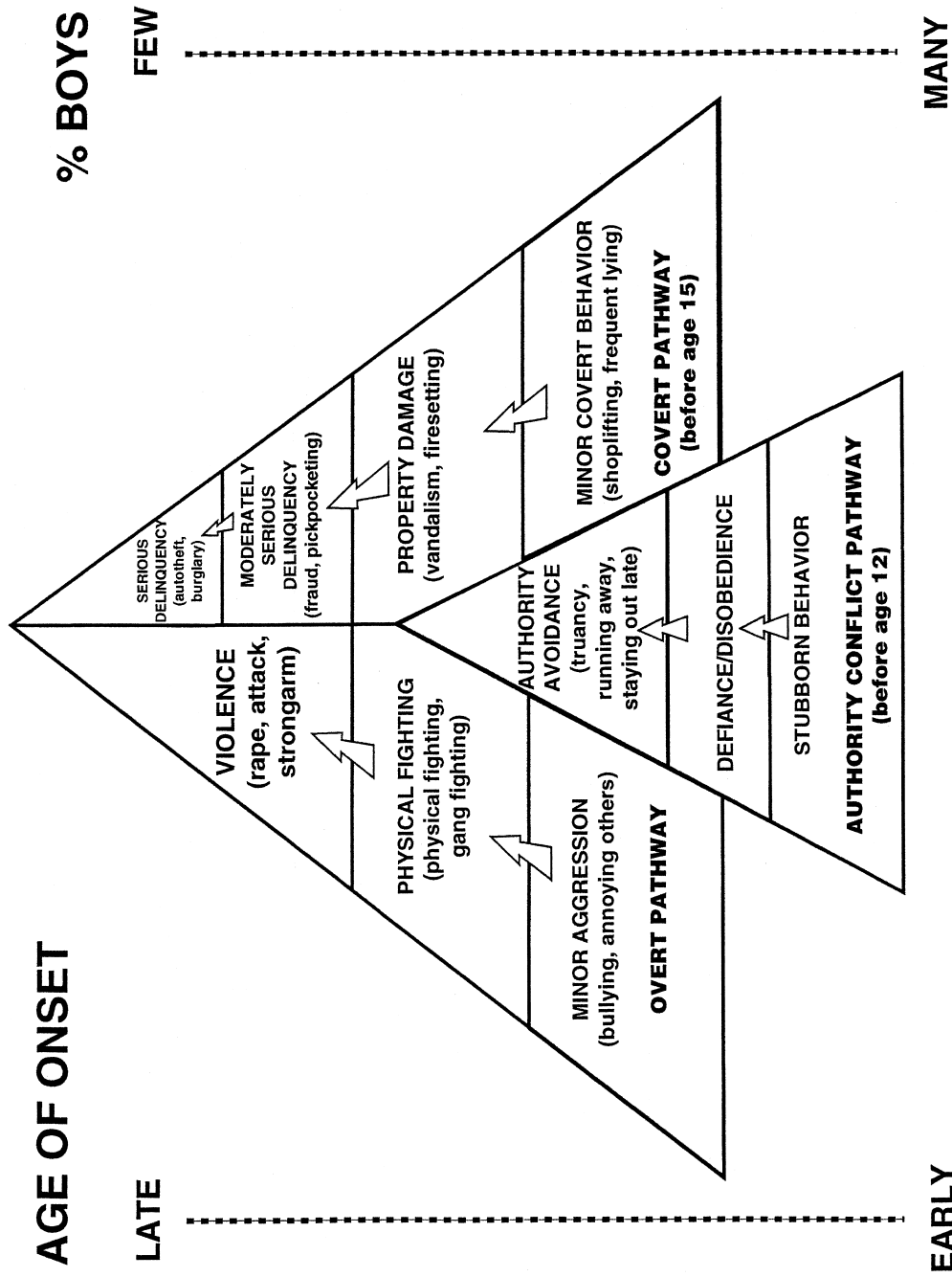


Figure 1. Schematic presentation of the disruptive-delinquent pathways.

time span from the participant's date of birth to the time of data collection. Mean participant age at time of data collection was 19.7 years. However, the list of participants with a CYS record was developed when the participants' mean age was 18.3 years; therefore, some participants who were not 18 years old yet at the time of the list may not have been detected if a first report was made after the list of CYS referrals was created. In addition, families may have been reported to CYS outside Allegheny County. However, census data show that Pittsburgh is a city with a low mobility rate (cited in Loeber et al., 1998). By age 18 years, 92.5% still lived in Allegheny county.

The Maltreatment Classification System developed by Cicchetti and his group (Barnett, Manly, & Cicchetti, 1993) was used for data collection. This classification system defines different types of maltreatment and levels of severity for each type. The types of maltreatment were physical abuse; sexual abuse; failure to provide—physical neglect; lack of supervision—physical neglect; emotional maltreatment; moral—legal maltreatment; educational maltreatment; and incorrigibility. In the original scheme, moral—legal and educational maltreatment were one category. We have treated them as separate categories. We also added incorrigibility because it was a reason that was relatively frequently used by CYS. We expect that participants who are labeled as incorrigible will be particularly involved in authority conflict behaviors.

The severity of maltreatment was rated on a 5-point scale. In the present study, 16% of the records were extracted independently on a separate occasion by another staff member and then compared to ensure accuracy and consistency during the data extraction process. All information on type and severity of maltreatment was independently coded on two occasions by separate staff. The variables and the rates of agreements were as follows: number of times families were referred to CYS (100%), families with a case accepted by CYS (100%), number of times the participant was in accepted case (100%), reasons of maltreatment in the referral (97.2%), reasons for abuse in CYS acceptance (96.5%), age of

participant at time of accepted case (100%), the severity level of the reason(s) for opening the case (98.5%), relationship of the perpetrator of maltreatment to the victim (99.8%), relationship of the primary caretaker to the victim (99.2%), and the number of placements utilized (98.8%). Discrepancies were resolved by the supervisor of the coders.

We will use the term "substantiated maltreatment" as an overarching term for all forms of problems requiring the intervention of CYS. The children subjected to maltreatment will be called victims.

The creation of pathway variables has been described in Loeber et al. (1993, 1999) and in Tolan and Gorman-Smith (1999). Data from several instruments were used from more than 10 phases:

1. An extended version of the Child Behavior Checklist was completed by the caretaker (Achenbach & Edelbrock, 1983; Loeber et al., 1998).
2. At the second phase of data collection, the caretakers were administered a revised form of the Diagnostic Schedule for Children (Costello, 1987). The interview assessed lifetime and past 6 months' DSM-III-R symptoms.
3. The boys were administered the Self-Reported Delinquency interview (Loeber et al., 1998). At the first administration, lifetime questions were also asked.
4. In addition, the boys were given the Youth Self-Report (Achenbach & Edelbrock, 1987). Thus, some of the data were retrospective. However, a replication of the pathways based on data from the youngest sample who were in first grade at the first assessment yielded similar results (Loeber et al., 1998).

Ages of onset of disruptive and delinquent behavior were calculated for the steps in the three pathways. In addition, a variable was made of the total number of steps a participant had reached.

The juvenile court records of Allegheny County were extracted to collect all data for the juvenile years (Maguin, 1994). Variables

from the juvenile court records were any petition to juvenile court, any index violence offense petition, any index property offense petition, any nonindex violence offense petition, and any nonindex property offense petition.

Demographic information was collected to determine age, race, and family social status. The race variable was based on caretaker information. Age of the participant was rounded down to whole years. Socioeconomic status (SES) was based on Hollingshead's (1975) index of social status, which uses occupational prestige and educational level. If the family had two parents in the household, the highest score was selected. For the purpose of matching, the score was dichotomized at the 75th percentile.

Control group

We developed a matched group for our victim group as a way of controlling confounding variables (Howing, Wodarsky, Kurtz, & Gaudin, 1989; Karon & Kupper, 1982). Victims were matched to controls on race, age, and SES. Two thirds of the victims were African American. The victims' ages ranged, at the beginning of the study when they had started eighth grade, from 12 to 15 years, with a median of 14 years of age, which was 1 year above the appropriate age for eighth grade. Therefore, age was used as an approximation of school success or lack thereof. One third of the victims were placed in the lowest 25% of SES. Other variables, such as disadvantaged neighborhood or single parenthood, could have been added to the matching procedure, but, apart from making matching more complicated, these variables were highly correlated with race and SES. Participants whose family had been involved in an open case with CYS for someone other than our participant were disqualified as matches. However, families who had been reported to CYS but whose cases had never been opened were allowed to stay in the match pool. The final matched group provided two exact matches for each maltreated participant. By doubling the number of controls, the standard error of comparison between the victims and the

matched control group is decreased (Kahn & Sempos, 1989).

Results

We first investigated the prevalence of substantiated maltreatment in an urban male sample up to their 18th birthdays. Most of the sample was born in the period from 1973 to 1975. Thus, the weighted prevalence data reported here concern substantiated maltreatment up to 1992. Almost one quarter (23.6%) of the families in the oldest sample had been reported to CYS. However, maltreatment was substantiated by CYS in two thirds of the reported families (15.5% weighted prevalence). Before their 18th birthdays, 10.4% of the participants were victims of substantiated maltreatment in at least one accepted referral. Although we could not establish the duration of the maltreatment, we had collected information on the number of accepted referrals to give some indication of duration. The majority of the victims had only one accepted referral to CYS (76.2%); however, 17.4% had two referrals, two cases had three referrals, and one case had four referrals. Using prevalence and frequency of substantiated maltreatment up to age 17 years, we estimated the yearly incidence of substantiated maltreatment to be 8 per 1,000.

Reasons for victims' referral to CYS and of acceptance of a case by CYS are listed in Table 1. The figures in parentheses show the percentage of participants in the weighted sample for each reason at acceptance. Note that incorrigibility is listed even though the child is not strictly the victim. However, no case occurred where incorrigibility was the sole reason for CYS involvement, showing the interrelationship between substantiated maltreatment and child problem behavior.

Physical abuse (38.2%), failure to provide (41.8%), lack of supervision (32.7%), and emotional maltreatment (20.0%) were the most prevalent reasons at acceptance by CYS. Sexual abuse was listed for 5.5% of the victims of accepted referrals. Comparing column 1 and column 2 of Table 1, it is clear that not all referral reasons became an accepted case. On average, about 18% of the reasons were

Table 1. Percent of victims with reason for referral and acceptance (weighted)

	Referral (%)	Acceptance (%)
Physical abuse	56.4	38.2 (4.2)
Sexual abuse	9.0	5.5 (0.7)
Failure to provide/neglect	45.5	41.8 (4.6)
Lack of supervision/neglect	61.8	32.7 (3.6)
Emotional maltreatment	40.0	38.2 (4.1)
Moral/legal maltreatment	9.0	5.5 (0.5)
Educational maltreatment	16.4	20.0 (2.1)
Incorrigible	9.0	18.2 (2.1)

Note: The weighted *N*s for the full sample and for the victim group were 506 and 52, respectively. Percentages do not add to 100 because victims may have more than one reason for referral and for acceptance. The percentages in parentheses are for the full sample.

not substantiated and, thus, dropped. The largest drop took place for lack of supervision–physical neglect. Of the 61.8% victims that had lack of supervision–physical neglect as one of the referral reasons, it had been substantiated for 32.7% of the victims only. However, the percent of cases for which educational maltreatment and incorrigibility was noted increased after CYS investigation relative to the referral. For almost one fifth (18.2%) of the accepted cases, the boys were also deemed incorrigible. None of the prevalence rates of the individual reasons reached 5% of the weighted sample, and sexual abuse occurred for less than 1% of the sample.

The number of reasons for accepted referrals ranged from 1 to 8 with a mean of 2.5 per victim. Because of this, it was impossible to isolate large enough groups of pure abuse and pure neglect cases. More than half of the victims who had been referred for physical or sexual abuse had also been subjected to neglect (58.3%); conversely, almost half of the neglect cases had also experienced physical or sexual abuse (46.7%). There were only 10 victims of abuse and 6 victims of neglect without any other reason for acceptance of their cases.

The severity of maltreatment for each reason of acceptance was rated from 1 (*least serious*) to 5 (*most serious*). The median rating was 3; however, more than one quarter of the

reasons were given a score of 4 or 5 (27.5%). Another indication of the severity of the reasons for acceptance was that 52.7% of the victims experienced, at least once, a CYS-arranged change of placement. This was most likely necessitated by the fact that 96.3% of the perpetrators of the maltreatment lived in the same house as the victim, and 94.4% were relatives (or live-in boyfriends of the mother).

Maltreatment often starts in the preschool years, but, as Ireland et al. (2000) have pointed out, maltreatment continues to be initiated throughout adolescence. In the present study, the age of the victims at the time of the first accepted case followed a similar pattern. Although 39.2% of the maltreatment started before age 6 years, 29.1% of the victims were between the ages of 6 and 10 years, and an additional 31.7% was over age 10 years before maltreatment was reported to CYS and the case was accepted.

In summary, more than 10% of the sample had documented cases of substantiated maltreatment. For half of the cases, the complaint was serious enough to require out-of-home placement. Slightly more than 20% of the victims were over age 10 years before substantiated maltreatment took place. The overwhelming majority of perpetrators were family members.

The second question we addressed was whether substantiated maltreatment was related to disruptive behaviors and delinquency in the triple pathways (Table 2). Victims, compared to the controls, showed a higher percentage of problem behavior in all steps of the authority conflict pathway, with the highest odds ratio (OR) for the last step, authority avoidance (OR = 4.00). With regard to the overt pathway, victims, compared to controls, were more likely to have engaged in each of the three steps. This was particularly the case for fighting: 77.0% of the victims, compared to 42.6% of the controls, had engaged in this behavior (OR = 4.52).

Victims and controls were more similar in terms of covert behaviors. Only for minor covert behavior and moderately serious delinquency did the victims have higher prevalences of problem behavior, with ORs of 2.39 and 3.24, respectively.

Table 2. Percent of participants in pathway steps

	Groups		Odds Ratio
	Victim (%)	Control (%)	
Authority conflict pathway (up to age 12 years)			
Stubbornness	41.0	23.8	2.23 (1.15–4.31)
Defiance	41.0	19.7	2.83 (1.44–5.59)
Authority avoidance	39.3	13.9	4.00 (1.94–8.27)
Any authority conflict pathway step	63.9	41.0	2.55 (1.35–4.81)
Overt pathway			
Aggression	67.2	46.7	2.34 (1.23–4.44)
Fighting	77.0	42.6	4.52 (2.25–9.09)
Violence	50.8	34.4	1.97 (1.05–3.68)
Any overt pathway step	91.8	70.5	4.69 (1.74–12.66)
Covert pathway (up to age 15 years)			
Minor covert behavior	82.0	65.6	2.39 (1.12–5.05)
Property damage	60.7	58.2	— <i>ns</i>
Moderately serious delinquency	78.7	53.3	3.24 (1.60–6.58)
Serious delinquency	55.7	44.3	— <i>ns</i>
Any covert pathway step	91.8	81.1	— <i>ns</i>

Note: Numbers in parentheses represent 95% confidence intervals.

The victims and controls did not differ on the average ages of onset of the authority conflict pathway behaviors and the overt pathway behaviors. However, the victims, compared to the controls, had an earlier age of onset for minor covert behavior (average 9.7 vs. 11.9 years, $t = 3.30$, $p < .01$) and for moderately serious delinquency (average 13.4 vs. 14.4 years, $t = 2.20$, $p < .05$). The number of pathway steps a victim had engaged in was related to the number of accepted referrals ($r = .28$, $p < .05$) and the number of reasons for accepted referrals ($r = .28$, $p < .05$). The seriousness level of the reasons for acceptance was not related to the number of pathway steps.

In summary, out of the 10 pathway steps, the victims, compared to the controls, had a higher prevalence of disruptive or delinquent behavior in 8 of the pathway steps. The non-significant differences were in the covert pathway, suggesting a stronger relationship between substantiated maltreatment and overt, compared to covert forms of disruptive behavior and delinquency. Victims, compared to controls, were more likely to reach the most severe step in the authority conflict and overt pathways. However, about half of the victims

did not reach the highest step (violence) in the overt pathway. Victims, compared to controls, were more likely to be involved in steps in the overt *and* the covert pathways (85.2% vs. 62.3%, $p < .01$). About 40% of those victims involved in both pathways were at the highest level of the overt and covert pathways. With two exceptions, victims did not have an earlier age of onset of pathway steps than the controls.

As we had expected, victims who were also incorrigible were all involved in authority conflict behavior, with all of them reaching the highest step of authority avoidance. However, the number of incorrigible boys was only 10, so conclusions are tentative.

Contact with the juvenile court is another way to measure involvement in a delinquent career. Table 3 shows that slightly over half of the victims (54%) had at least one petition in juvenile court, compared to 38.5% of the controls (OR = 1.88). Victims were more likely than the controls to have a petition for index property offenses (OR = 2.13) but not for index violence offenses. Index violence offenses are the most likely offenses to be dealt with by adult court; therefore, our index

Table 3. Percent of participants with court referral

	Groups		Odds Ratio
	Victim (%)	Control (%)	
Any petition	54.0	38.5	1.88 (1.01–3.50)
Any index violence offense petition	26.3	19.7	— <i>ns</i>
Any index property offense petition	41.0	24.6	2.13 (1.11–4.10)
Any nonindex violence offense petition	32.8	16.2	2.49 (1.21–5.10)
Any nonindex property offense petition	47.5	27.1	2.45 (1.29–4.65)

Note: Numbers in parentheses represent 95% confidence intervals.

violence offense petition rate is bound to be an underestimate. Victims were more likely to have a petition for both nonindex violence offenses and nonindex property offenses (ORs of 2.49 and 2.45, respectively). Thus, the risk of court contact was about twice as high for the victims, compared to the controls.

Although we have not collected adult court records yet, we know that 10 participants have been convicted of homicide up to 1999 (Loeber, Crawford, Rosenfeld, Farrington, Stouthamer-Loeber, & Wei, 2000). Of the victims, 6.6% were homicide offenders, compared to 3.3% of the controls and .6% of the remainder of the sample, showing a high overrepresentation among the victims of maltreatment. However, it is well to note that because of the low figures the data are tentative and that 60% of the homicide offenders had no reports of maltreatment.

The last question concerns the temporal order between substantiated maltreatment and the occurrence of disruptive and delinquent child behavior. We will first address victims' age distributions of substantiated maltreatment, and onset of behaviors in the pathways. Figure 2 shows the 25th percentile, median, and 75th percentile for the age of first substantiated maltreatment and onsets of pathway steps. The weighted median age of first CYS contact for an accepted case was 8 years. This compared to median ages of 8, 13, and 10 years for the onsets of behaviors in the authority conflict, overt, and covert pathways, respectively. A quarter of the CYS involvement took place before age 3 years. Thus, on average, the age of onset for overt and covert

pathways was later than the age of first CYS involvement, but the range was very wide.

The next set of analyses examined substantiated maltreatment and onset of disruptive or delinquent behavior within participants. As mentioned, almost 40% of the maltreatment was documented to have happened in the preschool years and 70% prior to age 11 years. Table 4 shows that two thirds of maltreated boys showed authority conflict problems, and almost all maltreated boys displayed behaviors characteristic of the overt and covert pathways.

We expected that most substantiated maltreatment would precede rather than follow the onset of disruptive and delinquent child behavior in each of the three pathways. The results show that three quarters (75.4%) of the onset of CYS contacts took place prior to the onset of overt child problem behavior or in the same year. This compared to 60.7% of the onset of CYS contacts taking place prior to or in the same year of the onset of covert behavior. However, this was much less the case for behaviors characteristic of the authority conflict pathway. Only 32.8% of the onset of CYS contacts took place prior to or in the same year as the onset of authority conflict behaviors. Thus, most of the onset of CYS contact tended to precede or co-occur with overt and covert problem behavior, but about half of the onset of authority conflict behaviors tended to precede contact with CYS.

Discussion

The present study is one of the few studies to use a community sample to prospectively

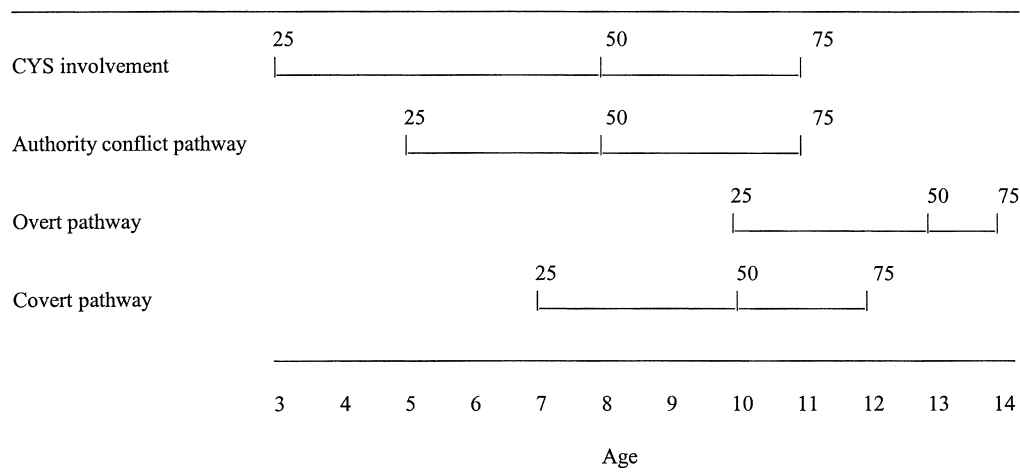


Figure 2. Twenty fifth, median, and 75th percentile of age of onset of CYS acceptance of a maltreatment case, and ages of onset of any step in the disruptive–delinquent pathways.

Table 4. Order of first CYS contact and pathway steps

CYS Contact	Pathways		
	Overt (%)	Covert ^a (%)	Authority Conflict ^b (%)
Before pathway onset	59.0	50.8	26.2
Same year	16.4	9.9	6.6
Later	16.4	31.1	31.1
No pathway step	8.2	8.2	36.6

^aUp to age 15 years.

^bUp to age 12 years.

examine the relation of child maltreatment with disruptive and delinquent child behavior from childhood through adolescence. There are some limitations to the current study. Child maltreatment was measured through CYS records rather than youth self-report or parental report. Sample size was a limiting factor that restricted the number of substantiated maltreatment cases and prevented us from being able to investigate pure abuse or pure neglect cases. However, if most maltreatment cases suffer from more than one source of maltreatment, the study of pure cases will not be very useful. Also, we were not able to study duration of maltreatment and its impact on subsequent child problem behavior. We

used a crude measure of number of accepted referrals, which was related to the number of pathway steps the boy was engaged in. However, there were too few cases with more than one CYS contact or very severe maltreatment to examine in detail the effect of repeated episodes of maltreatment (Manly, Cicchetti, & Barnett, 1994). In addition, we were not able to examine which types of CYS intervention were associated with a reduction or change in child problem behaviors. The present study focused on disruptive and delinquent child behavior and did not include other outcomes associated with maltreatment, such as substance use and mental health problems as well as adjustment problems in adult life (see Ireland et al., 2000; Widom, 2000). One of the main strengths of the study, however, is the carefully repeated measures of disruptive and delinquent child behavior, which allowed us to map the timing of substantiated maltreatment with the developmental unfolding of child problem behaviors.

We found that about a quarter of the inner-city families had been referred to CYS, which shows the large burden imposed by maltreatment on CYS and on society. After CYS investigation, 10.4% of the participants were victims of substantiated maltreatment, which was somewhat lower than the 16% documented in the comparable Rochester Youth

Development Study (Ireland et al., 2000). Unfortunately, the incidence rate in the present study of 8 victims of any kind of maltreatment per 1,000 boys per year cannot be directly compared to the NIS figures because we did not collect data according to the harm standard used in the NIS study (Warner-Rogers et al., 1999).

The present findings support earlier reports of the linkage between child maltreatment and delinquency. However, the present study extends these findings by documenting that child maltreatment is particularly associated with parent and child reports of violence, raising the odds by a factor of about 2. We did not find that child maltreatment was associated with parent and child reports of serious property offenses. At the lower levels of severity, however, maltreatment was associated with disruptive or delinquent behavior characteristics of both the overt and the covert pathways. In summary, we found that child maltreatment is associated with delinquency in general at the lower levels of severity, and especially with the more serious violence. All of the victims who had reached the most serious level of violence were also involved in property crimes. The other serious offender category, those who commit property crimes only, was not represented in the victim group. This supports the idea that the adult-child conflict emanating from maltreatment over time may be transformed to juveniles' acts to property crime as well as acts of violence to others, often outside of the family. Thus, a proportion of maltreated victims turn into offenders victimizing others. It should be noted, however, that this was not true for all maltreated boys; 50% of them did not escalate to violence, and 46% did not escalate to the highest level of property crimes, although a longer follow-up of the sample during early adulthood is likely to reveal additional cases.

The result on the differential impact of maltreatment on violence and property offenses as compared with the controls is tempered somewhat by the findings on official records of delinquency. We found that three out of the four indexes of official offending were associated with maltreatment, including index and nonindex property offense petitions. The

exception was index violence offense petitions. This may be because of the diversion of the most serious violent cases to adult court. Preliminary analyses on the 10 homicide offenders in the sample, all of whom were convicted in adult court, tends to support this.

Child maltreatment, particularly physical abuse, may often take place in the course of disciplinary actions by parents in response to disruptive child behavior. The study offers several pieces of evidence of the interaction between child problem behavior and maltreatment. First, we found that child incorrigibility was documented in almost one out of five of the substantiated child maltreatment cases (18%). Second, we found that child maltreatment was associated with each of the steps in the authority conflict pathway (stubbornness, defiance, authority avoidance). The behaviors represented in these steps denote some reaction of children to authority figures, including parents, caretakers, and teachers. Particularly, maltreated children, compared to controls, had a 4 times higher risk than controls of displaying authority avoidance behaviors, such as truancy, staying out late at night, and running away from home. We had speculated that authority conflict might be increased in families in which maltreatment is allowed to occur, which seems to be borne out by the results. It should be noted, however, that this association was not universal; 6 out of 10 of the maltreated children did not escalate to authority avoidance behaviors.

The study has shed some light on the developmental timing of maltreatment and child problem behavior. The earlier literature reviewed in the introduction suggests that maltreatment is an important potential causal factor for later disruptive and delinquent child behavior. However, prospective studies to substantiate this are extremely rare. Even in the current study, the temporal relationship between maltreatment and child problem behavior was difficult to establish. Part of this was due to the fact that we know more about the timing of when child maltreatment was substantiated (based on CYS records) than about the duration or possible episodic nature of the maltreatment itself. We are on better grounds with the prospective measurement

of child disruptive and delinquent behavior, but the limiting factor was that information on onset prior to age 13 years was based on retrospective, albeit often incomplete, recall. Therefore, conclusions about temporal ordering of maltreatment and disruptive or delinquent behavior can only be tentative. Leaving these limitations aside, the present study suggests several important trends.

We found that 40% of the substantiated CYS cases took place before the child reached age 6 years, and 70% of the substantiated CYS cases took place before age 11 years. Thus, it can be argued that in the majority of the cases the temporal ordering between substantiated maltreatment and child problem behavior largely took place prior to the first assessments of the sample at age 13 years. Within-participant analyses based on the retrospective information collected about the onset of child problem behaviors suggest that about half of the onset of authority conflict behaviors tended to precede or co-occur with the first contact with CYS. There are several explanations for the fact that another 50% of the onset of authority conflict behaviors took place subsequent to the CYS contact. It may reflect age-normative increases in truancy, staying out late at night, and running away from home, as known from other population samples (Loeber, 1985), although this seems to occur at a relatively young age for maltreated boys. It is also possible that children's awareness of substantiated maltreatment by CYS strengthens their resolve to oppose adults in their proximal environment. These speculations clearly need further study.

One might hope that once child maltreatment is proven by CYS and is terminated, the risk of subsequent child problem behaviors is accordingly reduced. The present study could not clearly establish to what extent maltreatment ceased and at what point in time. It is clear, however, that the potential effect of maltreatment may extend for many years beyond the first contact with CYS. Thus, we found that boys' escalation to serious forms of delinquency, particularly violence, took place subsequent to the CYS investigation. In other words, maltreatment may be one of many factors that have far-reaching impact on chil-

dren's adjustment and CYS intervention may not substantially reduce this risk.

Studies uniformly show that although maltreatment raises the risk of later delinquency, there are many other risk factors that do this as well. Eventually, the study of maltreatment should be executed in the context of other risk factors in and outside of the home. Because most maltreatment occurs in the home (Margolin & Gordis, 2000; Warner-Rogers et al., 1999), it is very difficult to disentangle the effects of child maltreatment from other adverse family characteristics and circumstances. Child-maltreating parents are more likely to abuse partners and to have mental health problems such as alcoholism or depression (Bland & Orn, 1986). Thus, maltreated children may witness abuse and delinquency as well as being subjected to poor parenting skills. Henggeler et al. (1989) also make the point that possible maltreatment effects need to be disentangled from other adverse circumstances.

It is also important to study reasons why a proportion of maltreated children escape the adverse outcomes (Cicchetti, Rogosch, Lynch, & Holt, 1993; Widom, 2000). About half of the victims in our sample did not engage in the behaviors forming the highest steps in the overt and covert pathways. Characteristics surrounding the maltreatment, such as the age at which maltreatment takes place and the duration of the episode in which maltreatment takes place, may play a role in the eventual outcome. For instance, Ireland et al. (2000) found maltreatment early in life, in contrast to maltreatment in later childhood or adolescence, not to be related to later delinquency. Like any adverse outcome, delinquency is dependent on the balance between risk and promotive factors in a child's life (Stouthamer-Loeber, Loeber, Wei, Farrington, & Wikstrom, in press). Maltreatment is one of the risk factors, unfortunately related to other risk factors, and generally more than one risk factor is required to lead to an enduring negative outcome.

Interventions to reduce maltreatment still heavily rely on actions undertaken by CYS. Inherently, this is a reactive rather than a proactive mode of intervention. Although neces-

sary, we argue that more preventive interventions need to be undertaken, particularly to prevent child maltreatment in at-risk populations of parents. For example, in an intervention study undertaken by Olds and colleagues (Olds et al., 1997; Olds, Henderson, Chamberlin, & Talelbaum, 1986) nurse home visitations from pregnancy to the end of the 2nd year after birth for unmarried women from households with low SES reduced child abuse

and neglect. Significantly, the intervention also reduced later delinquency of the offspring. A later report found that the intervention reduced the risk of 15-year-old children's reports of arrests, convictions, violation of probation, and running away from home (Olds et al., 1998). Replications and extension of these promising findings to other high-risk populations are badly needed.

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