Bullying perpetration and victimization as predictors of delinquency and depression in the Pittsburgh Youth Study

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Abstract

Purpose – School bullying is an important social problem with serious consequences. Many studies suggest that involvement in bullying (as a perpetrator or a victim) is associated with undesirable short-term effects on the physical and psychological health of children and with undesirable long-term effects on their future psychosocial adjustment as adults. The purpose of this paper is to investigate whether bullying perpetration predicts later criminal offending and whether bullying victimization predicts later depression.

Design/methodology/approach – The paper analyses data from the Pittsburgh Youth Study in which 503 boys who were originally assessed at age 6-7 years have been followed up to age 19, with yearly or half-yearly assessments.

Findings – Bullying perpetration in one age range, according to boys and mothers, predicted delinquency (reported by boys) in a later age range, and this relationship held up after controlling for ten major risk factors measured in an earlier age range. Bullying perpetration, according to boys, was the stronger predictor of delinquency. Bullying victimization (being bullied) in one age range predicted depression (reported by boys, mothers and teachers) in a later age range, and this relationship also held up after controlling for ten earlier risk factors. Bullying victimization according to mothers was the stronger predictor of depression.

Originality/value – The paper provides useful evidence which leads to the conclusion that bullying perpetration is followed by an increased risk of delinquency, and that bullying victimization is followed by an increased risk of depression.

Keywords Depression, Bullying, Boys, Youth, United States of America

Paper type Research paper

Introduction

School bullying is an important social problem with serious consequences. Many studies suggest that involvement in bullying (as a perpetrator or a victim) is associated with undesirable short-term effects on the physical and psychological health of children and with undesirable long-term effects on their future psychosocial adjustment as adults (Ttofi and Farrington, 2008, 2010). In particular, it has been argued that bullying perpetration predicts later criminal offending and that bullying victimization predicts later depression (Farrington and Ttofi, 2011; Kaltiala-Heino et al., 1999).

It is less clear, however, whether there is any causal effect of bullying and victimization on later offending and depression. Bullying may predict delinquency because both are behavioural manifestations of the same underlying construct such as an antisocial personality. Similarly, victimization may predict depression because both are symptoms of the same underlying internalizing disorder. To the extent that this is true, the predictive power of the earlier variable should extend over long time intervals.

Alternatively, bullying may be an early stage in a developmental or causal sequence that leads to delinquency, and similarly victimization may be an early stage in a developmental or

causal sequence that leads to depression. Bullying perpetration may increase the probability of later delinquency, and bullying victimization may increase the probability of later depression. To the extent that this is true, the predictive power of the earlier variable may extend only over short-time intervals (i.e. the causal lag may be short). In order to establish whether there is some kind of facilitating effect of the earlier behaviour on the later one, it is important to investigate whether bullying predicts delinquency, and victimization predicts depression, after controlling for earlier risk factors (Murray *et al.*, 2009). Also, the predictive power of bullying and victimization may vary at different ages and according to different reporters (boys, parents or teachers).

The key questions addressed in this paper are therefore as follows:

- To what extent does school bullying predict later delinquency?
- To what extent does school bullying predict later delinquency after controlling for earlier risk factors?
- To what extent does school victimization (being bullied) predict later depression?
- To what extent does school victimization (being bullied) predict later depression after controlling for earlier risk factors?
- How does the strength of relationships vary according to the time interval between the predictor and the outcome?
- How does the strength of relationships vary according to the ages of assessment of predictors and outcomes?
- How does the strength of relationships vary according to whether boys or mothers report bullying and victimization?

Method

This paper analyses data collected in the Pittsburgh Youth Study, which is a prospective longitudinal survey of over 1,500 Pittsburgh boys from age 6 to 35 (Loeber *et al.*, 2008). Initially, three cohorts of boys in the first, fourth and seventh grades of public schools in the city of Pittsburgh were followed up (Loeber *et al.*, 1998). Each cohort consists of about 500 boys. This paper focuses on the youngest cohort of 503 boys who were originally assessed at age 6-7 in 1987-1988. These boys (and their parents and teachers) were assessed every six months up to age 10 and then every year up to age 19. As the parental informant was usually the mother, we will refer to mothers in this paper. Response rates were very high, with 82 per cent of the original sample of boys assessed in the 18th data wave at age 19.

The first data wave was a screening wave, while successive waves were labelled A, B, C, etc. (at six-month intervals). From the screening wave onwards (up to wave R at age 15), the mother and teacher (MT) completed the child behaviour checklist (CBCL), which included an item on ''cruelty, bullying and meanness to others''. However, this was not considered to be a sufficiently specific question about bullying. Beginning in wave G at age 10, a specific questionnaire on bullying was completed by the boy and his mother. This asked about whether the boy had bullied other children in school and about whether other children had bullied the boy in school (in the previous six months). When the assessments became yearly at wave J, the questions referred to the previous 12 months.

The boy's self-reported delinquency was measured at every wave (Farrington *et al.*, 1996; Loeber *et al.*, 1989). The items included stealing, shoplifting, vandalism, firesetting, burglary, joyriding, carrying a weapon, attacking to hurt, robbery, gang fighting and drug selling. The reference period was initially the previous six months and later the previous 12 months. Depression was measured by boys, mothers and teachers (BMT). The boys completed the Recent Mood and Feelings Questionnaire (Angold *et al.*, 1996). The items covered symptoms necessary for making a diagnosis of major depression according to DSM-III-R criteria, including lonely, cries a lot, feels that no-one loves him, feels worthless, unhappy and worries a lot. The questions referred to the previous two weeks. The MT completed the

CBCL, which included very similar items. The questions referred initially to the previous six months and later to the previous 12 months. The MT reports were combined.

Ten major child, family, peer and socio-economic risk factors were measured on continuous scales in each wave (Farrington *et al.*, 2002):

1. Hyperactivity-impulsivity-attention deficit problems, assessed on the CBCL by MT (scored out of 14 specified problems).

2. Low academic achievement, assessed by BMT.

3. Poor parental supervision, based on four questions answered by BM (e.g. ''Do your parents know who you are with when you are away from home?'').

4. Low parental reinforcement, based on seven questions measuring how often the boy is praised or otherwise reinforced, assessed by BM.

5. Poor parent-boy communication, assessed by boys and mothers and based on 29 questions (e.g. ''Do you tell your mother/father about your personal problems?'').

6. Low involvement of the boy in family activities, measuring how often he is involved in planning family activities or joins family members on outings, based on four questions answered by BM.

7. Delinquent peers, measuring the proportion of the boy's friends who engage in eight different types of delinquent acts, according to the boy's report.

8. Bad friends, based on five questions answered by BM (e.g. ''Are there any children in your group of friends of whom your parents disapprove?'').

9. Low socio-economic status of the parents, according to the occupational prestige and educational level of the parents, based on information from the mothers. If there were two parents, the higher score was coded.

10. Poor housing, based on eight items completed by the interviewer covering the structural condition of the house, visible signs of peeling paint and plaster, and cleanliness inside the house.

Where information was derived from two or three informants, the scores were averaged. It was expected that variables derived from two or three informants would be more valid than those derived from only one informant (Verhulst and van der Ende, 2008).

Results

Prevalence

Table I shows the prevalence of bullying and victimization in each data wave. Waves G and H referred to the previous six months, while waves J-T referred to the previous 12 months. The mean age was the mean age of the boy during the reference period. For example,

Table I	Prevalence (per cent) of bullying, victimization, delinquency and depression							
		Bullying		Victimization		Delinquency	Depression	
Phase	Mean age	Boy	Mother	Boy	Mother	Boy	Boy	MT
G	9.7	17.2	37.8	25.3	25.1	21.5	43.6	38.7
H	10.2	–	–	–	–	25.6	–	45.8
J	10.9	22.4	43.3	22.2	28.3	36.8	31.2	42.4
L	11.9	21.5	36.6	14.7	21.2	35.2	26.4	43.0
N	12.9	22.4	36.7	8.8	18.7	39.8	20.4	40.3
P	13.9	18.1	31.0	5.8	13.8	36.6	22.3	37.3
R	14.9	14.6	24.8	4.1	11.6	32.8	22.2	22.3
T	15.9	11.7	22.1	2.9	7.0	32.8	23.9	23.7

Notes: G and H covered the previous six months; J-T covered the previous 12 months; ''–'', not assessed; MT, mother and teacher

the average age at interview for wave G was 9.95, but the average age enquired about (in the middle of the six-month reference period) was 9.70. In wave G, 17.2 per cent of boys and 37.8 per cent of mothers said that the boy had bullied other children, while 25.3 per cent of boys and 25.1 per cent of mothers said that the boy had been bullied by other children. It can be seen that the prevalence of bullying and victimization decreased at older ages.

Similarly, 21.5 per cent of boys admitted at least one delinquent act in the previous six months in wave G, and 36.8 per cent of boys admitted at least one delinquent act in the previous 12 months in wave J. The prevalence of self-reported delinquency did not change much between wave J (average age 10.9, which in future will be referred to as age 11) and wave T (which in future will be referred to as age 16). For comparability, depression according to MT was dichotomized into those with 3 or more problems out of 11 (''depressed'') versus the remainder. The prevalence of MT depression was 38.7 per cent at wave G (age 10). It decreased in the last two data waves, possibly because no teachers were assessed in wave T and only 70 per cent of teachers completed the assessment in wave R. Depression according to boys was also dichotomized, and its prevalence halved from wave G (43.6 per cent) to wave N (20.4 per cent).

Analyses

Because of the large number of data waves, it was necessary to simplify the analyses by combining adjacent data waves. Bullying and victimization in wave G (age 10) were used to predict delinquency and depression in waves J and L (11-12), N and P (13-14) and R and T (15-16). Bullying and victimization in waves J and L (11-12) were used to predict delinquency and depression in waves N and P (13-14) and R and T (15-16). Bullying and victimization in waves N and P (13-14) were used to predict delinquency and depression in waves R and T (15-16). For bullying, delinquency and depression, the combined variables specified boys who were identified in both waves (e.g. boys who were bullies in both waves J and L). Because of small numbers, the combined variable for victimization specified boys who were identified in either data wave. The combined BMT measure of depression specified boys who were identified by either data source (boys or MT).

In multivariate analyses, the ten key risk factors were always measured in the two data waves before the measurement of bullying or victimization. For example, in analyses where bullying or victimization in wave G was the predictor, the combined risk factors in waves E (mean age 8.7) and F (mean age 9.2) were used. Risk factors in two adjacent data waves were combined by averaging the scores in the two waves. They were then dichotomized into the ''worst'' quarter versus the remainder (see Farrington and Loeber, 2000, for the justification for dichotomization).

Risk factors versus outcomes

Table II shows the extent to which risk factors measured in waves J and L (age 11-12) predicted bullying and victimization in waves N and P (age 13-14) and delinquency and

Table II	Risk factors versus bullying, victimization, delinquency and depression (ORs)					
	Bullying		Victimization		Delinquency	Depression
Risk factor	Boy	Mother	Boy	Mother	Boy	BMT
Hyperactivity	1.01	4.06*	1.13	3.15*	1.39	1.91*
Low achievement	1.59	3.29*	1.31	2.07*	1.38	1.18
Poor supervision	2.64*	2.24*	1.21	1.16	1.29	1.07
Low reinforcement	1.89*	0.72	1.80	1.05	2.01*	0.87
Poor communication	3.89*	2.54*	1.62	2.06*	2.35*	2.47*
Low involvement	1.54	0.90	0.92	0.73	1.86*	0.96
Delinquent peers	5.80*	1.88*	1.45	1.74*	2.80*	1.63
Bad friends	3.83*	2.34*	1.90*	1.82*	2.08*	1.68
Low social class	1.21	1.41	1.26	1.24	1.64	0.72
Poor housing	1.12	1.47	0.91	1.26	1.02	2.30*

Notes: Significant at: *$p < 0.05$; risk factors measured at J/L (age 11-12); bullying and victimization measured at N/P (age 13-14); delinquency and depression measured at R/T (age 15-16); BMT – boy, mother, teacher

depression in waves R and T (age 15-16). The strength of relationships is summarized using the odds ratio (OR); roughly speaking, the OR indicates the increase in risk associated with a risk factor. An OR of 1.0 is the chance value, while an OR of 2.0 or greater indicates a strong relationship (Cohen, 1996). Delinquent peers, poor parent-boy communication, bad friends, poor parental supervision and low parental reinforcement were significant predictors of bullying according to boys. Hyperactivity, low academic achievement, poor parent-boy communication, bad friends, poor parental supervision and delinquent peers were significant predictors of bullying according to mothers.

Only one risk factor (bad friends) significantly predicted victimization according to boys. However, hyperactivity, low academic achievement, poor parent-boy communication, bad friends and delinquent peers significantly predicted victimization according to mothers. The best predictors of delinquency were delinquent peers, poor parent-boy communication, bad friends, low parental reinforcement and low involvement of the boy in family activities. Only three risk factors – poor parent-boy communication, housing and hyperactivity – were significant predictors of depression. One risk factor (low social class) did not predict any of these outcomes.

Bullying versus delinquency

Table III summarizes the relationship between bullying and later delinquency. For example, 40.5 per cent of 79 bullies (according to boys) at age 10 were delinquents at age 11-12, compared with 17.8 per cent of the remaining 376 boys at age 10 (OR = 3.14, confidence interval (CI) = 1.86 to 5.29). Bullying according to boys at age 10 also strongly predicted delinquency at age 13-14 (but not at age 15-16), and all the other relationships between bullying and delinquency were statistically significant. The weighted mean OR for bullying according to boys predicting delinquency was large (OR = 2.84, CI = 1.85 to 4.36).

In contrast, the mothers' reports of the boys' bullying were less strong predictors of the boys' delinquency. The weighted mean OR was significant but not large (OR = 1.56, CI = 1.28 to 1.91). Combining boys and mothers, the weighted mean OR = 2.04 (CI = 1.14 to 3.66). Assuming that a quarter of boys are bullies and a quarter of boys are delinquents, this value of the OR corresponds to 35.8 per cent of bullies becoming delinquents, compared with 21.4 per cent of non-bullies. Thus, being a bully increases the risk of delinquency by about two-thirds.

The right-hand side of Table III shows all the OR values after controlling for all ten risk factors. Bullying according to boys was still a strong predictor of delinquency (OR = 2.27,

Age BUL	Age DEL	Unadjusted		Adjusted	
		OR	CI	OR	CI
Boy					
10	11-12	3.14	1.86-5.29	2.72	1.51-4.90
10	13-14	2.48	1.46-4.23	1.69	0.92-3.11
10	15-16	1.25	0.67-2.32	0.95	0.47-1.91
11-12	13-14	7.25	3.75-14.01	4.99	2.34-10.64
11-12	15-16	2.89	1.47-5.67	3.08	1.38-6.88
13-14	15-16	2.65	1.34-5.26	2.21	0.97-5.01
Total		2.84	1.85-4.36	2.27	1.45-3.53
Mother					
10	11-12	1.45	0.93-2.28	1.08	0.64-1.83
10	13-14	1.80	1.15-2.81	1.42	0.85-2.38
10	15-16	1.05	0.63-1.75	0.89	0.50-1.57
11-12	13-14	2.43	1.52-3.89	2.29	1.29-4.07
11-12	15-16	1.08	0.62-1.89	0.94	0.48-1.86
13-14	15-16	1.72	0.99-3.01	1.59	0.79-3.18
Total		1.56	1.28-1.91	1.30	1.02-1.64
Grand total		2.04	1.14-3.66	1.66	0.97-2.86

Table III Bullying as a predictor of delinquency

Notes: BUL, bullying; DEL, delinquency; OR, odds ratio; CI, 95 per cent confidence interval

CI = 1.45 to 3.53). Bullying according to mothers was a weaker but nevertheless statistically significant predictor of delinquency (OR = 1.30, CI = 1.02 to 1.64). However, the combined measure of bullying was not quite statistically significant (on a two-tailed test) as a predictor of delinquency (OR = 1.66, CI = 0.97 to 2.86). This relationship would be significant on a one-tailed test (90 per cent CI = 1.06 to 2.61), and it would be reasonable to use a one-tailed test in light of the directional prediction that high bullying should predict high delinquency. Assuming that a quarter of boys are bullies and a quarter of boys are delinquents, this value of the OR corresponds to 32.6 per cent of bullies becoming delinquents, compared with 22.5 per cent of non-bullies. Thus, even after controlling for ten key risk factors, being a bully increases the risk of delinquency by about 45 per cent.

Victimization versus depression

Table IV summarizes the relationship between victimization and later depression. For example, 49.6 per cent of 113 victims (according to mothers) at age 10 were depressed at age 11-12, compared with 33.3 per cent of the remaining 339 boys at age 10 (OR = 1.96, CI = 1.28 to 3.03). Victimization according to mothers at age 10 also significantly predicted depression at ages 13-14 and 15-16, and all the other relationships between victimization and depression were strong and significant. The weighted mean OR for victimization according to mothers was large (OR = 2.10, CI = 1.73 to 2.55).

Victimization according to boys at age 10 (but not at later ages) predicted later depression. For example, 49.1 per cent of 114 victims at age 10 were depressed at age 11-12, compared with 33.8 per cent of the remaining 340 boys at age 10 (OR = 1.89, CI = 1.23 to 2.91). The weighted mean OR for victimization according to boys was small but statistically significant (OR = 1.36, CI = 1.10 to 1.67). Combining boys and mothers, the weighted mean OR = 1.69 (CI = 1.10 to 2.59). Assuming that a quarter of boys are victims and a quarter of boys are depressed, this value of the OR corresponds to 32.8 per cent of victims becoming depressed, compared with 22.4 per cent of non-victims. Thus, being bullied increases the risk of depression by nearly half.

The right-hand side of Table IV shows the OR values after controlling for all ten risk factors. Victimization according to mothers was still a strong and significant predictor of the boy's depression (OR = 2.03, CI = 1.62 to 2.54). The relationship at the oldest ages (13-14 versus 15-16) decreased because poor parent-boy communication was a strong predictor of both victimization and depression. Victimization according to boys was a weak but nevertheless

Age VIC	Age DEP	Unadjusted		Adjusted	
		OR	CI	OR	CI
Boy					
10	11-12	1.89	1.23-2.91	1.85	1.15-2.98
10	13-14	1.63	1.02-2.61	1.77	1.05-3.00
10	15-16	1.56	0.91-2.66	1.51	0.84-2.70
11-12	13-14	1.02	0.64-1.62	0.76	0.44-1.30
11-12	15-16	1.06	0.62-1.81	0.93	0.51-1.70
13-14	15-16	0.77	0.35-1.72	0.66	0.26-1.70
Total		1.36	1.10-1.67	1.27	1.01-1.61
Mother					
10	11-12	1.96	1.28-3.03	2.09	1.28-3.42
10	13-14	2.22	1.40-3.54	2.26	1.33-3.85
10	15-16	1.83	1.07-3.12	2.16	1.20-3.87
11-12	13-14	2.11	1.37-3.25	1.99	1.20-3.29
11-12	15-16	2.34	1.41-3.88	2.12	1.20-3.74
13-14	15-16	2.19	1.27-3.77	1.44	0.74-2.79
Total		2.10	1.73-2.55	2.03	1.62-2.54
Grand total		1.69	1.10-2.59	1.61	1.02-2.54

Table IV Victimization as a predictor of depression

Notes: VIC, victimization; DEP, depression; OR, odds ratio; CI, 95 per cent confidence interval

significant predictor of depression (OR = 1.27, CI = 1.01 to 1.61). The combined measure of victimization was also a statistically significant predictor of depression (OR = 1.61, CI = 1.02 to 2.54). Assuming that a quarter of boys are victims and a quarter of boys are depressed, this value of the OR corresponds to 32.0 per cent of victims becoming depressed, compared with 22.7 per cent of non-victims. Thus, even after controlling for ten key risk factors, being a victim increases the risk of depression by about 40 per cent.

Conclusion

The Pittsburgh Youth Study is unique because of the large samples, repeated assessments, low attrition rates, and the wide range of risk factors and outcomes measured at different ages. It shows that bullying according to boys, and bullying according to mothers, were significant predictors of delinquency according to boys, even after controlling for ten key risk factors. Bullying according to boys was the stronger predictor. The results suggest that the occurrence of bullying is followed by an increased risk of delinquency, and consequently that intervention programmes that prevent bullying would cause a decreased risk of delinquency.

Victimization (being bullied) according to mothers was a strong and significant predictor of depression, even after controlling for ten key risk factors. Victimization according to boys was a weak but nevertheless significant predictor, especially when it was measured at the youngest age of 10. These results suggest that being bullied is followed by an increased risk of depression, and consequently that intervention programmes that prevent bullying would cause a decreased risk of depression.

Implications for practice

- Boys who bully tend to become delinquents.
- Interventions that reduce bullying perpetration should be followed by a reduction in delinquency.
- Boys who are bullied tend to become depressed.
- Interventions that reduce bullying victimization should be followed by a reduction in depression.

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