

Childhood Bullying Behavior and Later Psychiatric Hospital and Psychopharmacologic Treatment

Findings From the Finnish 1981 Birth Cohort Study

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Context: No prospective population-based study examining predictive associations between childhood bullying behavior and long-term mental health outcomes in both males and females exists.

Objective: To study predictive associations between bullying and victimization in childhood and later psychiatric hospital and psychopharmacologic treatment.

Design: Nationwide birth cohort study from age 8 to 24 years.

Participants: Five thousand thirty-eight Finnish children born in 1981 with complete information about bullying and victimization at age 8 years from parents, teachers, and self-reports.

Main Outcome Measures: National register-based lifetime information about psychiatric hospital treatments and psychopharmacologic medication prescriptions.

Results: When controlled for psychopathology score, frequent victim status at age 8 years among females

independently predicted psychiatric hospital treatment and use of antipsychotic, antidepressant, and anxiolytic drugs. Among males, frequent bully-victim and bully-only statuses predicted use of antidepressant and anxiolytic drugs. Frequent bully-victim status among males also predicted psychiatric hospital treatment and use of antipsychotics. However, when the analysis was controlled with total psychopathology score at age 8 years, frequent bully, victim, or bully-victim status did not predict any psychiatric outcomes among males.

Conclusions: Boys and girls who display frequent bullying behavior should be evaluated for possible psychiatric problems, as bullying behaviors in concert with psychiatric symptoms are early markers of risk of psychiatric outcome. Among females, frequent childhood victimization predicts later psychiatric problems irrespective of psychiatric problems at baseline.

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BULLYING IS A MAJOR CONCERN for parents, school mental health services, and communities worldwide. Bullying can be defined as an aggressive act embodying an imbalance of power in which the victims cannot defend themselves accompanied by an element of repetition.¹ Boys engage in a greater amount of bullying and when they do, it is more physical compared with that of girls, who are more likely to be involved in relational forms of aggression.^{2,3} Bullying and victimization are associated with poorer family functioning,⁴ interparental violence,⁵ and parental maltreatment.⁶ Previous studies show that children who are both bullies and victims are the most troubled in terms of outcomes.⁷⁻⁹

There are very few population-based studies examining the effect of bullying prospectively.^{7,8,10,11} Kim et al⁸ observed seventh- and eighth-grade students for 10

months and showed that problem behavior was a consequence rather than a cause of bullying experiences. Until recently, follow-up studies examining the long-term consequences of victimization have been almost nonexistent, though Olweus¹² followed up 87 men from ninth grade to 23 years of age. Although former victims were relatively well-adjusted in many respects, they had lower self-esteem and depression more often than their nonvictimized peers. To the best of our knowledge, the only large-scale population-based long-term follow-up study of childhood bullying and victimization and early adulthood outcomes is the Finnish From a Boy to a Man study.^{9,13} We used a birth cohort of boys from age 8 years and followed up with them for up to 15 years to investigate, in part, the relationship between childhood bullying and adolescent/early adulthood outcomes. Bullying was predictive of a number of behaviors in-

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dicative of an antisocial tendency. However, because of the methodology (birth cohort of males was initially followed up at obligatory military call-up), follow-up information about females was not available at that time, and information about psychiatric outcome among boys was limited to military call-up health examinations.

There are no previous population-based studies that examined late adolescence or adulthood outcomes of childhood bullying among both males and females. In the present study, we used 2 sources of psychiatric outcomes not included in our previous reports for our entire birth cohort: (1) the nationwide hospital discharge register containing information about all psychiatric hospital treatments; and (2) information about psychotropic medication from the Finnish Social Insurance Institution. Hospital treatment in Finland is usually an indicator of a severe disturbance and is the most expensive treatment in psychiatry.^{14,15} Our study aimed to examine the associations between bullying and victimization at the age of 8 years and psychiatric hospital treatment and use of psychiatric medications from 13 to 24 years. We studied the different outcomes of children who only frequently bullied, those who were only frequently victimized, and those who were frequently both bullies and victims (bully-victims). Furthermore, our interest was to examine whether frequent bullying or victimization correlate with psychiatric outcomes when controlled for the effect of psychopathology and whether these correlations are different among males and females.

METHODS

SUBJECTS

This investigation is part of the nationwide Finnish 1981 Birth Cohort Study. The Joint Commission on Ethics of Turku University and Turku University Central Hospital approved the research plan, and informed consent was obtained from the children's parents at baseline. Combined information from questionnaires and registry data was analyzed in such a way that the subject could not be identified.

The methodology of the study has been previously reported in more detail.¹⁶⁻¹⁸ The original representative study sample was drawn from the total population of Finnish children born in 1981 (N=60 007). The first assessment was conducted in October and November 1989. Of the selected 6017 children, 5813 (96.6%) took part in the study in 1989. The personal identification numbers of 5351 subjects could be linked with the Finnish Population Register. Altogether, 462 identification numbers had been either lost or inappropriately documented. Complete information about bullying and victimization from all 3 informants (parent, teacher, and child self-report) at age 8 years and outcome data until age 24 years was obtained in 5038 subjects (86.7% of those who participated in the study in 1989).

METHODS

ASSESSMENT OF BULLYING AND VICTIMIZATION AT 8 YEARS OF AGE

Data collection at baseline was organized through teachers. The teacher sent questionnaires via the child to the parents, and the

parents returned them in a sealed envelope to the teacher. The children filled out a questionnaire in the classroom. The teachers then sent the parents' questionnaires, the parents' written consent sheet, the teachers' questionnaires, and the children's self-reports to the researchers in sealed envelopes.

The question that assessed bullying had 3 answers from which the child could choose: (1) "I bully other children almost every day," (2) "I bully sometimes," and (3) "Usually I do not bully." Victimization was assessed by the following: "Other children" (1) "bully me almost every day," (2) "bully me sometimes," and (3) "usually do not bully me." The question pertained to the child's behavior in the last 2 weeks. Similar questions focusing on bullying and victimization were included in the parent and teacher questionnaires (for a 12-month period), with the probe and response items worded as follows: The child bullies/is bullied by other children: (1) does not apply, (2) applies somewhat, and (3) certainly applies. For the purposes of the present study, alternatives 1 and 2 were regarded as indicating no or only occasional bully or victim status, whereas alternative 3 indicated frequent bully or victim status.

We classified the sample into the following groups: (1) those who never or only sometimes bullied and were not victimized according to parental, teacher, and self-reports; (2) those who frequently bullied (but were not victimized) according to at least 1 informant; (3) those who were frequently victimized (but did not bully) according to at least 1 informant; and (4) those who both frequently bullied and were victimized using pooled information from all 3 informants. For example, if a boy frequently bullied according to teachers and was frequently victimized according to self-reports, he was classified as a bully-victim. Only subjects with complete information about bullying and victimization from all 3 informants were included in the analysis. Combining the parent, teacher, and child reports of information about bullying/victimization by using the "either/or" rule is justified by the low interrater agreement (weighted $\kappa=0.11-0.22$).

MEASURES ON PSYCHIATRIC SYMPTOMS AT 8 YEARS OF AGE

In this study, we analyzed parental and teacher reports of the child's psychiatric symptoms as possible confounding variables. Parents and teachers completed a Rutter Scale,^{19,20} which was composed of 3 subscales (conduct, hyperactivity, and emotional scores). The Rutter questionnaires for screening children's emotional and behavioral problems are well-established and well-studied behavioral screening instruments that have proved valid and reliable in many contexts.²¹ In the present study, cut-off points corresponding to the 85th percentile (total score cut-off point of 13 on the parental scale and 9 on the teacher scale) were used as indicators of possible psychiatric disturbance. These cut-off points are widely used in child psychiatric epidemiology.^{16,21} In the present study, the child was considered screen-negative if he or she scored below the cut-off points in both the parent and teacher total Rutter scores. Children who scored above the cut-off points in either the parent or teacher scales were defined as screen-positive.

PSYCHIATRIC OUTCOMES FROM AGE 13 TO 24 YEARS

Psychiatric Hospital Treatment

Information about psychiatric hospital treatment according to the Finnish Hospital Discharge Register was collected from January 1, 1994, to December 31, 2005. The National Research and Development Centre for Welfare and Health in Finland has maintained the Finnish Hospital Discharge Register since 1969.²²

The Finnish Hospital Discharge Register contains personal identification numbers (since 1969), hospital identification codes, and data on length of stay and primary diagnoses at discharge (together with 3 possible subsidiary diagnoses). Diagnostic information in the register is based on clinical diagnoses made by the attending physician. It covers all mental and general hospitals as well as in-patient wards of local health centers, military wards, prison hospitals, and private hospitals. The diagnostic validity of the register concerning psychiatric disorders is good compared with medical records.^{23,24} We identified the subjects in our cohort by linking their unique identification number to information in the Finnish Hospital Discharge Register. The following psychiatric diagnostic codes of the register were chosen as outcomes: the 1994-1995 *International Classification of Diseases, Ninth Revision*, codes 290 to 319 and the 1996-2005 *International Statistical Classification of Diseases, 10th Revision*, codes F00 to F99. Because of the rather limited number of cases with psychiatric discharge diagnoses, it was not sensible to further classify the diagnostic groups for the purpose of the present study. Of males and females, 6.2% and 4.1%, respectively, had undergone psychiatric hospital treatment from age 13 and 24 years.

Psychopharmacologic Treatment

Information about psychotropic medication use from January 1, 1994, to December 31, 2005, was collected from the nationwide Drug Prescription Register filed by the National Social Insurance Institution. This register tracks medication that has been purchased from a pharmacy and is composed of data on 97% to 98% of all reimbursed prescriptions.²⁵ In Finland, the cost of prescription-only medicines deemed necessary for the treatment of an illness is reimbursed by the Health Insurance Institution. Drug purchases were recorded using the date of purchase, and drugs were coded according to the 2000 Anatomic Therapeutic Chemical (ATC) classification system.^{26,27} According to the ATC classification system, the drugs were further classified into (1) antipsychotics (ATC code N05A), (2) antidepressants (ATC code N06A), and (3) benzodiazepine derivatives (ATC code N05BA) (clonazepam was excluded, as it is mainly used to treat epilepsy). The same subject could have been classified as using medication from more than 1 drug group. The global index of having any psychopharmacologic treatment also included mood stabilizers, anti-epileptics (ATC code N03), and dicyprazine, hydroxyzine, buspirone, disulfiram, lithium, and methylphenidate. From age 13 to 24 years, 13.2% of males and 16.7% of females had undergone psychopharmacologic treatment.

Psychiatric Hospital or Psychopharmacologic Treatment

As a global index of psychiatric outcome, information about psychiatric hospital and pharmacologic treatment was pooled. From age 13 to 24 years, 16.6% of males and 17.8% of females had undergone such treatment.

STATISTICAL ANALYSIS

Associations of frequent bullying/victimization and psychiatric symptoms with incidence of mental hospital treatment from age 13 to 24 years were analyzed using Cox proportional hazards regression analysis.²⁸ The time from age 13 years to the first mental medication or hospital treatment before age 24 years was the observed time for end-point event in the analysis. For those who did not have any medication or hospital treatment before age 24 years, the time from age 13 years to age 24 years was recorded as the event time and it was handled as censored

time observation. The strength of the associations were quantified using hazard ratios (HRs) with 95% confidence intervals (CIs). Survival curves were estimated using the Kaplan-Meier technique. Statistical computations were done using SAS, release 9.1 (SAS Institute Inc, Cary, North Carolina).

RESULTS

Altogether, 6.0% of 8-year-old boys were frequently bullies but not victims according to at least 1 informant, whereas 6.4% of boys were frequently victims but not bullies. Among boys, 2.8% were frequently both bullies and victims. Among girls, the rate of frequent victims was 3.6%. However, the percentage of girls who frequently only bullied or were bully-victims was very low, 0.6% and 0.2%, respectively.

CHILDHOOD BULLYING/VICTIMIZATION AND PSYCHIATRIC HOSPITAL TREATMENT AT FOLLOW-UP

As shown in **Table 1**, 17% of the male bully-victim group had undergone psychiatric hospital treatment during follow-up, whereas 9% in the frequent bully-only group, 10% in the frequent victim-only group, and 5% in the reference group (not frequently a bully or victim) had undergone psychiatric hospital treatment during follow-up. Among females, 12% of the frequent victim group had undergone a psychiatric hospital treatment, while 4% in the reference group had undergone a psychiatric hospital treatment. Frequent victim status among both males and females and bully-victim status among males predicted psychiatric hospital treatment. However, when the analyses were adjusted with the total psychopathology score at age 8 years (sum score of symptoms using pooled information from parent and teacher ratings), only female frequent victim status predicted psychiatric hospital treatment

CHILDHOOD BULLYING/VICTIMIZATION AND PSYCHOPHARMACOLOGIC TREATMENT AT FOLLOW-UP

As shown in Table 1, 32% of males in the bully-victim group had psychopharmacologic treatment during follow-up, whereas 18% in the frequent bully-only group, 15% in the frequent victim-only group, and 12% in the reference group had psychopharmacologic treatment during follow-up. Thirty-two percent of females in the frequent victim group and 16% of females in the reference group had undergone psychopharmacologic treatment. In the total sample, sex \times bullying group interactions were significant only for use of anxiolytics ($P < .05$).

Among males in the unadjusted analysis, frequent bully-victim and frequent bully-only statuses predicted use of any psychiatric medication, antidepressants, or anxiolytics. Bully-victim status predicted use of antipsychotics. Frequent victim status did not predict later use of psychiatric medications. However, when the analyses were adjusted with the total psychopathology score, frequent bully and bully-victim statuses did not predict any outcome among males (Table 1). In unadjusted and adjusted analyses among females, frequent victim-only sta-

Table 1. Association Between Frequent Bullying and Victimization at Age 8 Years and First Use of Psychiatric Hospital and Medical Treatment From Age 13 to 24 Years^a

Outcome	No. of Participants	Frequent Victim				Frequent Bully			Frequent Bully-Victim			Not a Frequent Bully or Victim, No. (%) ^e
		No. (%) ^b	HR (95% CI)		No. (%) ^c	HR (95% CI)		No. (%) ^d	HR (95% CI)			
			Unadjusted	Adjusted		Unadjusted	Adjusted		Unadjusted	Adjusted		
Males (n=2541)												
Any psychiatric hospital treatment	158	17 (10.4)	1.9 (1.2-3.2) ^f	1.1 (0.7-1.9)	13 (8.6)	1.6 (0.9-2.8)	0.6 (0.3-1.1)	12 (16.9)	3.3 (1.8-6.1) ^g	0.8 (0.4-1.6)	116 (5.4)	
Any psychopharmacologic treatment	336	24 (14.7)	1.3 (0.8-1.9)	0.9 (0.6-1.4)	28 (18.4)	1.7 (1.1-2.5) ^h	1.0 (0.6-1.6)	23 (32.4)	3.5 (2.3-5.3) ^g	1.6 (0.9-2.7)	261 (12.1)	
Antipsychotics	66	3 (1.8)	1.0 (0.4-2.7)	0.6 (0.2-1.6)	7 (4.6)	1.8 (0.8-4.0)	0.7 (0.3-1.6)	5 (7.0)	2.9 (1.2-7.3) ^h	0.7 (0.2-2.0)	51 (2.4)	
Antidepressants	235	20 (12.3)	1.5 (0.9-2.4)	1.1 (0.7-1.8)	23 (15.1)	1.9 (1.2-2.9) ^f	1.2 (0.7-1.9)	15 (21.1)	2.8 (1.6-4.7) ^g	1.4 (0.7-2.5)	177 (8.2)	
Anxiolytics	116	4 (2.5)	0.7 (0.3-1.7)	0.5 (0.2-1.3)	13 (8.6)	2.0 (1.1-3.5) ^h	1.3 (0.7-2.4)	7 (9.9)	2.4 (1.1-5.1) ^h	1.0 (0.4-2.7)	92 (4.3)	
Females (n=2497)												
Any psychiatric hospital treatment	103	11 (12.4)	3.6 (2.0-6.5) ^g	2.6 (1.4-4.9) ^f	1 (7.1)	1.8 (0.2-12.8)	0.8 (0.1-6.3)	0	NA	NA	91 (3.8)	
Any psychopharmacologic treatment	418	28 (31.5)	2.3 (1.5-3.3) ^g	1.8 (1.2-2.6) ^f	4 (28.6)	2.1 (0.8-5.8)	1.3 (0.5-3.6)	1 (16.7)	1.1 (0.2-7.8)	0.5 (0.1-4.0)	385 (16.1)	
Antipsychotics	49	6 (6.7)	4.3 (2.0-9.0) ^g	3.2 (1.4-7.2) ^f	0	NA	NA	0	NA	NA	43 (1.8)	
Antidepressants	343	21 (23.6)	2.0 (1.3-3.1) ^f	1.6 (1.1-2.5) ^h	4 (28.6)	2.4 (0.9-6.5)	1.6 (0.6-4.3)	1 (16.7)	1.2 (0.2-8.8)	0.7 (0.1-4.8)	317 (13.3)	
Anxiolytics	133	12 (13.5)	3.1 (1.8-5.4) ^g	2.6 (1.4-4.7) ^f	1 (7.1)	1.3 (0.2-9.3)	0.9 (0.1-6.6)	0	NA	NA	120 (5.0)	

Abbreviations: CI, confidence interval; HR, hazard ratio; NA, not applicable because of low numbers.

^aAnalyses were conducted using Cox regression without and with adjustment for total psychopathology score at age 8 years.

^b163 males; 89 females.

^c152 males; 14 females.

^d71 males; 6 females.

^e2155 males; 2388 females.

^f $P < .01$.

^g $P < .001$.

^h $P < .05$.

tus predicted any psychiatric medication, use of antipsychotics, antidepressants, and anxiolytics (Table 1).

PSYCHIATRIC HOSPITAL AND/OR MEDICATION TREATMENT AS GLOBAL OUTCOME INDEX

The **Figure** shows the survival estimates for having psychiatric hospital treatment and/or using psychiatric medication from the age of 13 and 24 years, which was used as a global index for psychiatric outcome. Among males, frequent bully-only (HR, 1.6; 95% CI, 1.1-2.3), frequent victim-only (HR, 1.6; 95% CI, 1.1-2.3), and frequent bully-victim (HR, 3.8; 95% CI, 2.6-5.6) statuses; and among females, frequent victim-only (HR, 2.2; 95% CI, 1.5-3.2) and frequent bully-only (HR, 2.6; 95% CI, 1.1-6.3) statuses predicted this outcome. However, when adjusted with the total psychopathology score at age 8 years, only frequent victim status in females independently predicted this outcome (HR, 1.7; 95% CI, 1.1-2.5).

FREQUENT BULLYING/VICTIMIZATION AND PSYCHIATRIC SYMPTOMS

To identify the outcomes of bullying associated with psychiatric symptoms at baseline, the frequent bully, fre-

quent victim, and bully-victim groups were further classified into screen-positives (above clinical cut-off point on either the Rutter teacher or parental scale) and screen-negatives (below clinical cut-off point on both teacher and parental scale). As **Table 2** shows, male bully-victim status (victim and bully status co-occurring with psychiatric symptoms at age 8 years, ie, screen-positive in parent or teacher ratings) predicted a psychiatric outcome (psychiatric hospital treatment and/or psychiatric medication from the age of 13 to 24 years) when the reference group was screen-negative boys who were not involved in frequent bullying behavior. Of note, almost all bully-victims (97%) were screen-positive at baseline. If the boy was a frequent bully only or frequent victim only but screen-negative, he was not at increased risk of a psychiatric disorder. In paired comparisons, screen-positive bully-victims had a significantly higher risk of psychiatric outcome than screen-positive boys without bullying or victimization (HR, 2.6; 95% CI, 1.6-4.5) and screen-positive boys with bully-only status (HR, 2.4; 95% CI, 1.3-4.6).

Among females, screen-positive and screen-negative frequent victim-only and screen-positive bully-only statuses predicted psychiatric outcomes at follow-up (Table 2). Of 14 girls who were frequent bullies, 10 (71%)

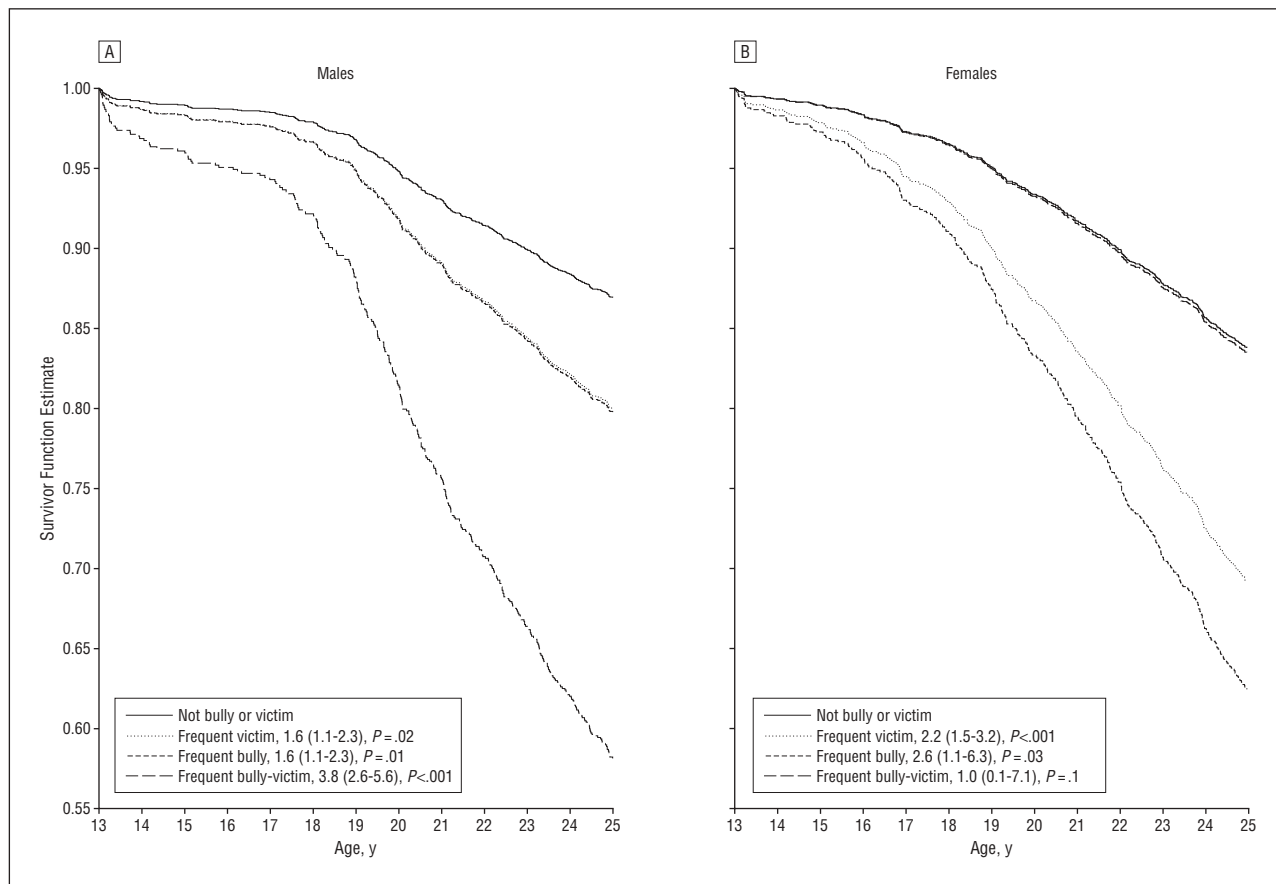


Figure. Estimated survival curves for time to psychiatric hospital or medical treatment. Statistics in the key are hazard ratios (95% confidence intervals) with *P* values.

Table 2. Associations of Frequent Bullying/Victimization and Dichotomized Psychiatric Symptom Screens With Psychiatric Hospital or Medication Treatment^a

Characteristic	Males (n=2528)			Females (n=2460)		
	No. of Participants	Psychiatric Medication or Hospital Treatment, No. (%)	HR (95% CI)	No. of Participants	Psychiatric Medication or Hospital Treatment, No. (%)	HR (95% CI)
Not frequently a bully or victim and screen-negative	1695	206 (12.5)		2104	346 (16.4)	
Not frequently a bully or victim and screen-positive	450	99 (22.0)	1.8 (1.4-2.4) ^b	250	62 (24.8)	1.7 (1.3-2.3) ^b
Frequently a bully only and screen-negative	31	3 (9.7)	0.9 (0.3-2.7)	4	0	NA
Frequently a bully only and screen-positive	121	28 (23.1)	2.2 (1.5-3.2) ^b	10	5 (50.0)	4.5 (1.9-10.9) ^b
Frequently a victim only and screen-negative	80	8 (10.0)	1.0 (0.5-1.9)	54	19 (35.2)	2.5 (1.6-4.0) ^b
Frequently a victim only and screen-positive	81	24 (29.6)	2.8 (1.8-4.3) ^b	32	9 (28.1)	2.0 (1.1-3.9) ^c
Frequently both a bully and victim and screen-negative	2	0	NA	3	0	NA
Frequently both a bully and victim and screen-positive	68	29 (42.7)	4.7 (3.2-6.9) ^b	2	1 (33.3)	2.3 (0.3-16.6)

Abbreviations: CI, confidence interval; HR, hazard ratio; NA, not applicable.

^aThe reference group was not frequently a bully or victim and screen-negative. Because of pooling together information about bullying and psychopathology, the number of cases is smaller than in Table 1. The analysis was conducted using Cox regression.

^b*P* < .001.

^c*P* < .05.

were screen-positive. Half of those with combined frequent bully-only and screen-positive status had undergone psychiatric hospital or medication treatment at follow-up. In paired comparisons among females, no significant interactions were found.

COMMENT

The present study has several findings that are of major public health significance. First, boys and girls are different in respect to the prevalence and outcome of bul-

lying behavior. Compared with boys, very few girls were frequent bullies or bully-victims. Previous studies have not always accounted for gender in their analysis.^{7,29-31} Second, girls who are frequently victimized are at risk of long-term psychiatric outcome regardless of their psychiatric statuses at baseline. Third, it was male bully-victims who were at greatest risk of a wide range of psychiatric outcomes. This finding adds to previous studies that have indicated that the male bully-victim group is at the highest risk overall.³¹⁻³³

The sex \times bullying interactions were significant only for use of anxiolytics. However, frequent victimization among girls but not among boys predicted psychiatric hospital treatment and use of psychopharmacologic medication when controlled with the effect of baseline psychopathology. Previous research findings indicate that the child's gender is a key variable in both the exposure to types of victimization and its link to later psychiatric problems. Our findings are consistent with previous cross-sectional, longitudinal, and population-based studies showing that victimization is associated with psychopathology, particularly among girls.^{2,34-37}

Young boys often experience more physical victimization, while girls are more prone to relational victimization.^{36,38,39} Therefore, compared with the often direct and observable victimization among boys, girls' victimization is more often indirect and subtle. Exclusion and gossip are especially frequent among girls.^{40,41} Biological factors may also explain the gender differences found in the present study. Stressful life events have been shown to increase vulnerability for depression among individuals with a functional variant in the serotonin transporter gene, and this risk has been found to be particularly high in females.^{42,43} Thus, negative feelings associated with victimization might develop into intense physiological reactions, leading to depression and other forms of psychopathology especially among females. Previous studies have indicated that the impact of being bullied on depression and loneliness is greater for relational victimization than for overt victimization.^{44,45} Future studies should address if the victimization to which girls are exposed is more traumatic than that to which boys are exposed. However, because the severity of the bullying events was not reported, the present study cannot fully address this question.

Among boys, almost half of the bully-victims at age 8 years had undergone either psychiatric hospital treatment or psychiatric medication at follow-up. Our results support previous findings that, among males, bully-victims are the most troubled group.^{8,46} Of note, almost all bully-victims were screen-positive at age 8 years, indicating a strong association between psychopathology and bully-victim status among boys. Very few girls were given the status of bully-victims. A multitude of studies have uncovered significant gender differences in both impulsivity and aggression, especially direct aggression, with boys scoring significantly higher across cultures.⁴⁷⁻⁴⁹

Bully-only status among boys also predicted outcome, though less so than bully-victim status. Our adjusted results also show that bullies with psychiatric symptoms were at elevated risk of later psychiatric outcomes. If the frequent bully did not have a high level of symp-

toms at age 8 years, the results suggest that the primary intervention focus should be regulating behavior at school and enhancing peer relationships. An approach to screening that relies first on identifying frequent bullies, victims, or bully-victims and then conducts a psychiatric screening could be a cost-effective alternative to universal screening for psychiatric problems. However, the screening approach requires second-stage clinical evaluations, effective child mental health services, and efforts to assist families in obtaining help.

Most of the very few girls with bully-only status had comorbid psychiatric symptoms at age 8 years and the low numbers prevent meaningful conclusions drawn from this group. Girls with both frequent bullying and psychiatric problems at age 8 years appeared to be at great risk of a psychiatric outcome. These findings should be interpreted cautiously, given the small number of girls with frequent bullying. Despite the lower prevalence of antisocial behavior among girls, studies of clinically referred samples frequently report that girls show more severe problems than boys,⁵⁰ a pattern known as the gender paradox.^{51,52} This paradox has also been previously described in the bullying literature,^{8,53,54} suggesting that while girls are less likely to be bullies, when they are bullies they have a more severe impairment than their male counterparts. One explanation for this could be that from a young age, girls are expected to control their behavior better than boys. When a girl is incapable of doing so it probably reflects severe psychiatric problems much more than among boys, in whom such behavior is more accepted as part of their everyday lives. Boys and girls who display frequent bullying behavior should be evaluated for possible psychiatric problems, because bullying behaviors in concert with psychiatric symptoms are early markers of risk of psychiatric outcomes.

This is the first population-based study to report a predictive association between bullying behavior as early as age 8 years and psychiatric outcome in adolescence and early adulthood in both males and females. Many previous studies on bullying have not studied boys and girls separately, which has influenced earlier findings. As such, our study has several strengths: a nationwide sample; a low attrition rate; combined information about childhood bullying behavior from parent, teacher, and child self-reports; and the use of national registers. However, several limitations should be considered when interpreting the results. It is very likely that many simultaneous factors that could not be tested in the present study affect the outcome. These factors include rearing practices, maltreatment, and neglect, which are found to be related to being a bully and being victimized⁵⁵⁻⁵⁷ and to both concurrent and future psychopathology. Unfortunately, information about other types of victimization, besides bullying was not gathered.

The prevalence of frequent bullying was rather low. There is a great variation in the prevalence rates of children's involvement in bullying across countries. In a cross-national study of approximately 113 000 students aged 11 to 15 years from 25 countries, involvement in bullying varied from 9% to 54%.⁴⁶ These values include both occasional and frequent bullying behavior, and the age group was older than in the present study. One could argue that

the definition of bullying/victimization was rather strict in the present study. However, previously we showed that parent, teacher, and child reports of frequent bullying independently predicted later psychiatric disorder among males, while informant reports about infrequent bullying showed at most a rather low risk of adverse outcomes.⁵⁸

Furthermore, this study lacks specification of bullying and victimization and whether it was executed by boys or girls. Only bullying in general was asked about, and different types of bullying were not specified (physical aggression, physical bullying, verbal aggression, and social exclusion). Information about bullying was gathered in 1989 at the time when the concept of bullying might have been focused more on a type of aggressive victimization. However, in our 10-year time-trend study, the prevalence of bullying and victimization was rather similar among 8-year-old children born in 1981 and those born in 1991.⁵⁹ Previous findings⁶⁰ suggest that at 8 years of age, children contrast aggressive and nonaggressive scenarios, but do not distinguish clearly between different forms of aggression. Future prospective longitudinal research on bullying and victimization should thus include measures of different forms of bullying, who is the aggressor, whether social support is available, and whether the child sought such support. Previous studies suggest that when girls are victimized by boys it is often related to sexual harassment.^{61,62} Future research addressing gender-related mechanisms related to bullying behavior and its consequences is warranted.

Because of a low number of cases, it was not possible to examine associations between bullying and specific psychiatric discharge diagnosis groups. Furthermore, findings on service use have limitations, since a substantial number of disorders are not treated and some treated cases may not have psychiatric disorders.

Bullying behavior should be considered a marker of the risk of a later psychiatric disorder, which if not treated promptly, might develop into a serious problem for those involved and for society as a whole. Among girls, frequent childhood victimization may predict later psychiatric problems regardless of psychiatric problems at baseline. Developing prevention systems requires a knowledge of the biological, psychological, and social mechanisms involved. As later psychological disorders have been found to be associated with individuals displaying childhood bullying behaviors, there is a need for the integration of mental health services into the school context. It is important to inform policymakers, school professionals, and the public about the potential short-term and long-term consequences of bullying and victimization.

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REFERENCES

1. Olweus D. Bullying/victim problems among schoolchildren: basic facts and effects of a school-based intervention programme. In: Pepler D, Rubin K, eds. *The Development and Treatment of Childhood Aggression*. Hillsdale, NJ: Erlbaum; 1991:411-448.
2. Klomek AB, Marrocco F, Kleinman M, Schonfeld IS, Gould MS. Peer victimization, depression, and suicidality in adolescents. *Suicide Life Threat Behav*. 2008; 38(2):166-180.
3. Nansel TR, Overpeck M, Pilla RS, Ruan WJ, Simons-Morton B, Scheidt P. Bullying behaviors among US youth: prevalence and association with psychosocial adjustment. *JAMA*. 2001;285(16):2094-2100.
4. Rigby K, Cox I, Black G. Cooperativeness and bully/victim problems among Australian school children. *J Soc Psychol*. 1997;137(3):357-368.
5. Baldry AC. Bullying in schools and exposure to domestic violence. *Child Abuse Negl*. 2003;27(7):713-732.
6. Shields A, Cicchetti D. Parental maltreatment and emotion dysregulation as risk factors for bullying and victimization in middle childhood. *J Clin Child Psychol*. 2001;30(3):349-363.
7. Kumpulainen K, Räsänen E. Children involved in bullying at elementary school age: their psychiatric symptoms and deviance in adolescence: an epidemiological sample. *Child Abuse Negl*. 2000;24(12):1567-1577.
8. Kim YS, Leventhal BL, Koh YJ, Hubbard A, Boyce AT. School bullying and youth violence: causes or consequences of psychopathologic behavior? *Arch Gen Psychiatry*. 2006;63(9):1035-1041.
9. Sourander A, Jensen P, Rönning JA, Elonheimo H, Niemelä S, Helenius H, Kumpulainen K, Piha J, Tamminen T, Moilanen I, Almqvist F. Childhood bullies and victims and their risk of criminality in late adolescence. *Arch Pediatr Adolesc Med*. 2007;161(6):546-552.
10. Kumpulainen K, Räsänen E, Henttonen I, Almqvist F, Kresanov K, Linna SL, Moilanen I, Piha J, Puura K, Tamminen T. Bullying and psychiatric symptoms among elementary school-age children. *Child Abuse Negl*. 1998;22(7):705-717.
11. Sourander A, Helstelä L, Helenius H, Piha J. Persistence of bullying from childhood to adolescence: a longitudinal 8-year follow-up study. *Child Abuse Negl*. 2000;24(7):873-881.
12. Olweus D. Bullying at school: long term outcomes for the victims and an effective school-based intervention program. In: Huesmann R, ed. *Aggressive Behaviour: Current Perspectives*. Plenum Series in Social/Clinical Psychology. New York, NY: Plenum Press; 1994.
13. Sourander A, Jensen PS, Rönning JA, Niemelä S, Helenius H, Sillanmäki L, Kumpulainen K, Piha J, Tamminen T, Moilanen I, Almqvist F. What is the early adulthood outcome of boys who bully or are bullied in childhood? the Finnish from a boy to a man study. *Pediatrics*. 2007;120(2):397-404.
14. Ellilä HT, Sourander A, Välimäki M, Warne T, Kaivosoja M. The involuntary treatment of adolescent psychiatric inpatients: a nation-wide survey from Finland. *J Adolesc*. 2008;31(3):407-419.
15. Sourander A, Ellilä H, Välimäki M, Aronen ET. Psychopharmacological treatment of child and adolescent psychiatric inpatients in Finland. *J Child Adolesc Psychopharmacol*. 2002;12(2):147-155.
16. Almqvist F, Ikäheimo K, Kumpulainen K, Tuompo-Johansson E, Linna SL, Puura

- K, Moilanen I, Räsänen E, Tamminen T, Piha J. Design and subjects of a Finnish epidemiological study on psychiatric disorders in childhood. *Eur Child Adolesc Psychiatry*. 1999;8(suppl 4):3-6.
17. Sourander A, Multimäki P, Nikolakaras G, Haavisto A, Ristkari T, Helenius H, Parkkola K, Piha J, Tamminen T, Moilanen I, Kumpulainen K, Almqvist F. Childhood predictors of psychiatric disorders among boys: a prospective community-based follow-up study from age 8 years to early adulthood. *J Am Acad Child Adolesc Psychiatry*. 2005;44(8):756-767.
 18. Sourander A, Elonheimo H, Niemela S, Nuutila AM, Helenius H, Sillanmaki L, Piha J, Tamminen T, Kumpulainen K, Moilenen I, Almqvist F. Childhood predictors of male criminality: a prospective population-based follow-up study from age 8 to late adolescence. *J Am Acad Child Adolesc Psychiatry*. 2006;45(5):578-586.
 19. Rutter M. A children's behaviour questionnaire for completion by teachers: preliminary findings. *J Child Psychol Psychiatry*. 1967;8(1):1-11.
 20. Rutter M, Tizard J, Whitmore K. *Education, Health and Behaviour*. London, England: Longman; 1970.
 21. Elander J, Rutter M. Use and development of the Rutter parents' and teachers' scales. *Int J Methods Psychiatr Res*. 1996;6(2):63-78.
 22. Gissler M, Haukka J. Finnish health and social welfare registers in epidemiological research. *Norsk Epidemiologi*. 2004;14(1):113-120.
 23. Keskimäki I, Aro S. Accuracy of data on diagnoses, procedures and accidents in the Finnish Hospital Discharge Register. *Int J Health Sci*. 1991;2:15-21.
 24. Perälä J, Suvisaari J, Saarni SI, Kuoppasalmi K, Isometsä E, Pirkola S, Partonen T, Tuulio-Henriksson A, Hintikka J, Kieseppä T, Härkänen T, Koskinen S, Lönnqvist J. Lifetime prevalence of psychotic and bipolar I disorders in a general population. *Arch Gen Psychiatry*. 2007;64(1):19-28.
 25. National Social Insurance Institution. Statistical Yearbook of the Social Insurance Institution. http://www.kela.fi/it/kelasto/kelasto.nsf/alias/Vk_06_pdf/. Accessed June 2, 2008.
 26. Pahor M, Chrischilles EA, Guralnik JM, Brown SL, Wallace RB, Carbonin P. Drug data coding and analysis in epidemiologic studies. *Eur J Epidemiol*. 1994;10(4):405-411.
 27. World Health Organization guidelines for ATC classification for DDD assignment. WHO Collaboration Centre for Drug Statistics Methodology. <http://www.whooc.no/atcddd/indexdatabase>. Accessed June 2, 2008.
 28. Hoshmer DW, Lemeshow S. *Applied Survival Analysis, Regression Modeling of Time to Event Data*. New York, NY: John Wiley & Sons, Inc; 1999.
 29. Camodeca M, Goossens FA. Aggression, social cognitions, anger and sadness in bullies and victims. *J Child Psychol Psychiatry*. 2005;46(2):186-197.
 30. Fekkes M, Pijpers FI, Verloove-Vanhorick SP. Bullying behavior and associations with psychosomatic complaints and depression in victims. *J Pediatr*. 2004;144(1):17-22.
 31. Juvonen J, Graham S, Schuster MA. Bullying among young adolescents: the strong, the weak, and the troubled. *Pediatrics*. 2003;112(6, pt 1):1231-1237.
 32. Austin S, Joseph S. Assessment of bully/victim problems in 8- to 11-year-olds. *Br J Educ Psychol*. 1996;66(pt 4):447-456.
 33. Kaltiala-Heino R, Rimpelä M, Marttunen M, Rimpelä A, Rantanen P. Bullying, depression, and suicidal ideation in Finnish adolescents: school survey. *BMJ*. 1999;319(7206):348-351.
 34. Arseneault L, Walsh E, Trzesniewski K, Newcombe R, Caspi A, Moffitt TE. Bullying victimization uniquely contributes to adjustment problems in young children: a nationally representative cohort study. *Pediatrics*. 2006;118(1):130-138.
 35. Bond L, Carlin JB, Thomas L, Rubin K, Patton G. Does bullying cause emotional problems? a prospective study of young teenagers. *BMJ*. 2001;323(7311):480-484.
 36. Crick NR, Bigbee MA. Relational and overt forms of peer victimization: a multi-informant approach. *J Consult Clin Psychol*. 1998;66(2):337-347.
 37. Kim YS, Koh YJ, Leventhal B. School bullying and suicidal risk in Korean middle school students. *Pediatrics*. 2005;115(2):357-363.
 38. Cullerton-Sen C, Crick NR. Understanding the effects of physical and relational victimization: the utility of multiple perspectives in predicting social-emotional adjustment. *School Psych Rev*. 2005;34(2):147-160.
 39. Schäfer M, Werner NE, Crick NR. A comparison of two approaches to the study of negative peer treatment: general victimization and bully/victim problems among German school children. *Br J Dev Psychol*. 2002;20(2):281-306.
 40. Crick NR, Casas JF, Nelson DA. Toward a more comprehensive understanding of peer maltreatment: studies of relational victimization. *Curr Dir Psychol Sci*. 2002;11(3):98-101.
 41. Owens L, Shute R, Slee P. "Guess what I just heard!" indirect aggression among teenage girls in Australia. *Aggress Behav*. 2000;26(1):67-83.
 42. Caspi A, Sugden K, Moffitt TE, Taylor A, Craig IW, Harrington H, McClay J, Mill J, Martin J, Braithwaite A, Poulton R. Influence of life stress on depression: moderation by a polymorphism in the 5-HTT gene. *Science*. 2003;301(5631):386-389.
 43. Kendler KS, Kuhn JW, Vittum J, Prescott CA, Riley B. The Interaction of stressful life events and a serotonin transporter polymorphism in the prediction of episodes of major depression: a replication. *Arch Gen Psychiatry*. 2005;62(5):529-535.
 44. Crick NR, Grotpeter JK. Children's treatment by peers: victims of relational and overt aggression. *Dev Psychopathol*. 1996;8(2):367-380.
 45. van der Wal MF, de Wit CA, Hirasang RA. Psychosocial health among young victims and offenders of direct and indirect bullying. *Pediatrics*. 2003;111(6, pt 1):1312-1317.
 46. Nansel TR, Craig W, Overpeck MD, Saluja G, Ruan WJ; Health Behaviour in School-aged Children Bullying Analyses Working Group. Cross-national consistency in the relationship between bullying behaviors and psychosocial adjustment. *Arch Pediatr Adolesc Med*. 2004;158(8):730-736.
 47. Archer J. Sex differences in aggression in real-world settings: a meta-analytic review. *Rev Gen Psychol*. 2004;8(4):291-322.
 48. Caspi A, Moffitt TE, Silva PA, Stouthamer-Loeber M, Krueger RF, Schmutte PS. Are some people crime-prone? replication of the personality-crime relationship across countries, genders, races and methods. *Criminology*. 1994;32(2):163-195.
 49. Côté S, Tremblay RE, Nagin D, Zoccolillo M, Vitaro F. The development of impulsivity, fearfulness, and helpfulness during childhood: patterns of consistency and change in the trajectories of boys and girls. *J Child Psychol Psychiatry*. 2002;43(5):609-618.
 50. Silverthorn P, Frick PJ. Developmental pathways to antisocial behaviour: the delayed-onset pathway in girls. *Dev Psychopathol*. 1999;11(1):101-126.
 51. Loeber R, Keenan K. Interaction between conduct disorder and its comorbid conditions: effects of age and gender. *Clin Psychol Rev*. 1994;14(6):497-523.
 52. Tiet QQ, Wasserman GA, Loeber R, McReynolds LS, Miller LS. Developmental and sex differences in types of conduct problems. *J Child Fam Stud*. 2001;10(2):181-197.
 53. Brunstein Klomek A, Marrocco F, Kleinman M, Schonfeld IS, Gould MS. Bullying, depression, and suicidality in adolescents. *J Am Acad Child Adolesc Psychiatry*. 2007;46(1):40-49.
 54. Prinstein MJ, Boergers J, Vernberg EM. Overt and relational aggression in adolescents: social-psychological adjustment of aggressors and victims. *J Clin Child Psychol*. 2001;30(4):479-491.
 55. Ladd GW, Ladd BK. Parenting behaviors and parent-child relationships: correlates of peer victimization in kindergarten? *Dev Psychol*. 1998;34(6):1450-1458.
 56. Bowers L, Smith PK, Binney V. Perceived family relationships of bullies, victims and bully/victims in middle childhood. *J Soc Pers Relat*. 1994;11(2):215-232.
 57. Carney AG, Merrell KW. Bullying in schools: perspectives on understanding and preventing an international problem. *Sch Psychol Int*. 2001;22(3):364-382.
 58. Ronning JA, Sourander A, Kumpulainen K, Tamminen T, Niemelä S, Moilanen I, Helenius H, Piha J, Almqvist F. Cross-informant agreement about bullying and victimization among eight-year-olds: whose information best predicts psychiatric caseness 10-15 years later? *Soc Psychiatry Psychiatr Epidemiol*. 2009;44(1):15-22.
 59. Santalahti P, Sourander A, Aromaa M, Helenius H, Ikäheimo K, Piha J. Victimization and bullying among 8-year-old Finnish children: a 10-year comparison of rates. *Eur Child Adolesc Psychiatry*. 2008;17(8):463-472.
 60. Smith PK, Cowie H, Olafsson RF, Liefvooghe APD, Almeida A, Araki H, del Barrio C, Costabile A, Dekleva B, Houndoumadi A, Kim K, Olafsson RP, Ortega R, Pain J, Pateraki L, Schafer M, Singer M, Smorti A, Toda Y, Tomasson H, Wenxin Z. Definitions of bullying: a comparison of terms used, and age and gender differences, in a fourteen-country international comparison. *Child Dev*. 2002;73(4):1119-1133.
 61. Felix ED, McMahon SD. Gender and multiple forms of peer victimization: how do they influence adolescent psychosocial adjustment? *Violence Vict*. 2006;21(6):707-724.
 62. McMaster LE, Connolly J, Pepler D, Craig WM. Peer to peer sexual harassment in early adolescence: a developmental perspective. *Dev Psychopathol*. 2002;14(1):91-105.