

Adult Health Outcomes of Childhood Bullying Victimization: Evidence From a Five-Decade Longitudinal British Birth Cohort

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Objective: The authors examined midlife outcomes of childhood bullying victimization.

Method: Data were from the British National Child Development Study, a 50-year prospective cohort of births in 1 week in 1958. The authors conducted ordinal logistic and linear regressions on data from 7,771 participants whose parents reported bullying exposure at ages 7 and 11 years, and who participated in follow-up assessments between ages 23 and 50 years. Outcomes included suicidality and diagnoses of depression, anxiety disorders, and alcohol dependence at age 45; psychological distress and general health at ages 23 and 50; and cognitive functioning, socioeconomic status, social relationships, and well-being at age 50.

Results: Participants who were bullied in childhood had increased levels of psychological distress at ages 23 and 50. Victims of frequent bullying had higher rates of depression (odds ratio=1.95, 95%

CI=1.27–2.99), anxiety disorders (odds ratio=1.65, 95% CI=1.25–2.18), and suicidality (odds ratio=2.21, 95% CI=1.47–3.31) than their nonvictimized peers. The effects were similar to those of being placed in public or substitute care and an index of multiple childhood adversities, and the effects remained significant after controlling for known correlates of bullying victimization. Childhood bullying victimization was associated with a lack of social relationships, economic hardship, and poor perceived quality of life at age 50.

Conclusions: Children who are bullied—and especially those who are frequently bullied—continue to be at risk for a wide range of poor social, health, and economic outcomes nearly four decades after exposure. Interventions need to reduce bullying exposure in childhood and minimize long-term effects on victims' well-being; such interventions should cast light on causal processes.

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Increasing evidence now confirms that being a target of bullying in childhood jeopardizes young victims' well-being and contributes to the development of mental health problems early in life (1). Not only do victims of bullying have elevated symptoms of anxiety and depression in childhood and adolescence, they also show increased rates of self-harm (2, 3), suicidal thoughts and suicide attempts (4), and psychotic symptoms (5, 6). Bullying victimization is associated with poor child outcomes net of the effects of prior adjustment problems, and also of genetic and family confounds (7), indicating an environmentally mediated effect on the development of mental health problems in childhood. As a result, victimization by bullies is increasingly considered alongside maltreatment and neglect as a form of childhood abuse (8).

To date, however, relatively little is known about the long-term impact of bullying, as few studies with measures of bullying victimization in childhood have traced participants to adult life. A prospective nationwide birth cohort study from Finland (9) revealed that girls who were frequent victims of childhood bullying had increased rates of suicide attempts and completed suicides up to age 25,

and were more likely to have received psychiatric hospital treatment and to have used psychiatric medications (10). For male participants, young victims had increased levels of anxiety disorders between ages 18 and 23 years (11) and increased risks of heavy smoking, but not of frequent drunkenness, when they reached age 18 (12). Data on young adult outcomes in these studies were gathered from army registries and hospital records, so may underestimate overall levels of distress. This limitation was recently addressed in a population-based study from the United States (13) that used prospective measures of bullying between ages 9 and 16 years and repeated measures of psychiatric outcomes to age 25. Victims of bullying, and especially victims who also bullied others, had elevated rates of depression and anxiety disorders in early adulthood. They were not, however, at increased risk for anti-social personality or substance use disorders.

To our knowledge, no study so far has examined whether the adverse effects of bullying persist beyond the early adult years. To extend previous findings to midlife, and also to other domains of adult functioning, we investigated the outcomes of childhood bullying victimization using data

from a 50-year prospective follow-up of a British birth cohort. We tested associations between being bullied at ages 7 and 11 and psychological distress and general health in both early adulthood (at age 23) and again in midlife (age 50). We also examined associations between childhood bullying and midlife psychiatric diagnoses at age 45 and cognitive functioning at age 50. In addition, to gain a more comprehensive picture of midlife functioning, we investigated socioeconomic outcomes, social relationships, and well-being at age 50. All analyses were controlled for a series of childhood confounders known to be associated with bullying. Finally, to gain a comparative perspective on the strength of the associations between bullying victimization and adult outcomes, we compared the estimated effects of bullying with the effects on adult outcomes associated with exposure to other forms of childhood adversity.

Method

Participants

Data were from the National Child Development Study, the 1958 British Birth Cohort study (14). Information was collected on 98% of all births during 1 week in 1958 in England, Scotland, and Wales (17,638 participants). Subsequent follow-ups took place at ages 7, 11, and 16 years in childhood, and at ages 23, 33, 42, 45, and 50 years in adult life. During the childhood surveys, the sample was augmented by 920 immigrants to the United Kingdom who were born in the study week, for a total of 18,558 cohort members. We report on data from the childhood contacts at ages 7 and 11 and the adult follow-up contacts at ages 23, 45, and 50. After complete description of the study was given to the participants, written informed consent was obtained for the clinical interview at age 45. Ethical approval was given by the South East Multi-Centre Research Ethics Committee.

Assessment of Bullying

Exposure to bullying was assessed using parental interviews when participants were 7 and 11 years old. At each age, parents were asked if their child was bullied by other children never, sometimes, or frequently. We combined responses from both interviews (N=11,872) to create a three-level indicator of exposure to childhood bullying: 0=never bullied (never at both 7 and 11 years); 1=occasionally bullied (sometimes at either age); and 2=frequently bullied (frequently at either age or sometimes at both ages). Where only one parental interview was available (N=2,511 at age 7; N=1,563 at age 11), responses from that interview were used, providing bullying assessments on 86% of cohort members.

Reports of bullying victimization from mothers and children have been shown to be similarly associated with emotional and behavioral problems (15). Although agreement between informants is typically low (16, 17), this suggests that both informants provide a unique and meaningful perspective on bullying victimization.

Childhood Confounders

Childhood IQ was assessed at age 11 using a standardized 80-item general ability test (18). Scales of childhood internalizing and externalizing behavior problems were derived from teacher ratings on the Bristol Social Adjustment Guides (19) (precursors to more recent behavior ratings) at ages 7 and 11. These scales

show adequate reliability and predict psychiatric morbidity in adult life (20). We used the mean of scores across ages 7 and 11 where both measures were available (N=12,781), and single-age measures for the remainder of the sample (N=3,522). Family social class in childhood was classified on the basis of the father's occupation when the child was 7 years old, categorized as professional/managerial/technical, other skilled nonmanual, skilled manual, and unskilled manual (21). Childhood adversity was assessed from both prospective and retrospective reports. Prospectively, parents and caretakers reported at the age-11 contact whether the child had ever been in the care of the local authority or a voluntary agency. In addition, information collected from parents and teachers was used to create an 8-item scale of low parental involvement, including indicators of the child's physical appearance and the parents' activities with the child at ages 7 and 11 (22). Retrospectively at age 45, participants completed a 16-item questionnaire about their exposure to a range of childhood adversities including poverty; parental mental health, drug, or alcohol problems; family conflict; and physical and sexual abuse (23). We grouped responses into those reporting none (47%), one (25%), and two or more adversities (28%).

Adult Outcomes

Psychological distress at ages 23 and 50 was measured by a 9-item version of the Malaise Inventory, a widely used measure of low mood with demonstrated validity in this sample (24). Internal reliability was acceptable at both ages (age 23, $\alpha=0.70$; age 50, $\alpha=0.79$). Depressive and anxiety disorders (past week) were assessed at age 45 using the depression and anxiety modules of the Revised Clinical Interview Schedule (25), administered by trained research nurses using computer-assisted personal interviewing as part of a clinical examination in the participants' homes. Diagnoses were derived according to standard algorithms for ICD-10 diagnoses. We used summary measures of 1) depressive disorders (mild, moderate, and severe); 2) any anxiety disorders (including generalized anxiety disorder, specific and social phobias, panic disorder, and agoraphobia); and 3) any anxiety or depressive disorders. The age-45 assessments also included questions on suicidal thoughts and plans, and the AUDIT (26), a 10-item screening questionnaire designed by the World Health Organization, was used to identify mild alcohol dependence. Participants rated their general health (27) at ages 23 and 50 from excellent (a score of 1 at age 23 and 50) to poor (a score of 4 at age 23 and a score of 5 at age 50). To facilitate comparisons across age, we standardized both scales. The age-50 interviews also included tests of cognitive function, including word recall tasks in which participants were read a list of 10 common words (e.g., child, book, and tree) and asked to recall them immediately and after 5 minutes (28). We used results from the delayed recall task (range=0–10). We excluded from the analyses any participants where the presence of others at the time of testing or other contextual factors could have impaired performance (N=523).

Data from the age-50 interviews also provided a range of socio-demographic indicators at midlife, including 1) highest educational qualifications (1=no academic qualifications; 2=O-A levels; 3=diplomas, teaching, and nursing qualifications; 4=degree level and higher academic qualifications); 2) current partnership status (living with a partner or alone); 3) current employment status (employed or unemployed) for participants in the labor market (i.e., excluding individuals in full-time education or economically inactive); and 4) current weekly net pay in pounds sterling. Participants reported on how often they had seen friends in the past 2 weeks (1=not at all; 4=more than six times), and rated the social support available to them (1=not at all; 4=a great deal) on scenarios (e.g., "If you were sick in bed how much could you count on the people around you to help out?"). Participants also

completed a 12-item version of the CASP quality of life scale (higher scores indicating higher well-being) (29) and two 11-point ratings of life satisfaction, the first relating to satisfaction “with the way life has turned out so far,” and the second relating to “...how [satisfied] you expect to be in 10 years’ time.”

Attrition

Sample retention in childhood was high (92% at ages 7 and 11) (14). Retention rates were somewhat lower in adulthood, with data available on 76% of participants eligible for follow-up at age 23, 78% at age 45, and 61% at age 50. We took a conservative approach and reported on 7,771 cohort members with complete data on bullying victimization at ages 7 and 11 and psychological distress at ages 23 and 50. Data availability was unrelated to exposure to childhood bullying (see Table S1 in the data supplement that accompanies the online edition of this article), but was predicted by male gender, low IQ, low childhood social class, low parental involvement, and childhood internalizing and externalizing problems. We derived inverse probability weights (30) from a logistic regression analysis predicting availability of complete data on childhood bullying and psychological distress at ages 23 and 50, including the variables listed above. We included these weights in all analyses.

Statistical Analyses

We examined associations between bullying victimization and concurrent childhood characteristics using analysis of variance and ordinal logistic regressions. We used ordinal logistic regression analyses to test associations between childhood bullying victimization and adult health outcomes, and to compare effects with exposure to other childhood adversities. To test their robustness, all analyses were adjusted for the childhood confounders listed above as covariates. We conducted further ordinal logistic and linear regression analyses to examine associations between bullying victimization and adult indices of socioeconomic status, social relationships, and quality of life, again controlling for confounders. We used robust variance (sandwich-type) estimates to adjust the standard errors of the parameter estimates for the sampling weights applied to observations. All analyses were conducted in STATA, version 11.2 (31).

Results

Childhood Bullying Victimization

Consistent with contemporary findings, childhood bullying was relatively common in this 1950s cohort; just over one-quarter of children (28%) had been exposed to occasional bullying and 15% had been frequently bullied. Correlates of bullying victimization were also similar to those reported in more recent cohorts (Table 1). Being bullied in childhood was associated with being male and having parents in manual occupations, with low parental involvement and being placed in public or substitute care, and with retrospective reports of experiencing two or more childhood adversities. In addition, children who had been bullied had lower IQ scores and higher rates of both internalizing and externalizing problems in childhood than their nonvictimized peers.

Childhood Bullying Victimization and Adult Health Outcomes

Bullying victimization was associated with poorer health outcomes in adult life (Table 2). Being bullied (occasionally

or frequently) was associated with higher levels of psychological distress at age 23 and also at age 50, almost 40 years after exposure. Being frequently bullied was associated with an increased risk of both depression and anxiety disorders at age 45, and also with suicidality. Children who were occasionally bullied were at increased risk of depression. By contrast, bullied children did not show elevated rates of midlife alcohol dependence. The increased risks of adult mental health problems among bullied children were similar in magnitude to those risks faced by participants who had been placed in public or substitute care in childhood or who reported multiple childhood adversities (Table 2). Being bullied in childhood was also associated with self-ratings of poor general health at ages 23 and 50, and with poor cognitive functioning at age 50 (Table 2).

Bullying victimization remained associated with adult health outcomes after adjustment for the confounding effects of childhood IQ, parents’ socioeconomic status, low parental involvement, and both internalizing and externalizing problems in childhood (Table 3). Furthermore, these associations with mental health outcomes at age 45 were robust to simultaneous controls for all childhood confounders, and also to further adjustment for placement in public or substitute care and childhood adversities (Table 3).

Childhood Bullying Victimization and Adult Socioeconomic Outcomes, Relationships, and Well-Being

The impact of bullying victimization was not limited to indicators of adult health. Children who were frequently bullied had lower educational levels at midlife, and men in the labor market were more likely to be unemployed and to earn less than their peers (Table 4). Social relationships in adulthood were affected too; children who were bullied were at increased risk of living without a spouse or partner at age 50, were less likely to have met up with friends in the recent past, and were less likely to have access to social support if they were sick. Bullying victimization also affected adult well-being; being bullied was associated with lower perceived quality of life at age 50 and lower satisfaction with life so far. Cohort members who had been frequently bullied also anticipated less life satisfaction in the years to come. When controlling for childhood confounders, bullying victimization became marginally associated with unemployment (for men), net pay (for men), and meeting friends in the last 2 weeks. All other associations remained significant.

Discussion

Dan Olweus (32) was the first to examine the lasting effects of bullying, demonstrating that young male victims were more depressed and had lower self-esteem in early adulthood than their nonbullied peers. Twenty years later, our study, using data from a large prospective British birth cohort, shows that being bullied in childhood retains

TABLE 1. Associations Between Being Bullied and Demographic Characteristics in Childhood^a

Childhood characteristic	Bullied at Ages 7 and 11 Years						Group Difference	
	Never (N=4,557)		Occasionally (N=2,128)		Frequently (N=1,086)		χ^2 (df=3)	p
	N	%	N	%	N	%		
Parents' social class							49.17	<0.001
Professional/managerial	1,120	21.7	418	16.8	174	14.3		
Skilled nonmanual	480	9.8	240	10.3	91	7.6		
Skilled manual	1,906	43.8	905	43.6	517	47.8		
Semiskilled/unskilled manual	1,023	24.7	559	29.3	304	30.2		
Number of childhood adversities							41.05	<0.001
0	1,901	47.3	777	41.8	364	39.0		
1	988	24.9	453	25.0	235	25.8		
2 or more	1,071	27.8	568	33.2	324	35.2		
Placement in public or substitute care	99	2.4	65	3.4	40	4.1	7.91	0.048
	Mean	SD	Mean	SD	Mean	SD	F	p
Low parental involvement	1.0	1.3	1.3	1.5	1.4	1.6	33.16	<0.001
Childhood IQ ^b	44.7	15.0	41.9	15.5	40.2	15.4	44.08	<0.001
Internalizing problems	1.9	0.0	2.0	0.9	2.2	0.9	58.79	<0.001
Externalizing problems	1.9	0.9	2.0	0.9	2.1	1.0	18.96	<0.001

^a We report unweighted N values but weighted percentages, means, and standard deviations. All group differences were adjusted for gender. Childhood adversity included poverty, parental mental health and drug/alcohol problems, family conflict, and physical and sexual abuse.

^b There was a significant gender by being bullied status interaction for childhood IQ only. Group differences were significant for males (F=12.1, p<0.001) but were stronger for females (F=37.4, p<0.001).

TABLE 2. Associations Between Adverse Experiences in Childhood and Adult Health Outcomes^a

Adult Health Outcomes	Bullied at Ages 7 and 11				Placement in Public or Substitute Care (N=204)		Childhood Adversity			
	Occasionally (N=2,128)		Frequently (N=1,086)		Odds Ratio	95% CI	1 Adversity (N=1,676)		≥2 Adversities (N=1,963)	
	Odds Ratio	95% CI	Odds Ratio	95% CI			Odds Ratio	95% CI	Odds Ratio	(95% CI)
Psychological distress at age 23 ^b	1.51	1.37–1.68	1.82	1.60–2.08	1.41	1.07–1.85	1.30	1.15–1.47	2.14	1.91–2.40
Psychological distress at age 50	1.39	1.26–1.54	1.49	1.30–1.70	1.59	1.17–2.15	1.33	1.19–1.50	2.45	2.18–2.74
Psychiatric outcomes at age 45										
Depression or anxiety disorders	1.25	1.01–1.55	1.75	1.37–2.24	1.48	0.91–2.42	1.32	0.99–1.76	3.60	2.87–4.53
Depression	1.71	1.19–2.47	1.95	1.27–2.99	2.14	1.03–4.45	1.18	0.70–1.98	3.72	2.48–5.58
Any anxiety disorders	1.14	0.89–1.47	1.65	1.25–2.18	1.34	0.76–2.36	1.32	0.95–1.84	3.48	2.69–4.51
Suicidality	1.45	0.99–2.12	2.21	1.47–3.31	3.25	1.82–5.81	1.74	1.05–2.89	4.02	2.65–6.10
Alcohol dependence	1.00	0.67–1.48	1.13	0.71–1.81	1.40	0.55–3.58	1.37	0.84–2.23	2.80	1.88–4.17
General health at age 23 (z score)	1.33	1.19–1.48	1.47	1.28–1.69	1.59	1.15–2.18	1.16	1.02–1.31	1.29	1.15–1.46
General health at age 50 (z score)	1.33	1.20–1.47	1.63	1.43–1.85	1.94	1.43–2.62	1.24	1.10–1.39	1.57	1.40–1.75
Cognitive functioning at age 50 ^c	0.81	0.73–0.90	0.70	0.61–0.90	0.68	0.53–0.88	1.05	0.94–1.18	0.99	0.89–1.11

^a Significant findings are reported in bold. We reported unweighted N values but weighted odds ratios. All estimates of associations controlled for gender.

^b There was a significant gender by being bullied status interaction for psychological distress at age 23 only. The estimates of associations with being bullied status were significant in males (occasionally bullied: odds ratio=1.51, 95% CI=1.29–1.76; frequently bullied: odds ratio=1.61, 95% CI=1.33–1.95) but were stronger in females (occasionally bullied, odds ratio=1.51, 95% CI=1.32–1.74; frequently bullied: odds ratio=2.07, 95% CI=1.73–2.48).

^c Estimates of association with cognitive functioning adjusted for the time of day at testing (am/pm/evening), the mode of administration (computer voice/interviewer), and word list (a/b/c/d). We excluded from the analyses any participants where the presence of others at the time of testing or other contextual factors could have impaired performance (N=523).

TABLE 3. Associations Between Being Bullied in Childhood and Adult Mental Health Outcomes Controlling for Confounders^a

Mental Health Outcomes	Controlling For All Childhood Confounders ^b		All Childhood Confounders Plus Placement in Public or Substitute Care and Childhood Adversity ^b	
	Odds Ratio	95% CI	Odds Ratio	95% CI
Psychological distress at age 23				
Bullied occasionally	1.38	1.24–1.53	1.38	1.23–1.55
Bullied frequently	1.57	1.37–1.80	1.51	1.30–1.75
Psychological distress at age 50				
Bullied occasionally	1.33	1.20–1.47	1.29	1.15–1.44
Bullied frequently	1.37	1.19–1.56	1.28	1.11–1.48
Depression or anxiety disorders at age 45				
Bullied occasionally	1.14	0.91–1.42	1.10	0.88–1.38
Bullied frequently	1.50	1.16–1.93	1.40	1.08–1.80
Depression at age 45				
Bullied occasionally	1.56	1.08–2.24	1.52	1.05–2.19
Bullied frequently	1.65	1.07–2.54	1.54	1.00–2.39
Any anxiety disorders at age 45				
Bullied occasionally	1.05	0.81–1.35	1.01	0.78–1.31
Bullied frequently	1.42	1.06–1.89	1.34	1.01–1.80
Suicidality at age 45				
Bullied occasionally	1.23	0.83–1.81	1.19	0.81–1.77
Bullied frequently	1.66	1.09–2.52	1.57	1.02–2.39

^a Significant findings are reported in bold. All estimates of associations controlled for gender and factors as stated above. See Table S3 in the online data supplement for estimates of associations controlling for each childhood confounder separately.

^b Confounders include childhood IQ, parental social class, low parental involvement, and internalizing and externalizing problems. Childhood adversity included poverty, parental mental health and drug/alcohol problems, family conflict, and physical and sexual abuse.

associations with poor mental, physical, and cognitive health outcomes at least to middle adulthood, 40 years after exposure. The effects were small but similar to those of other forms of childhood hardship, and the effects remained significant after adjusting for established correlates of bullying victimization, including both internalizing and externalizing problems in childhood and exposure to other forms of early adversity. In addition, we observed that bullying victimization was also associated with poor social relationships, economic difficulties, and lower perceived quality of life in the middle adult years. Forty years after exposure, individuals who had been bullied in childhood continued to show persistent and pervasive negative sequelae.

Three findings deserve particular mention. First, estimates of the associations between bullying victimization and adult outcomes were small but robust to adjustment for a number of key confounders. The strength of the associations we observed—with most odds ratios in the region of 1.5—likely reflects the four decades that separated exposure to bullying and the assessments of later outcomes. The findings are compelling in showing that the independent contribution of bullying victimization survives the tests of time and confounding. It is unlikely, of course, that bullying operates in isolation to create such lifelong adversities. Future studies should examine bullying victimization in the context of other forms of childhood abuse and identify pathways leading to poor adult outcomes.

Second, the longitudinal associations between bullying victimization and adult outcomes were similar to those

of placement in public or substitute care or exposure to multiple adversities within the family. The long-term effects of these forms of childhood adversity have been extensively documented (33). Our findings suggest that bullying leaves similar long-term traces that are still evident well into the adult years.

Third, the impact of bullying victimization is pervasive, affecting many spheres of a victim's life. This study is among the first to show that being bullied in childhood influences not only victims' mental health but also social and economic outcomes. Findings from the Great Smoky Mountains Study demonstrated that childhood bullying victimization was associated with variations in health, wealth, and social relationships at age 25 (34). In addition, our findings indicate that bullying also influenced later cognitive functioning, over and above controls for childhood IQ. The mechanisms underlying this association remain to be clarified. On the one hand, it could mirror links between maltreatment and cognitive problems observed in other studies in childhood (35). On the other, it is possible that bullying victimization contributes to early aging, as found in research on telomere shortening that is contingent on other forms of abuse (36, 37). Interestingly, like Copeland et al. (13), we found that bullying victimization was not associated with increased risks of adult alcohol dependence in the National Child Development Study cohort. Developmental pathways to alcohol problems start in the teenage years, and often involve peer influences, something that young victims of bullying may be less exposed to given their difficulties with peers.

TABLE 4. Associations Between Being Bullied in Childhood and Midlife Socioeconomic Status, Social Relationships, and Quality of Life^a

Midlife Outcomes	Bullied at Ages 7 and 11 Years ^a						Estimates of Associations			
	Never (N=4,557)		Occasionally (N=2,128)		Frequently (N=1,086)		Occasionally Bullied		Frequently Bullied	
	N	%	N	%	N	%	Odds Ratio	95% CI	Odds Ratio	95% CI
Socioeconomic Status at Age 50										
Highest qualification							1.00	0.90–1.12	0.81	0.71–0.93
No academic qualification	658	16.8	376	20.6	272	28.7				
O-A level	2,267	51.3	1,071	51.9	510	46.7				
Diploma/teaching/nursing	656	13.5	275	11.7	130	10.8				
Higher degree	976	18.4	406	15.8	174	13.8				
Unemployment^b										
Men	61	3.1	34	3.5	26	5.7	0.98	0.61–1.57	0.62 ^c	0.37–1.03
Women	37	1.9	16	2.3	8	1.6	0.94	0.51–1.73	1.48	0.59–3.74
	Mean	SD	Mean	SD	Mean	SD	beta	95% CI	beta	95% CI
Net pay (£ per week)^b										
Men	333.9	377.0	317.4	340.4	281.9	336.0	-1.13	-27.1 to 24.9	-27.2 ^c	-59.3 to 4.94
Women	203.1	217.4	195.7	202.7	172.2	167.5	4.88	-10.2 to 19.9	-10.3	-27.5 to 6.91
	N	%	N	%	N	%	Odds Ratio	95% CI	Odds Ratio	95% CI
Social Relationships at Age 50										
Living with a partner	3,718	81.4	1,679	78.6	830	75.5	0.88 ^c	0.76–1.01	0.76	0.64–0.90
Met friends in last 2 weeks							0.92	0.83–1.02	0.89 ^c	0.78–1.01
Not at all	758	16.7	395	19.0	204	18.8				
Once or twice	2,098	45.8	983	45.0	511	47.2				
More than three times	1,701	37.5	750	35.9	371	34.0				
Social support when sick in bed							0.87	0.76–0.99	0.74	0.62–0.87
Not at all	78	1.7	36	1.7	25	2.3				
A little	311	6.8	149	7.2	95	9.1				
Somewhat	537	22.0	290	13.6	157	13.9				
A great deal	3,628	80.5	1,652	77.5	808	74.6				
	Mean	SD	Mean	SD	Mean	SD	Odds Ratio	95% CI	Odds Ratio	95% CI
Quality of Life at Age 50^d										
Quality of life	26.5	5.6	25.6	5.8	25.3	6.0	0.80	0.72–0.89	0.73	0.64–0.84
Life satisfaction, so far	7.39	1.77	7.23	1.91	7.03	1.98	0.91 ^c	0.82–1.01	0.77	0.68–0.88
Expected life satisfaction, 10 years later	7.74	1.74	7.64	1.86	7.45	2.00	0.98	0.88–1.08	0.86	0.75–0.99

^a We report unweighted N values but weighted percentages, means, and standard deviations. Significant findings are reported in bold. All estimates of associations were adjusted for gender and all childhood confounders, except for unemployment and net pay (minus gender factor).

^b We included in this analysis only participants in the labor market, excluding all others enrolled in full-time education or economically inactive (housework, sick, disability, long holiday, etc.). Male, N=3,488; Female, N=3,379.

^c Significant at trend level ($p < 0.10$).

^d Each item on the quality of life scale were positively worded and rated from 1=often to 4=never. Life satisfaction, so far and later, was rated from 0=completely dissatisfied to 10=completely satisfied.

The developmental mechanisms that translate childhood bullying victimization into poor mental, physical, and cognitive health in adulthood remain unclear. One possibility is that poor mental health outcomes are a function of symptoms that developed closer in time to bullying exposure. Untreated signs of distress appearing early in life may be early precursors to a life marked by symptoms of anxiety and depression. A second possibility is that bullying victimization generates further abuse from peers or adults, forming the first stage in a cycle of victimization that perpetuates itself over time and across situations. Past

studies have shown that children exposed to violence are at increased risk of revictimization of this kind and also of being subjected to differing types of violence (38, 39). Finally, in line with hypotheses derived from theories of the biological embedding of stress (40), previous studies have shown that bullying victimization in childhood is associated with a blunted cortisol response (41) and higher serotonin transporter gene methylation levels (42). Effects of this kind could constitute further pathways for the persistence of poor outcomes across the life course.

Our findings should be interpreted in light of several limitations. First, parents were not shown a definition of bullying, nor were they instructed to consider a particular reporting period. The prevalence of bullying and its associations with childhood correlates were, however, similar to those reported today, suggesting that understandings of the concept have not changed greatly over the years. Second, the National Child Development Study did not include questions about participants' own acts of bullying. As a result, we were unable to identify children who were both victims and perpetrators. Past studies suggest that the associations we observed are partly driven by this group (13). Third, attrition in the National Child Development Study across five decades of assessment was not negligible, although it is unlikely that this affected the pattern of our findings; dropout was not associated with bullying victimization (see Table S1 in the online data supplement) and we controlled for other effects of selective attrition by including weights throughout the analyses. Fourth, depression and anxiety disorders assessed in the National Child Development Study were limited to the previous week. This is reflected by the relatively low prevalence rates of those disorders. Therefore, our study fails to capture an unknown proportion of cases with a psychiatric disorder. However, the impact of this on our findings would likely be to underestimate the associations between childhood victimization and psychiatric problems in midlife. As a result, the conclusions we report are probably a conservative estimate of the true associations between childhood bullying victimization and psychopathology in midlife. Fifth, although we controlled for a wide range of potential confounders, it remains possible that there are other factors not assessed in the National Child Development Study that could explain why young victims of bullying face poor health outcomes in later life. These unmeasured factors limit causal inferences relating to childhood bullying victimization. We examined other potential confounders, including physical disabilities, number of people in the household, birth order, family difficulties, and quarrels with siblings, but did not include these variables in further tests as they did not remain significantly associated with adult outcomes in multivariate analyses.

Conclusions and Implications

Like other forms of childhood abuse, bullying victimization has a pervasive effect on functioning and health outcomes up to midlife. In addition to reducing bullying behaviors in the early years, our findings suggest that intervention efforts should aim to minimize poor health outcomes in young victims of bullying. Not only may this stop children's suffering, it may also help prevent problems persisting to adolescence and adult life. Our findings also emphasize the importance of gaining a better understanding of the mechanisms underlying the persistence and pervasiveness of the impact of childhood bullying

victimization. These risk mechanisms could become suitable targets for intervention programs designed to reverse the effects of early life adversity later in the life course. Future research elucidating the biological, behavioral, or social pathways from childhood bullying victimization to poor adult outcomes could help the development of effective intervention strategies to reverse the effects incurred by young victims of bullying and possibly modify the course of their long-term trajectories.

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Dr. Takizawa had full access to all the data in the study, performed all statistical analyses, and takes responsibility for the accuracy of the data analyses. Drs. Takizawa, Maughan, and Arseneault are responsible for the study concept and design, interpretation of data, and drafting and revising the manuscript for important intellectual content.

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