

The predictive efficiency of school bullying versus later offending: A systematic/meta-analytic review of longitudinal studies

MARIA M. TTOFI¹, DAVID P. FARRINGTON¹, FRIEDRICH LÖSEL¹ AND ROLF LOEBER², ¹Institute of Criminology, Cambridge University, Cambridge, UK; ²Western Psychiatric Institute and Clinic, University of Pittsburgh, Pittsburgh, USA

ABSTRACT

Background Although bullying and delinquency share similar risk factors, no previous systematic review has ever been conducted to examine possible links between school bullying and criminal offending later in life.

Aims To investigate the extent to which bullying perpetration at school predicts offending later in life, and whether this relation holds after controlling for other major childhood risk factors.

Method Results are based on a thorough systematic review and meta-analysis of studies measuring school bullying and later offending. Effect sizes are based on both published and unpublished studies; longitudinal investigators of 28 studies have conducted specific analyses for our review.

Results The probability of offending up to 11 years later was much higher for school bullies than for non-involved students [odds ratio (OR) = 2.50; 95% confidence interval (CI): 2.03–3.08]. Bullying perpetration was a significant risk factor for later offending, even after controlling for major childhood risk factors (OR = 1.82, 95% CI: 1.55–2.14). Effect sizes were smaller when the follow-up period was longer and larger when bullying was assessed in older children. The age of participants when outcome measures were taken was negatively related with effect sizes. Finally, the summary effect size did not decrease much as the number of controlled risk factors increased.

Conclusions School bullying is a strong and specific risk factor for later offending. Effective anti-bullying programmes should be promoted, and could be viewed as a form of early crime prevention. Such programmes would have a high benefit:cost ratio. Copyright © 2011 John Wiley & Sons, Ltd.

Introduction

School bullying is an important social problem with serious short-term consequences for the physical and psychological health of children and with long-term effects on their future psychosocial adjustment as adults (for reviews, see Ttofi and Farrington, 2008, 2010).

Major longitudinal studies in criminology have highlighted the developmental associations between early childhood emotional and behavioural problems and adolescent or early adulthood criminality (e.g. Loeber, 1996). School bullying shares many risk factors with offending (e.g. Lösel and Bliesener, 2003). School bullying, conceptualised as a distinct type of repeated aggression and a systematic abuse of power (Olweus, 1993; Smith and Sharp, 1994), is a behavioural problem that can predict future criminality even across generations (Farrington, 1993). This review examines whether school bullies differ from non-involved children in their later criminal careers.

Objectives of the review

Our objective was to conduct a systematic review of the link between bullying perpetration and later offending, and calculate standardised effect sizes with the final aim of:

1. Establishing the extent to which there is a significant association between bullying perpetration and offending behaviour later in life.
2. Establishing the unique contribution of school bullying as a risk factor for later offending (i.e. the predictive efficacy across time after controlling for other childhood risk factors).
3. Establishing what covariates (e.g. length of follow-up period; number of risk factors controlled for; age of assessment of bullying and offending) are significantly related to and can explain variability in effect sizes.

Searches

Extensive searches were conducted in 63 journals and 19 electronic databases. In addition, we contacted numerous longitudinal researchers on school bullying and developmental criminology. Further details (e.g. names of journals, key words used in databases, etc.) can be found in a report which is being prepared the Swedish National Council for Crime Prevention (Ttofi et al., in preparation).

Eligibility criteria for inclusion or exclusion of a study

The criteria for inclusion of reports were as follows:

1. The report clearly indicates that it is concerned with school bullying and not peer aggression in general.
2. A clear definition of offending as an outcome measure is presented. Two reports (Smith et al., 2004; Boulton et al., 2010)¹ provided an effect size of 'behavioural conduct', which might be seen as a proxy for delinquency. However, since it was not clear to us exactly what 'behavioural conduct' measured, we excluded these from the meta-analysis. Another study on gang membership was also excluded (Holmes et al., 1998)*, since gang membership is not a measure of delinquency, let alone offending.
3. The report presents longitudinal data. Chronologically, the predictor (i.e. bullying perpetration) precedes the outcome (i.e. offending).
4. Study participants are school-aged children in the community.
5. The report has quantitative data that allow calculation of an effect size.
6. Published and unpublished reports of the literature, including books (e.g. Olweus, 1993a; Haas, 2001)*, book chapters (e.g. Olweus, 1993b)*, journal articles, Masters or PhD theses (e.g. Wong, 2009)*, and conference presentations (e.g. Lösel et al., 2008)*. As mentioned earlier, data were also obtained via email communications with principal investigators of major longitudinal studies.

Some criteria for exclusion of reports were as follows:

1. Bullying perpetration is a subscale of a peer victimisation/aggression scale, and effect sizes are not shown for the bullying subscale.
2. The predictor is bullying victimisation and not bullying perpetration (e.g. Wong, 2009; Azzouzi and Killias, 2010; McGee et al., 2011; Shakoor et al., 2011)*.
3. The outcome measure (i.e. offending) is part (i.e. a subscale) of a wider theoretical construct (e.g. antisocial behaviour), and effect sizes are not shown for the offending subscale.
4. Study participants attend institutions for incarcerated/institutionalised youth. Three independent studies by Bijeveld et al. (2011)* were excluded because of this feature.

¹ Throughout the paper, citations in parentheses indicated with an asterisk refer to manuscripts included in the systematic review, but not necessarily in the meta-analysis. These citations are also shown in the Appendix. For the exact references, see Ttofi et al., in preparation; they are not presented here because of space limitations.

Combining effect sizes within a report

We used odds ratios (ORs) as the measure of effect size. Where studies presented other statistics, these were converted into ORs. Within each manuscript, more than one effect size could be reported. When choosing an appropriate effect size that would justify inclusion of a report in the meta-analysis, the following rules were set:

1. Reports dealing with shoplifting, theft, vandalism/property damage, violent offending, arrest and police/court contact could be included in the meta-analysis.
2. Within a report, if different effect sizes were derived from official records of arrest or police/court contact, and from self-reports of shoplifting, theft, vandalism, or violent offending, these were combined into one effect size. However, if a general measure of offending, as well as any of the specific offences were available within a report, then we chose to include the general measure in our meta-analysis. These strategies avoided the inappropriate weighting of multiple effects.
3. If within a manuscript an effect size was given separately for males and females, we combined the two measures. The same strategy was followed when a separate measure was presented for two follow-up periods. It would have been ideal if we could have examined possible changes in the magnitude of the effect size within each study for different follow-up periods, but not many studies provided this information. We did, however, include the length of the follow-up period across studies in the moderator analyses.
4. If for the same outcome measure, different effect sizes were reported separately for each informant, but the manuscript also provided a combined measure across all informants, then we chose to report the latter combined measure. We followed the same rule for the predictor (i.e. bullying perpetration), giving preference to a combined measure as opposed to a separate measure (e.g. we chose combined self- and peer-rated bullying rather than separate self- or peer-rated bullying).

In the Appendix, we list the reports from each longitudinal study. Under the name of each study, we indicate whether we have used a general measure of offending or a combined measure based on different criminal acts.

Results

The association of school bullying with later offending: unadjusted and adjusted effect sizes

Eighteen studies provided an effect size for bullying perpetration versus offending. For three of them (i.e. Pulkkinen and Tremblay, 1992; Kendrick and Stattin, 2010;

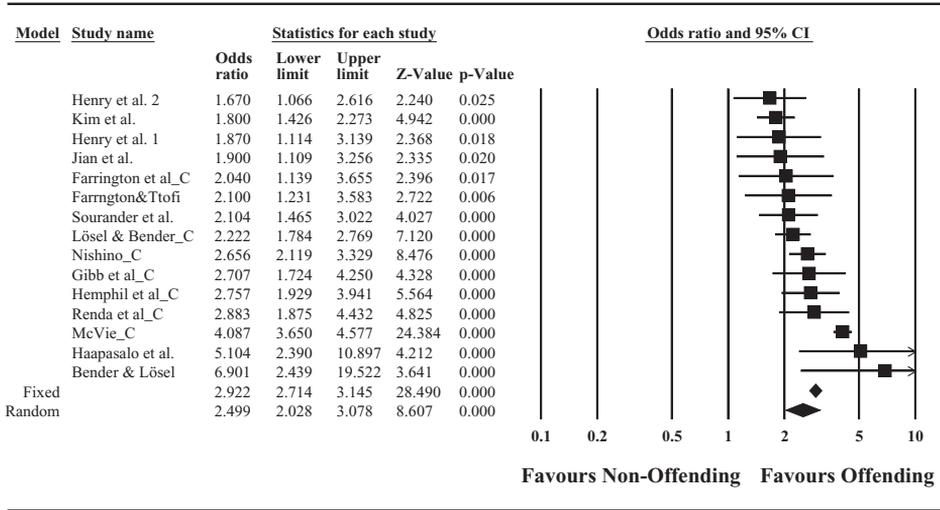


Figure 1: Bullying perpetration versus offending: unadjusted effect sizes

Olweus, 2011)*, only an unadjusted effect size was available. As mentioned, the effect size that we used was the odds ratio (OR). The summary effect size across the 18 studies was OR = 2.60 [95% confidence interval (CI): 2.15–3.14; $\tau = 9.90$] for the random-effects model. We used the random-effects model since the heterogeneity test, Q , of 87.93 was highly significant at $p = 0.0001$. When the three studies with only unadjusted effect sizes were excluded, the summary effect size for the remaining 15 studies – for the random-effects model – was OR = 2.50 (95% CI: 2.03–3.08, $\tau = 8.61$). Again, there was significant variability in effect sizes across these studies ($Q = 79.26$, $p = 0.0001$). The summary effect size for each study was significant, as shown in the forest graph in Figure 1. When controlling for covariates, the adjusted summary effect size was reduced to OR = 1.82, but this was still highly significant (95% CI: 1.55–2.13, $\tau = 7.28$). Figure 2 shows the forest graph for adjusted effect sizes. While all these effect sizes were in the expected direction, four were not statistically significant.

Meta-regression

For the adjusted summary effect size, various moderators were investigated to explain the heterogeneity in effect sizes across studies, which was significant ($Q = 39.23$, $p = 0.0001$). These included the number of covariates controlled for at baseline [range: 1–20; $M = 7.20$; standard deviation (SD) = 5.07], the age at which school bullying was measured (range: 6.23–15.54; $M = 11.26$; SD = 2.68), the age of participants when outcome measures were taken (range: 10.00–24.64; $M = 16.66$; SD = 4.48), and the length of the follow-up period, measured in years (range: 0.42–11.25; $M = 5.40$; SD = 3.70).

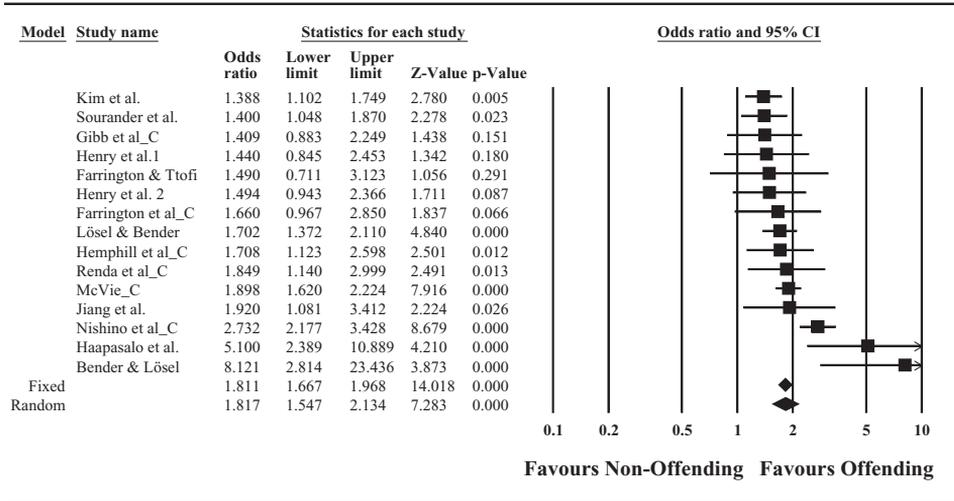


Figure 2: Bullying perpetration versus offending: adjusted effect sizes

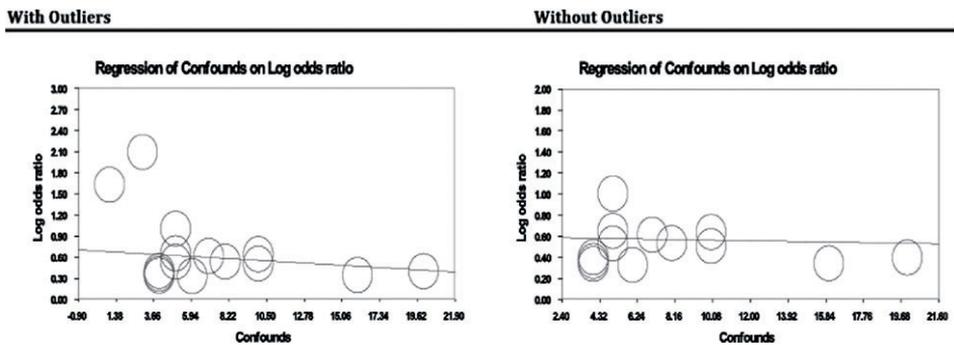


Figure 3: Relationship between the effect size and the number of covariates/confounders

The age at which bullying was measured was positively associated with the effect size, with a regression coefficient close to statistical significance ($B = 0.037$, $SE = 0.021$, $p = 0.076$), while the length of the follow-up period was negatively associated with the effect size ($B = -0.036$, $SE = .011$, $p = 0.0009$). As expected, the age of the study participants when outcome measures were taken was significantly negatively related to the effect size ($B = -0.033$, $SE = 0.012$, $p = 0.008$). The above two negative relationships suggest that bullying perpetration has a stronger effect in the short term. The relationship between the number of covariates controlled for and the effect size was in the expected negative direction, but was not significant ($B = -0.014$, $SE = 0.013$, $p = 0.291$).

Figure 3 shows that effect sizes were linearly related to the number of covariates controlled for in all studies except two. When the two outliers were removed,

the p value for the unbiased regression coefficient increased ($B = -0.003$, $SE = 0.013$, $p = 0.830$). Since $Y = B \times X + C$, one could extrapolate an OR of 1.57 when controlling for 50 covariates and an OR of 1.35 when controlling for 100 covariates.

Discussion

A key issue is whether school bullying and later offending are different age- and context- related manifestations of underlying antisocial dispositions. However, the current meta-analysis indicates that school bullying is a unique childhood risk factor for later offending, and that bullying perpetration increases the probability of adverse outcomes later in life. While causal inferences cannot necessarily be drawn, an important finding was that the number of covariates controlled for was not significantly related to the adjusted effect size. Our analyses show that the OR would still be significant and substantial in predicting later offending even after controlling for many covariates.

Our thorough review highlights beyond any doubt the importance of intervening to save high-risk youth, specifically school bullies. Bullying prevention programmes are effective (Farrington and Ttofi, 2009; Ttofi and Farrington, 2011), and financial support for the implementation of high-quality anti-bullying programmes is justified. These programmes can have longer-term effects by interrupting a future criminal career (and reducing health, welfare, education, custody and other costs linked to a criminal career). In light of evidence on the monetary value of saving a high-risk youth (Cohen and Piquero, 2009), an effective programme for school bullies would have a high benefit:cost ratio.

In any case, school bullies are children in need. Intervention strategies aiming at tackling school bullying and promoting safer school communities can be seen as a moral imperative (Smith *et al.*, 2003). We recommend that more efforts should be made to implement effective programmes with individual bullies and victims, perhaps based on child skills training (e.g. Lösel and Beelman, 2003). Family-based programmes (e.g. Farrington and Welsh, 2003) may also be useful in interrupting the intergenerational continuity of aggression and bullying.

Acknowledgements

This study was supported by the British Academy and the Swedish National Council for Crime Prevention. We would like to thank all 28 longitudinal researchers who have conducted special analyses for the aims of our review. We are most appreciative of the academic support of Jan Andersson and Peter K. Smith and of the methodological feedback provided by David B. Wilson. Mr. Nikos Theodorakis has worked as a research assistant on the project.

References

- Cohen MA, Piquero AR (2009) New evidence on the monetary value of saving a high risk youth. *Journal of Quantitative Criminology* 25: 25–49.
- Farrington DP (1993) Understanding and preventing bullying. In Tonry M (ed.) *Crime and Justice*, Vol. 17. Chicago: University of Chicago Press pp. 381–458.
- Farrington DP, Ttofi MM (2009) School-based programs to reduce bullying and victimization. *Campbell Systematic Reviews* 2009: 6. <http://www.campbellcollaboration.org> [accessed February 22, 2011]
- Farrington DP, Welsh BC (2003) Family-based prevention of offending: A meta-analysis. *Australian and New Zealand Journal of Criminology* 36: 127–151.
- Loeber R (1996) Developmental continuity, change, and pathways in male juvenile problem behaviors and delinquency. In Hawkins JD (ed.) *Delinquency and Crime: Current Theories*. Cambridge: Cambridge University Press pp. 1–27.
- Lösel F, Beelman A (2003) Effects of child skills training in preventing antisocial behavior: A systematic review of randomized evaluations. *Annals of the American Academy of Political and Social Science* 587: 84–109.
- Lösel F, Bliesener T (2003) *Aggression und delinquenz unter jugendlichen: Untersuchungen von kognitiven und sozialen Bedingungen*. Hermann: Luchterhand.
- Olweus D (1993) *Bullying at School: What We Know and What We Can Do*. Oxford: Blackwell.
- Smith PK, Sharp S (1994) *School Bullying: Insights and Perspectives*. London: Routledge.
- Smith PK, Ananiadou K, Cowie H (2004) Interventions to reduce school bullying. *Canadian Journal of Psychiatry* 48: 591–599.
- Ttofi MM, Farrington DP (2008) Bullying: Short-term and long-term effects, and the importance of defiance theory in explanation and prevention. *Victims and Offenders* 3: 289–312.
- Ttofi MM, Farrington DP (2010) School bullying: Risk factors, theories and interventions. In Brookman F, Maguire M, Pierpoint H, Bennett TH (eds) *Handbook of Crime*. Cullompton, Devon: Willan pp. 427–457.
- Ttofi MM, Farrington DP (2011) Effectiveness of school-based programs to reduce bullying: A systematic and meta-analytic review. *Journal of Experimental Criminology* 7: 27–56.
- Ttofi MM, Farrington DP, Lösel F, Loeber R (in preparation) *Adverse Criminal and Health Outcomes of Children Involved in School Bullying: A Systematic Review of Longitudinal Studies*. Stockholm: Swedish National Council for Crime Prevention.

Address correspondence to: Dr Maria M. Ttofi, Institute of Criminology, Sidgwick Ave., CB3 9DA, Cambridge, UK. Email: mt394@cam.ac.uk

Appendix: 43 reports on offending behaviour from 28 longitudinal studies

(A) Included studies

Australian Temperament Project (Renda et al., 2011)

Police/court contact based on self-reports at age 21.5; bullying at age 13.5; controlling for 7 covariates

Cambridge Study in Delinquent Development (Farrington, 1993; Farrington and Ttofi, 2011)

Offending based on convictions (official record data) at age 17.5; bullying at age 14; controlling for 20 covariates

Christchurch Health and Development Study (Gibb et al., 2011)

Combined property offending and arrest/conviction (separate measures) based on self-reports at age 23; bullying at age 11.75; controlling for 16 covariates

Edinburgh Study of Youth Transitions and Crime (Smith and Ecob, 2007; Barker et al., 2008; McVie, 2010)

Combined property theft and damage (separate items) based on self-reports at age 14; bullying at age 13; controlling for 10 covariates

Erlangen-Nuremberg Longitudinal Study of Bullying (Lösel and Bliesener, 2003; Lösel et al., 2008; Bender and Lösel, 2011)

Delinquency based on self-reports at age 24.64; bullying at age 15.54; controlling for 3 covariates

Erlangen-Nuremberg Development and Prevention Study (Lösel and Bender, 2010²)

Self-reported delinquency for offending (property offences was subcategory of delinquency scale) at age 13.7; bullying at age 9; controlling for 5 covariates

From a Boy to a Man Finnish Longitudinal Study; sub-category of the Nationwide Finnish 1981 Birth Cohort Study (Sourander et al., 2006, 2007)

Property offences for offending based on official records at age 18; bullying at age 8; controlling for 4 covariates

International Youth Development Study (Hemphill et al., 2011)

Theft based on self-reports at age 16.9; bullying at age 14.4; controlling for 8 covariates

Japanese Longitudinal Study (Nishino et al., 2009; Nishino, 2010³/email; Nishino et al., 2011)

Combined shoplifting and vehicle theft (separate measures) based on self-reports at age 12.92; bullying measured at age 12.5; controlling for 5 covariates

Jyvaskyla Longitudinal Study in Finland (Pulkkinen and Tremblay, 1992)

Total criminal records ('all registers') for offending based on official records; unadjusted effect sizes only

Metropolitan Area Child Study (Henry et al., 2010); Study 1

Delinquency based on self-reports at age 10; bullying at age 8; controlling for 4 covariates

Metropolitan Area Child Study (Henry et al., 2010); Study 2

Delinquency based on self-reports at age 13; bullying at age 11; controlling for 4 covariates

Montreal Longitudinal Study (Pulkkinen and Tremblay, 1992; Tremblay and Haapasalo, 1998; Haapasalo et al., 2000)

Delinquency based on self-reports at age 11; bullying at age 6.23; controlling for 1 covariate

² Email communication with Friedrich Lösel, 31 December 2010.

³ Email communication with Yasuyo Nishino, 30 March 2010.

Pittsburgh Youth Study (Farrington et al., 2011; White and Loeber, 2008)

Delinquency based on self-reports at age 14.27; bullying at age 10.98; controlling for 10 covariates

Raising Healthy Children Project (Kim et al., 2011)

Violent offending based on self-reports at age 21.52; bullying at age 11.5; controlling for 6 covariates

SNAP Under 12 Outreach Project (Jiang et al., 2011)

Offending based on official records at age 17.99; bullying at age 9.5; controlling for 5 covariates

Seven Schools Longitudinal Study (Kendrick and Stattin, 2010; email⁴)

Property crimes based on self-reports; unadjusted effect sizes only

Swedish Community Samples (Olweus 1991, 1993a, 1993b, 1993c, 1994a, 1994b, 1997, 2011)

Offending based on official records; unadjusted effect sizes only

*(B) Excluded studies***E-Risk Longitudinal Study (Shakoor et al., 2011, in press)****Five-Month Follow-Up of English Students (Boulton et al., 2010)****Mater-University of Queensland Study of Pregnancy and Its Outcomes (McGee et al., 2011)****National Longitudinal Survey of Youth 1997 (Wong, 2009)****Official Records Follow-Up Study in the Netherlands; Study 1 (Bijleveld et al., 2011)****Official Records Follow-Up Study in the Netherlands; Study 2 (Bijleveld et al., 2011)****Official Records Follow-Up Study in the Netherlands; Study 3 (Bijleveld et al., 2011)****Project GANGFACT (Holmes et al., 1998)****Swiss Federal Survey of Army Recruits of 1997 (Haas, 2001; Azzuzi and Killias, 2010)****Two-Year Follow-Up Study of London Children (Smith et al., 2004)**

⁴ Email communication with Kristin Kendrick, 22 and 26 February 2010.