Did bullying victimization decrease after a nationwide school-based anti-bullying program? A time-trend study

Authors: Elina Tiiri, Terhi Luntamo, Kaisa Mishina, Lauri Sillanmäki, Anat Brunstein-Klomek, Andre Sourander

ABSTRACT

Objective: We assessed changes in traditional and cyberbullying victimization, and their associations with mental health, before and after the introduction of a nationwide anti-bullying program in Finnish schools in 2009.

Method: This time-trend assessment comprised two methodologically identical cross-sectional survey studies, with 2,061 adolescents in 2008 (response rate 90.2%) and 1,936 in 2014 (91.8%). Their mean age was 14.4 years. They completed questionnaires about traditional and cyberbullying, mental health and perceptions of school safety. Odds ratios (OR) and 95% confidence intervals (95% CI) are presented with 2008 as the reference year.

Results: From 2008 to 2014, traditional victimization decreased from 28.9% to 19.1% (OR 0.5, 95% CI 0.4–0.7) among boys and from 23.2% to 17.4% (OR 0.7, 95% CI 0.6–0.9) among girls. Cyberbullying victimization remained fairly stable at 3.3% and 3.0% (OR 0.7, 95% CI 0.4–1.2) for boys and at 2.7% and 4.1% (OR 1.4, 95% CI 0.9–2.4) for girls. Combined traditional and cyberbullying victimization decreased from 6.1% to 3.9% (OR 0.5, 95% CI 0.4–0.8) among boys and from 7.5% to 6.7% (OR 0.8, 95% CI 0.6–1.2) among girls. Those suffering from both traditional and cyberbullying reported the highest mental health problems. Perceived school safety improved among boys, but not girls. Both reported greater efforts by teachers and fellow students to stop bullying.

Conclusion: Combined traditional and cyberbullying victimization was an indicator of comorbid mental health problems. Interventions that target both types of bullying, and are integrated with mental health promotion, are needed.

INTRODUCTION

The American Centers for Disease Control and Prevention defines bullying as unwanted repetitive aggressive behavior that occurs within the context of an unequal power relationship and inflicts harm or distress on the victim. Bullying can either be direct or indirect, depending on whether the victim is physically present. It can be physical, verbal or relational, or manifested as damaging someone's property.[1] Bullying can also be conceptualized as traditional or cyberbullying, which is a relatively new phenomenon related to the increased popularity of texting and social media. Although we do not currently have a well-established definition of cyberbullying,[2,3] it can be defined as an aggressive, intentional act carried out using electronic forms of contact, repeatedly against a victim who cannot easily defend themself.[4]

Bullying victimization has been associated with later mental health problems, including anxiety[5-8] and depression,[2,6-10] and with later physical health problems and socioeconomic disadvantages.[8] There seems to be a dose effect: more frequent victimization has been associated with a higher risk of severe outcomes.[8,10] Victimization has also been associated with perceptions of school safety, as those who are victimized feel less safe in the school environment.[11]

According to a meta-analysis of 80 studies, the mean prevalence rates were 36% (range 9–98%) for traditional bullying victimization and 15% (range 2–56%) for cybervictimization.[3] The prevalence of traditional victimization has been decreasing, according to some studies,[12-15] but some have showed that it has increased[12] or has been fairly stable.[12-14,16] Only a few time-trend studies have been conducted on cyberbullying. They have shown inconsistent results, namely that cybervictimization has increased,[13,17-19] decreased[15] or remained relatively stable.[18] These inconsistent results were influenced by differences in

study methods, such as definitions of bullying and how victimization was measured.[3] The lack of a well-established definition of cyberbullying has been a particular issue.[2,3]

The first large-scale national anti-bullying program was implemented in Norway in 1983 and since then several school-based programs have been launched to reduce school bullying.[20] In 2009, Finland introduced KiVa, a nationwide research-based anti-bullying program, developed by the University of Turku, with funding from the Ministry of Education and Culture. KiVa is short for Kiusaamista Vastaan, which means against bullying. This whole-school intervention conceptualizes bullying as a group phenomenon and aims to achieve a positive change by encouraging bystanders to support victims and not condone bullying. In turn this reduces support for bullies and reduces their motivation to bully.[21] Although randomized controlled trials (RCTs) have shown that KiVa reduced traditional victimization among younger students,[21-23] it did not improve self-reported victimization among adolescents.[23] RCTs reported that cyberbullying in the intervention group decreased compared to the control group,[21,24] but the effect was only modest.[24] A cohort study showed that KiVa had beneficial effects on traditional victimization in elementary school, but adolescents benefitted much less.[25] Until now, the effectiveness of KiVa has been evaluated within a year of the program being launched.[21-25] However, there has been a lack of studies on its long-term effectiveness in real-life settings and it is crucial to assess this because the effects seen during RCTs tend to decline during implementation.[26]

Our study design resembled a natural experiment, as we were able to study victimization before and after the introduction of KiVa in the study schools. Natural experiments are cohort studies where participants form the exposed or the unexposed groups due to an event that is beyond their own control,[27] like the introduction of the anti-bullying program. A well-known example of a natural experiment is the Great Smoky Mountains Study[28] in North Carolina, USA. The study found that conduct problems reduced in children whose families moved out of poverty because they started to receive revenue from a casino set up by their community, but no change was found in the children of families whose financial situation remained stable.

This study filled a gap in the literature, by focusing on adolescents and monitoring cyberbullying, years after the intervention was implemented in real-life practice. It is essential to study interventions in real-life practice to understand what works and how it works. The gap between the knowledge gained from intervention trials and how they work in real-life practice is commonly described as the implementation gap, which is a major challenge in developing early interventions and services.

Our study consisted of two cross-sectional measurements of the population-based prevalence of traditional and cyberbullying victimization in 2008 and 2014. The measurements took place before and after the launch of the KiVa school-based anti-bullying intervention in 2009. The first study aim was to assess the changes in traditional victimization, adolescents' perceptions of school safety and whether teachers and peers were more likely to stop bullying after KiVa was launched. This was based on previous findings that showed the effectiveness of KiVa,[21-23,25] although the findings were more consistent among younger students, and the association of victimization with school safety.[11] The second aim was to explore if there were changes in cyberbullying after KiVa, which mainly focuses on traditional bullying prevention, was implemented. Only a few studies existed on whether school-based programs, which focused mainly on traditional victimization, also decreased cybervictimization effectively.[24,29] The interpretations of research knowledge are contradictory,[3,29,30] and one of the key questions about preventing bullying is whether interventions should focus on multiple forms of bullying.[24,29,30] In fact, there have been intensive discussions recently about the level at which traditional and cyberbullying are distinct phenomena[3,30] and consequently the implications for prevention and intervention strategies.[30-32] The third aim was to study the associations between mental health and victimization, and to detect any differences between the strengths of these associations before and after implementation. This was based on previous studies, that found that combined victimization was associated with a more severe impact on the victims.[30,33]

Based on these aims, we had three hypotheses, and one of them was explorative. First, we hypothesized that there would be a decrease in traditional victimization at school and outside school after the implementation of KiVa and that adolescents would report improvements in school safety and increased attempts by teachers and peers to stop bullying. Second, our approach on the changes of cyberbullying was explorative. Our final

hypothesis was that adolescents who were victims of both traditional and cyberbullying, referred to as combined victimization, would show the highest levels of comorbid mental health problems.

METHODS

Subjects and procedure

These cross-sectional survey studies were conducted in two cities in Finland in 2008 and 2014. Rovaniemi is a city in northern Finland, with a population of over 60,000, and Salo is a city in southern Finland, with a population of over 50,000. They are typical Finnish cities, with large geographical areas, including both urban and rural communities. Their population structure, including their gender distribution, educational structure, income distribution, ethnic background and the family structure of their inhabitants, are comparable to the general population in Finland.[34]

The data was collected from all secondary schools in the two cities, except for classes for adolescents with special needs. Only the schools that provided data at both measurement points were included in this analysis. The study participants were in grades 7 (typically aged 13–14 years) and 9 (typically aged 15–16 years) in the Finnish secondary schools in both 2008 and 2014. KiVa was introduced in 2009.

Ethical approval for the study was granted by the Ethics Committee of the Hospital District of Turku University Hospital in 2008 and the Ethics Committee of the University of Turku in 2014. The school authorities gave us permission to conduct the studies and parental consent was obtained by informing them about the study and offering them the chance to refuse participation. Participation was voluntary and anonymity was guaranteed.

All adolescents who were at school on the day of the survey were asked to fill in the study questionnaires anonymously during a school lesson and seal them in envelopes. They returned these to their teacher, who sealed them in a larger envelope in the presence of the adolescents, to reassure them of the confidentiality of

the study. The envelopes were then returned to the research group. Teachers asked the students who were absent to fill in the questionnaires later under the same conditions that were in place on the study days.

In 2008, 2,061/2,286 (90.2%) adolescents returned appropriately completed questionnaires and in 2014 there were 1,936/ 2,108 (91.8%) responses (see Figure 1). Most of the non-respondents were students who were absent from school on the actual day of the survey.

Measures

Demographic details

The questionnaire requested information on age, gender, school grade, family background, and ethnic background. The family background options were living with two biological parents, a single parent, remarried parents, foster parents, adoptive parents or some other family model. Ethnic background was measured by asking the adolescent whether they were born in Finland, whether they spoke Finnish as their native language, and whether their biological parents were born in Finland.

Bullying and cyberbullying experiences

Adolescents were asked about their experiences of traditional and cyberbullying victimization. The same four-point response scale was used throughout the questionnaire, with the options being never, less than once a week, more than once a week, and almost every day.

The definition of traditional bullying that was provided on the questionnaire was: "*A student is getting bullied if another student, or a group of students, repeatedly treats him or her negatively or in an insulting manner. It is difficult for the bullied student to defend himself or herself. Bullying can be intermittent or continuous. Bullying can be verbal (e.g. name calling, threatening), physical (e.g. hitting, pushing), or psychological (e.g. rumor spreading, avoiding, excluding). Continuous nasty or insulting teasing is also bullying.*" The students were then asked how often they had been bullied at school or outside school in the last 6 months. Further questions concerned the types of experienced bullying incidents, such as people made fun of their looks or the way they talked (see Supplement 1, available online). They were also asked whether they were bullied by girls, boys or groups.

Cyberbullying was defined as: "*Repeated mocking on the Internet, bullying via emails or text messages or spreading insulting material about another person on the Internet.*" Students were then asked how often they had been cyberbullied in the past 6 months and what form the bullying took, such as people spreading rumors about them (see Supplement 1, available online). They were asked whether the bullies were girls, boys, adult women, adult men, strangers, or groups. They were also asked if they had told someone about the bullying, and, if they said yes, they were asked who they had told. The options were a parent, a sibling, a friend, a teacher, another adult at school, a mental health professional, or someone else.

School perceptions

Perceptions about the school environment were studied by asking the students to indicate, using a four-point scale, which statements best represented their experiences or thoughts. The statements covered whether they felt safe at school and whether their teachers cared for them. We also asked whether teachers, other adults or their peers intervened to stop bullying. The possible answers were almost never, sometimes, often and almost always.

Mental health

Psychiatric symptoms were assessed with a self-report version of the Strengths and Difficulties Questionnaire (SDQ).[35] A double-translated Finnish version of the questionnaire, has been shown to have adequate validity and reliability.[36] The SDQ consists of 25 items divided into five scales: emotional symptoms, conduct problems, hyperactivity, peer problems, and prosocial scale.[35] The question on bullying was excluded from the analyses. The cut-off points that indicated mental health problems were the 80th percentile score for the SDQ total score, the emotional symptoms, conduct problems, hyperactivity and peer problems scales and the 20th percentile score for the prosocial behavior scale. These percentile scores were used to minimize the number of false negatives.[35]

Statistical analyses

First, changes of the outcomes - victimization and school perceptions - over time were assessed with year as the predictor. Victimization was analysed both by type - none, traditional only, cybervictimization only

and combined victimization - and frequency in different settings. Gender × year interactions were tested and proved significant. Therefore, single- and multi-predictor analyses were conducted separately for genders. In multi-predictor models adjustment for city, grade, family and ethnic background was made. Second, the change of victimization was further described. The outcomes were bullying incidents, perpetrator, and who the victim told about bullying, with the year as the single-predictor. Third, victim subgroups were assessed with the type of victimization - none, traditional only, cybervictimization only and combined victimization - as the outcome. Year, gender, grade, family and ethnic background, city and the dichotomized SDQ scales were the predictors. Three-way and two-way interactions between the SDQ, gender and year were tested. They were nonsignificant apart from the SDQ prosocial category × gender × year interaction, for which post hoc analyses were conducted. Otherwise, the data of both years and genders were pooled for further analyses. Single-predictor analyses, with year, gender, grade, family background, ethnic background and city as predictors, were conducted. Both single- and multi-predictor analyses with the SDQ categories as predictors were conducted, and in multi-predictor models adjustment for year, gender, city, grade, family and ethnic background was made. Logistic regression methods were used in all the analyses. Odds ratios (OR) with 95% confidence intervals (95% CI) were estimated. Two-sided p values of less than .05 were interpreted as statistically significant, except for the interactions the threshold was .1. SAS 9.4 for Windows (SAS Institute Inc. Cary, NC, USA, 2012) was used to conduct the analyses.

RESULTS

Participants

The background characteristics of the participants are presented in Table 1. There were no statistically significant time effects from 2008 to 2014.

Changes in prevalence of bullying victimization

The prevalence of victimization decreased when it was measured at any frequency in any setting, namely traditional victimization at school and outside school and cybervictimization. The reduction was more

prominent for boys than girls. We found that the percentage of boys bullied at any frequency was 38.0% in 2008 and 25.8% in 2014 and for girls it was 33.4% and 28.2%, respectively.

Table 2 presents changes in victimization from 2008 to 2014. Victimization showed more marked reductions for boys than girls. Victimization by just traditional bullying decreased for both genders and victimization by just cyberbullying showed no significant changes. Combined victimization by both traditional and cyberbullying only decreased among boys. Traditional victimization was the most prevalent form of victimization at both study points, followed by combined victimization and cybervictimization.

Changes in victimization were also analyzed at different settings by the frequency of the incidents. For boys, victimization at school decreased, whereas for girls only infrequent victimization at school decreased. As a whole, there was a major reduction in the prevalence of victimization at school. In 2008, a total of 30.5% of adolescents were victims of bullying at school and 20.6% were victims in 2014 (OR 0.6, 95% CI 0.5–0.7, p < .001). Traditional victimization outside school only decreased among boys. The only change in cybervictimization was a reduction in frequent cybervictimization among boys. The interaction p values are shown in Table S1 (available online).

As shown in Table S2 (available online), there was a significant reduction in physical victimization, but increases in relational victimization. Table S3 (available online) shows changes in the bullying perpetrators. Boys were the most frequent perpetrators for both traditional and cyberbullying, while the number of girls and groups perpetrating traditional bullying significantly increased. The frequency of cyberbullying perpetrators who were strangers increased, while the frequency of adult women decreased. Most of the bullying victims told someone they were being bullied and they told parents and siblings more frequently in 2014 than in 2008 (see Table S4, available online).

Changes in school perceptions

Table 3 presents changes in school perceptions from 2008 to 2014. The number of boys who never felt safe at school halved, but there was no change for girls. The other three items about how the students perceived school all improved, namely teachers care and both teachers and other adults and peers try to stop bullying.

More than half (53.3%) of the adolescents felt that adults always or usually tried to stop bullying in 2008 and this increased to 70.4% in 2014 (OR 0.5, 95 % CI 0.4–0.6, $p < .001$). When it came to peers always or usually intervening, this rose from 21.0% in 2008 to 31.5% in 2014 (OR 0.6, 95 % CI 0.5–0.7, $p < .001$). Despite this, the vast majority of students thought that other students tried to stop bullying sometimes or never, with 79.0% in 2008 and 68.5% in 2014. The interaction p values are shown in Table S1 (available online).

Associations between bullying victimization, demographic characteristics and mental health

Table 4 presents the associations between the types of victimization and demographic characteristics and mental health. Those suffering from combined victimization reported the highest levels of mental health problems, with 50.2% exceeding the 80% cut-off point on the total SDQ scale, compared with 28.0% of traditional bullying victims, 24.6% of cyberbullying victims and 10.7% of non-victims. Boys were more prone to just traditional victimization, whereas girls were more prone to combined victimization. Traditional and combined victimization were more common among younger adolescents. Those who lived with other family models than with two biological parents were associated with all types of victimization, together with a higher prevalence of victimization.

When we analyzed victimization, the three-way interaction between the SDQ prosocial scale, gender, and year was significant. The girls who in 2014 were victimized by combined victimization or by cyberbullying only had the highest odds for weak prosocial skills (see Table S5 and Figure S2, available online).

DISCUSSION

This was the first study to examine time-trends of bullying victimization among adolescents at two time points by carrying out two identical population-based cross-sectional surveys before and after the introduction of the independent KiVa anti-bullying program. The first main finding was that there was a reduction in traditional victimization of about 30%. In addition, the adolescents reported that they felt safer

at school in the later cohort and reported increased attempts by teachers, other adults and peers to stop bullying at school. The second main finding was that the prevalence of cybervictimization remained fairly stable between the two time points, despite the school-based KiVa anti-bullying program. The third main finding was that adolescents who were the victims of both traditional and cyberbullying reported the highest levels of comorbid mental health problems.

There are several possible explanations for the reduction in traditional victimization. The first is that the school-based KiVa anti-bullying program reduced traditional bullying among adolescents after it was implemented in real-life practice, as our findings agreed with RCTs that reported its effectiveness.[21-23] Importantly, our study showed that the prevalence of traditional victimization decreased and adolescents also reported increased school safety and increased attempts by teachers, other adults and peers to stop bullying. KiVa encourages students to join forces to counteract bullying and support the victims,[21] making the bullying less effective. Previous studies have reported an association between school bullying victimization and school safety[11] and that attempts by teachers to separate students to diminish bullying was related to lower levels of victimization.[37] However, although KiVa promoted a strong bystander approach, only 31% of the adolescents reported that other students always or usually tried to stop bullying.

It is also possible that the reduction in victimization was partly explained by increased public awareness of the harmful effects of bullying. Finland has had frequent media coverage on the subject and since 2003 Finnish legislation[38] has made it compulsory for schools to have an action plan against violence, bullying and harassment and to monitor it.

The reduction in traditional victimization in our study was more marked among boys, resulting in converging rates of traditional victimization in both genders. While traditional victimization decreased among both genders at school, there was only a decrease among boys outside school. Physical bullying, previously recognized as more typical among boys,[39,40] decreased. Physical bullying is easier to detect than relational bullying and is more likely to be judged and stopped by bystanders. Feeling safe at school increased among boys and both genders increasingly perceived that teachers cared, and that teachers, adults

and other students tried to stop bullying at school. Some indications of increased relational bullying were found, which has previously been reported to be more frequent among girls.[30,41] However, it is possible that anti-bullying actions have increased awareness of indirect bullying, resulting in higher reporting.[42]

Interestingly, our previous cross-sectional population-based school surveys in 2005 and 2013, before and after the 2009 KiVa launch, showed that the parents and teachers of 8-year-old children did not report significant decreases in traditional victimization.[14] Comparing those results and the results of the present study may have important implications. The participants of our previous study[14] were in the 2nd grade of elementary school. As KiVa is a school-based program, these children had been influenced by KiVa for less than two years before the second survey in 2013. In the present study, the participants already attended school at the time of the 2009 KiVa launch, five years before the second survey in 2014. This may indicate a positive dose effect, i.e. when long-lasting anti-bullying programs start in childhood, the long-term effects may accumulate as children grow older. This is particularly important, as bullying involvement often persists from childhood to adolescence.[43] Another possible reason for the conflicting results between the two studies is that KiVa was more effective in real-life practice in mid-adolescence than in early childhood, for example due to decreasing impulsiveness and increasing cognitive skills with increasing maturity.[20]

The second main finding was that the prevalence of cybervictimization remained stable, despite the KiVa launch. The only decrease was found in frequent cybervictimization among boys – 2.4% in 2008 and 1.1% in 2014 – but as the number of cases was very low, this result should be interpreted with caution. To put the 9.4% prevalence of cybervictimization found in our study into context - including both pure cybervictimization and combined victimization - the self-reported prevalence of cybervictimization among subjects aged 10–16 in 18 European countries varied from 2.8% to 15.4%.[44] Our findings address one of the key questions in bullying prevention policies, namely whether traditional school-based anti-bullying interventions should have a broader remit, so that they also cover cyberbullying. According to previous studies, KiVa may have had positive effects on cyberbullying victimization[21,24] and cyberbullying,[24] but the effects were modest and the effect on cyberbullying was only significant among younger students.[24] KiVa targets classroom norms and behaviors in the group, while online social networks include others who are

outside the school.[24] Thus, interventions that reduce multiple forms of bullying are needed. To achieve this, traditional anti-bullying interventions should be combined with components that target cyberbullying. Psychoeducation about cyberbullying, and its association with traditional bullying, Internet safety and the responsible use of technology, should be offered, as well as enhanced parental monitoring of technology use. School policies and procedures about cyberbullying should be defined and partnerships developed between schools and parents. This emphasis is crucial due to the high correlation between different forms of bullying[3,30] and the fact that cyberbullying can be independent of the school setting. Partnerships between schools and parents should tackle all forms of bullying. In addition, strategies that focus on coping with cyberbullying, such as emphasizing awareness of cyberbullying, online help-seeking and involving adults in helping, should be incorporated into anti-bullying programs to help adolescents manage their online experiences.

The third main finding was that the combination of traditional and cybervictimization was associated with the highest mental health symptoms. School health services must consider combined victimization as a strong indicator for possible comorbid mental health problems. Bullying needs to be reduced in different settings and there needs to be a greater emphasis on more individualized actions to help those who are bullied and have mental health problems, as these have been reported to have a bi-directional relationship. Victimization has been associated with higher levels of internalizing problems at follow up and internalizing problems seem to maintain bullying victimization.[45] Thus, assessing for both victimization and psychopathology is important when health services treat adolescents. It is important to emphasize that even if victimization is reduced, it should be followed up as it can re-occur unless the underlining mental health issues are also addressed.

Mental health promotion is a natural part of the socio-ecological understanding of bullying prevention.[46] Coping skills to enhance mental resiliency, such as strengthening emotional regulation, cognitive restructuring and problem solving, should be provided to students, parents and teachers. Encouraging students to disclose bullying, seek help and receive support are crucial coping skills for good mental health and students, parents and teachers need to be aware of this. Interventions to date that have included mental

health components have usually mainly focused on psychoeducation[47] and have not included a full integrative mental health module. Recently, evidence supporting multiple approaches was provided by a cluster RCT. A whole-school intervention, based on restorative approaches to reduce bullying and aggression, engaging students in school decision making, and providing emotional and social skills education, reduced bullying victimization.[48]

Some limitations need to be considered when interpreting the results. The data was only based on self-reports. The time-trends observed in the two cross-sectional samples allowed no causal inference because there was no control group and no possibility to measure the dose of KiVa. After the study, we contacted the principals of the study schools, but could not identify any meaningful indicators to categorize the schools into sub-analyses. Thus, no causality could be confirmed between the implementation of the anti-bullying intervention and the changes observed.

The response rates were similar in both years, with approximately 10% of students not participating, because they were unwilling to, or they were absent from school on the survey days. This creates a possibility of bias, as school absenteeism has been associated with both bullying victimization[49] and increased mental health problems.[50] However, the time-trend assessment was still reliable, because the direction of the possible bias remained similar in both years due to the equivalence of the response rates.

Conclusions

The results of this study have important clinical and public health implications. It is important to conceptualize bullying victimization as a major risk factor for mental health and it is also important to consider combined victimization as a strong indicator for possible comorbid mental health problems. This emphasizes the need to target both forms of bullying[3] and to fully integrate mental health promotion with bullying prevention efforts in schools.

True integration of mental health promotion and anti-bullying interventions would highlight mental health as a priority in school-based anti-bullying interventions, as well as counteracting bullying. True integration would include initiatives such as training students, school staff and parents to increase their awareness and

knowledge about core mental health issues and the bi-directional association between bullying victimization and mental health.[45] It is important to promote direct communication between school-based and community mental health professionals to build a chain of care for those in need. The involvement of parents is crucial in any initiative.

REFERENCES

1. Gladden RM, Vivolo-Kantor AM, Hamburger ME, Lumpkin CD. Bullying Surveillance Among Youths: Uniform Definitions for Public Health and Recommended Data Elements, Version 1.0. Atlanta, GA; National Center for Injury Prevention and Control, Centers for Disease Control and Prevention and U.S. Department of Education; 2014:7. https://www.cdc.gov/violenceprevention/pdf/bullying-definitions-final-a.pdf Accessed 4 October 2018.

2. Livingstone S, Smith PK. Annual research review: Harms experienced by child users of online and mobile technologies: the nature, prevalence and management of sexual and aggressive risks in the digital age. J Child Psychol Psychiatry 2014;55:635-654.

3. Modecki KL, Minchin J, Harbaugh AG, Guerra NG, Runions KC. Bullying prevalence across contexts: A meta-analysis measuring cyber and traditional bullying. J Adolesc Health 2014;55:602-611.

4. Smith PK, Mahdavi J, Carvalho M, Russell S, Tippett N. Cyberbullying: its nature and impact in secondary school pupils. J Child Psychol Psychiatry 2008;49:376-385.

5. Sourander A, Jensen P, 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;120:397-404.

6. Copeland WE, Wolke D, Angold A, Costello J. Adult psychiatric outcomes of bullying and being bullied by peers in childhood and adolescence. JAMA Psychiatry 2013;70:419-426.

7. Brunstein Klomek A, Sourander A, Elonheimo H. Bullying by peers in childhood and effects on psychopathology, suicidality, and criminality in adulthood. Lancet Psychiatry 2015;2:930-941.

8. Wolke D, Lereya ST. Long-term effects of bullying. Arch Dis Child 2015;100:879-885.

9. Hamm MP, Newton AS, Chisholm A, Shulhan J, Milne A, Sundar P, Ennis H, Scott SD, Hartling L. Prevalence and effect of cyberbullying on children and young people. A scoping review of social media studies. JAMA Pediatrics 2015;169:770-777.

10. Sourander A, Gyllenberg D, Brunstein Klomek A, Sillanmäki L, Ilola AM, Kumpulainen K. Association of bullying behavior at 8 years of age and use of specialized services for psychiatric disorders by 29 years of age. JAMA Psychiatry 2016;73:159-165.

11. Varjas K, Henrich C, Meyers J. Urban Middle School Students' Perceptions of Bullying, Cyberbullying, and School Safety. J Sch Violence 2009;8:159-176.

12. Molcho M, Craig W, Due P, Pickett W, Harel-Fisch Y, Overpeck M, HBSC Bullying Writing Group. Cross-National time trends in bullying behaviour 1994-2006: findings from Europe and North America. Int J Public Health 2009;54:S225–S234.

13. Kessel Schneider S, O'Donnell L, Smith E. Trends in cyberbullying and school bullying victimization in a regional census of high school students 2006-2012. J Sch Health 2015;85:611-620.

14. Sourander A, Lempinen L, Brunstein Klomek A. Changes in mental health, bullying behavior, and service use among eight-year-old children over 24 years. J Am Acad Child Adolesc Psychiatry 2016;55:717-725.Waasdorp TE, Pas ET, Zablotsky B, Bradshaw CP. Ten-Year Trends in Bullying and Related Attitudes Among 4th- to 12-Graders. Pediatrics 2017;139:e20162615.

15. Clark T, Fleming T, Bullen P, Crengle S, Denny S, Dyson B, Peiris-John R, Robinson E, Rossen F, Sheridan J, Teevale T, Utter J, Lewycka S. Health and well-being of secondary school students in New Zealand: Trends between 2001, 2007 and 2012. J Paediatr Child Health 2013;49:925–934.

16. Rivers I, Noret N. 'I h8 u': findings from a five-year study of text and email bullying. Brit Educ Res J 2010;36:643-671.

17. Ybarra ML, Mitchell KJ, Korchmaros JD. National Trends in Exposure to and Experiences of Violence on the Internet Among Children. Pediatrics 2011;128:e1376-e1386.

18. Jones LM, Mitchell KJ, Finkelhor D. Trends in youth internet victimization: findings from three youth internet safety surveys 2000-2010. J Adolesc Health 2012;50:179-186.

19. Ttofi MM, Farrington DP. Effectiveness of school-based programs to reduce bullying: a systematic and meta-analytic review. J Exp Criminol 2011;7:27-56.

20. Salmivalli C, Kärnä A, Poskiparta E. Counteracting bullying in Finland: The KiVa program and its effects on different forms of being bullied. Int J Behav Dev 2011;35:405-411.

21. Kärnä A, Voeten M, Little TD, Poskiparta E, Kaljonen A, Salmivalli C. A large-scale evaluation of the KiVa antibullying program: Grades 4-6. Child Dev 2011;82:311-330.

22. Kärnä A, Voeten M, Little TD, Alanen E, Poskiparta E, Salmivalli C. Effectiveness of the KiVa Antibullying Program: Grades 1–3 and 7–9. J Educ Psychol 2013;105:535-551.

23. Williford A, Elledge LC, Boulton AJ, DePaolis KJ, Little TD, Salmivalli C. Effects of the KiVa antibullying program on cyberbullying and cybervictimization frequency among Finnish youth. J Clin Child Adolesc Psychol 2013;42:820-833.

24. Kärnä A, Voeten M, Little TD, Poskiparta E, Alanen E, Salmivalli C. Going to scale: A nonrandomized nationwide trial of the KiVa antibullying program for grades 1–9. J Consult Clin Psychol 2011;79:796-805.

25. Glasgow RE, Lichtenstein E, Marcus AC. Why don't we see more translation of health promotion research to practice? Rethinking the efficacy-to-effectiveness transition. Am J Public Health. 2003;93:1261-1267.

26. Schwartz S, Susser E. Study designs. Natural Experiments. In: Susser E, Schwartz S, Morabia A, Bromet EJ, eds. Psychiatric epidemiology. Searching for the causes of mental disorders. New York, NY: Oxford University Press; 2006:55-56.

27. Costello EJ, Compton SN, Keeler G, Angold A. Relationships between poverty and psychopathology. A natural experiment. JAMA 2003;290:2023-2029.

28. Espelage DL, Sung Hong J. Cyberbullying prevention and intervention efforts: Current knowledge and future directions. Can J Psychiatry 2017;62:374-380.

29. Wolke D, Lee K, Guy A. Cyberbullying: a storm in a teacup? Eur Child Adolesc Psychiatry 2017;26:899-908.

30. Olweus D. Invited expert discussion paper. Cyberbullying: An overrated phenomenon? Eur J Dev Psychol 2012;9:520-538.

31. Hinjuda S, Patchin JW. Commentary. Cyberbullying: Neither an epidemic nor a rarity. Eur J Dev Psychol 2012;9:539-543.

32. Cross D, Lester L, Barnes A. A longitudinal study of the social and emotional predictors and consequences of cyber and traditional bullying victimization. Int J Public Health 2015;60:207–217.

33. Statistics Finland. StatFin. Statistics Finland's PX-Web databases. http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/?rxid=c20c39a5-a79e-4c15-af0d-7f57eb7c1657 Accessed 16 March 2018.

34. Goodman R. The Strengths and Difficulties Questionnaire: a research note. J Child Psychol Psychiatry 1997;38:581-586.

35. Koskelainen M, Sourander A, Vauras M. Self-reported strengths and difficulties in a community sample of Finnish adolescents. Eur Child Adolesc Psychiatry 2001;10:180-185.

36. Kochenderfer-Ladd B, Pelletier M. Teachers' views and beliefs about bullying: Influences on classroom management strategies and students' coping with peer victimization. J Sch Psychol 2008;46:431-453.

37. Finnish Legislation. Suomen laki 477/2003. Laki perusopetuslain muuttamisesta. 29§ Oikeus turvalliseen opiskeluympäristöön. Helsinki 2003. https://www.finlex.fi/fi/laki/alkup/2003/20030477#Pidp451409472 [in Finnish] Accessed 19 November 2018.

38. Silva MAI, Pereira B, Mendonça D, Nunes B, Oliveira W. The Involvement of girls and boys with bullying: an analysis of gender differences. Int J Environ Res Public Health 2013;10:6820-6831.

39. Barzilay S, Brunstein Klomek A, Apter A, Carli V, Wasserman C, Hadlaczky G, Hoven CW, Sarchiapone M, Balazs J, Kereszteny A, Brunner R, Kaess M, Bobes J, Saiz P, Cosman D, Haring C, Banzer R, Corcoran P, Kahn J-P, Postuvan V, Podlogar T, Sisask M, Varnik A, Wasserman D. Bullying victimization and suicide ideation and behavior among adolescents in Europe: A 10-country study. J Adolesc Health 2017;61:179-186.

40. Crick NR, Grotpeter JK. Relational aggression, gender, and social-psychological adjustment. Child Dev 1995;66:710-722.

41. Smith PK, Ananiadou K, Cowie H. Interventions to Reduce School Bullying. Can J Psychiatry 2003;48:591-599.

42. 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;24:873-881.

43. Görzig A, Milosevic T, Staksrud E. Cyberbullying victimization in context: The role of social inequalities in countries and regions. J Cross Cult Psychol 2017;48:1198–1215.

44. Reijntjes A, Kamphuis J, Prinzie P, Telch M. Peer victimization and internalizing problems in children: A meta-analysis of longitudinal studies. Child Abuse Negl 2010;34:244-252.

45. Espelage D, Low S, Jimerson S. Understanding school climate, aggression, peer victimization, and bully perpetration: contemporary science, practice, and policy. Sch Psychol Q 2014;29:233-237.

46. Merrell K, Gueldner B, Ross S, Isava D. How effective are school bullying intervention programs? A meta-analysis of intervention research. Sch Psychol Q 2008;23:26-42.

47. Bonell C, Allen E, Warren E, McGowan J, Bevilacqua L, Jamal F, Legood R, Wiggins M, Opondo C, Mathiot A, Sturgess J, Fletcher A, Sadique Z, Elbourne D, Christie D, Bond L, Scott S, Viner RM. Effects of the Learning Together intervention on bullying and aggression in English secondary schools (INCLUSIVE): a cluster randomised controlled trial. Lancet 2018 Nov 22. doi: 10.1016/S0140-6736(18)31782-3. [Epub ahead of print]

48. Steiner RJ, Rasberry CR. Brief report: Associations between in-person and electronic bullying victimization and missing school because of safety concerns among US high school students. J Adolesc 2015;43:1-4.

49. Wood JJ, Lynne-Landsman SD, Langer DA, Wood PA, Clark SL, Eddy JM, Ialongo N. School attendance problems and youth psychopathology: structural cross-lagged regression models in three longitudinal data sets. Child Dev 2012;83:351-366.

Table 1. Background characteristics of the participants

	2008	2014
	n=2,061	n=1,936
Age (years)		
Mean (SD)	14.4 (1.1)	14.3 (1.1)
Gender (%)		
Girls	50.4	48.8
Boys	49.6	51.2
School grade (%)		
7th grade	51.5	51.9
9th grade	48.5	48.1
Family background (%)		
Two biological parents	66.8	70.4
Single parent	17.6	15.0
Remarried parents	12.8	12.1
Foster parents	0.8	1.0
Adoptive parents	0.3	0.4
Other	1.8	1.1
Ethnic background (%)		
Born in Finland	94.9	95.4
Native language is Finnish	95.1	96.0
Biological mother born in Finland	93.0	93.1
Biological father born in Finland	92.7	92.9
City (%)		
Rovaniemi	64.5	61.9
Salo	35.5	38.1

Abbreviations: SD standard deviation

Table 2. Changes in bullying victimization from 2008 to 2014.

	Females				Males			
	2008	2014	2014 vs. 2008		2008	2014	2014 vs. 2008	
	n=1,026	n=943	Unadjusted[a]	Adjusted[b]	n=1,009	n=988	Unadjusted[a]	Adjusted[b]
	%	%	OR (95 % CI)	OR (95 % CI)	%	%	OR (95 % CI)	OR (95 % CI)
Bullying victimization[c]								
None	66.6	71.8	1	1	61.7	74.1	1	1
Traditional bullying only[d]	23.2	17.4	**0.7 (0.6-0.9)****	**0.7 (0.6-0.9)****	28.9	19.1	**0.5 (0.4-0.7)*****	**0.5 (0.4-0.7)*****
Cyberbullying only	2.7	4.1	1.4 (0.9-2.4)	1.4 (0.9-2.4)	3.3	3.0	0.7 (0.4-1.3)	0.7 (0.4-1.2)
Both traditional[d] and cyberbullying	7.5	6.7	0.8 (0.6-1.2)	0.8 (0.6-1.2)	6.1	3.9	**0.5 (0.3-0.8)****	**0.5 (0.4-0.8)****
Traditional bullying victimization at school								
None	72.0	79.4	1	1	67.1	79.4	1	1
Less than once a week	21.6	14.8	**0.6 (0.5-0.8)*****	**0.6 (0.5-0.8)*****	24.8	15.5	**0.5 (0.4-0.7)*****	**0.5 (0.4-0.7)*****
More than once a week	6.4	5.8	0.8 (0.6-1.2)	0.8 (0.6-1.2)	8.1	5.1	**0.5 (0.4-0.8)****	**0.5 (0.4-0.8)****
Traditional bullying victimization outside school								
None	85.9	88.2	1	1	86.0	91.2	1	1
Less than once a week	11.5	9.2	0.8 (0.6-1.1)	0.8 (0.6-1.1)	11.3	8.1	**0.7 (0.5-0.9)***	**0.7 (0.5-0.9)***
More than once a week	2.7	2.6	0.9 (0.5-1.6)	1.0 (0.6-1.7)	2.7	0.7	**0.3 (0.1-0.6)****	**0.2 (0.1-0.6)****
Cyberbullying victimization								
None	89.7	89.2	1	1	90.7	93.2	1	1
Less than once a week	9.5	9.3	1.0 (0.7-1.3)	1.0 (0.7-1.4)	7.0	5.8	0.8 (0.6-1.2)	0.8 (0.6-1.2)
More than once a week	0.8	1.5	1.9 (0.8-4.6)	1.9 (0.8-4.5)	2.4	1.1	**0.4 (0.2-0.9)***	**0.4 (0.2-0.9)***

*p < .05, **p < .01, ***p < .001, statistically significant findings are presented in bold

[a] Single predictor logistic regression model

[b] Multi-predictor logistic regression model, adjustment for city, grade, family background and ethnic background

[c] Bullying victimization at any frequency

[d] Traditional bullying victimization at school and/or outside school

Table 3. Changes in the perceptions of adolescents regarding school safety and the positive behavior of teachers and other students from 2008 to 2014.

	Females				Males			
	2008	2014	2014 vs. 2008		2008	2014	2014 vs. 2008	
	n=1,026	n=943	Unadjusted[a]	Adjusted[b]	n=1,009	n=988	Unadjusted[a]	Adjusted[b]
	%	%	OR (95 % CI)	OR (95 % CI)	%	%	OR (95 % CI)	OR (95 % CI)
Feel safe at school								
Always/usually	89.0	88.8	1	1	85.3	88.5	1	1
Sometimes	9.6	9.3	1.0 (0.7-1.3)	1.0 (0.7-1.3)	8.2	8.3	1.0 (0.7-1.3)	1.0 (0.7-1.4)
Never	1.4	1.9	1.4 (0.7-2.8)	1.3 (0.7-2.7)	6.5	3.2	**0.5 (0.3-0.7)***	**0.5 (0.3-0.8)**
Teachers care								
Always/usually	55.5	61.6	1	1	51.4	57.6	1	1
Sometimes	32.5	32.8	0.9 (0.7-1.1)	0.9 (0.8-1.1)	28.9	30.2	0.9 (0.8-1.1)	0.9 (0.8-1.1)
Never	12.0	5.6	**0.4 (0.3-0.6)***	**0.4 (0.3-0.6)***	19.7	12.2	**0.6 (0.4-0.7)***	**0.6 (0.4-0.7)***
Adults try to stop bullying								
Always/usually	52.6	71.1	1	1	54.6	69.7	1	1
Sometimes	39.7	24.1	**0.45 (0.4-0.5)***	**0.5 (0.4-0.6)***	33.0	20.6	**0.5 (0.4-0.6)***	**0.5 (0.4-0.6)***
Never	7.7	4.8	**0.5 (0.3-0.7)***	**0.5 (0.3-0.7)***	12.4	9.8	**0.6 (0.5-0.8)**	**0.6 (0.5-0.9)**
Students try to stop bullying								
Always/usually	22.3	34.1	1	1	19.9	29.2	1	1
Sometimes	56.7	49.6	**0.4 (0.5-0.7)***	**0.6 (0.5-0.7)***	52.2	50.4	**0.7 (0.5-0.8)***	**0.7 (0.5-0.8)***
Never	21.1	16.3	**0.5 (0.4-0.7)***	**0.5 (0.4-0.7)***	28.0	20.4	**0.5 (0.4-0.6)***	**0.5 (0.4-0.6)***

*p < .05, **p < .01, ***p < .001, statistically significant findings are presented in bold

[a] Single predictor logistic regression model

[b] Multi-predictor logistic regression model, adjustment for city, grade, family background and ethnic background

Table 4. Association between types of bullying victimization and demographic characteristics and mental health, measured with the Strengths and Difficulties Questionnaire.

	Type of bullying victimization							
	None		Traditional bullying only		Cyberbullying only		Traditional and cyberbullying	
	n=2,616		n=850		n=125		n=231	
	%	OR	%	OR (95 % CI)	%	OR (95 % CI)	%	OR (95 % CI)
Year[a]								
2008	63.9		26.2		3.0		6.9	
2014	73.0	1	18.2	**0.6 (0.5-0.7)***	3.5	1.0 (0.7-1.5)	5.3	**0.7 (0.5-0.9)**
Gender [a]								
Girls	69.1		20.4		3.4		7.1	
Boys	67.8	1	24.1	**0.8 (0.7-0.97)***	3.2	1.0 (0.7-1.5)	5.0	**1.4 (1.1-1.9)***
Grade[a]								
7th	65.4		24.3		3.3		7.0	
9th	71.4	1	20.2	**0.8 (0.7-0.9)***	3.3	0.9 (0.6-1.3)	5.1	**0.7 (0.5-0.9)**
Family background[a]								
Biological parents	70.4		21.6		2.9		5.1	
Other	64.2	1	23.8	**1.2 (1.02-1.4)***	4.0	**1.5 (1.04-2.2)***	7.9	**1.7 (1.3-2.3)***
Ethnic background[a]								
Born in Finland	68.5	1	22.3	1.0 (0.7-1.5)	3.2	0.6 (0.3-1.4)	6.0	0.8 (0.4-1.6)
Other	66.2		22.1		4.8		6.9	
City[a]								
Rovaniemi	68.4		22.0		3.3		6.3	
Salo	68.1	1	22.8	1.0 (0.9-1.2)	3.2	1.0 (0.7-1.4)	5.9	0.9 (0.7-1.2)
SDQ emotional problems[b, c]	9.1	1	25.2	**4.2 (3.4-5.3)***	23.8	**3.3 (2.1-5.3)***	43.6	**8.8 (6.4-12.2)***
SDQ conduct problems[b, c]	8.8	1	15.7	**1.8 (1.4-2.3)***	13.5	1.6 (0.9-2.8)	29.1	**4.0 (2.8-5.5)***
SDQ hyperactivity[b, c]	12.9	1	18.9	**1.6 (1.3-2.0)***	19.8	1.6 (0.99-2.5)	32.9	**3.2 (2.4-4.4)***
SDQ peer problems[b, c]	8.9	1	23.6	**3.4 (2.7-4.2)***	14.3	1.6 (0.96-2.8)	33.9	**5.6 (4.1-7.6)***
SDQ prosocial skills[b, d]	10.1	1	13.3	**1.3 (1.002-1.6)***	14.3	1.4 (0.8-2.5)	17.6	**2.0 (1.4-2.9)***
SDQ total score[b, c]	10.7	1	28.0	**3.6 (2.9-4.3)***	24.6	**2.6 (1.7-4.0)***	50.2	**8.7 (6.4-11.7)***

*p < .05, **p < .01, ***p < .001, statistically significant findings are presented in bold
[a] Single predictor logistic regression model

[b] Multi-predictor logistic regression model, adjustment for year, gender, city, grade, family background and ethnic background
[c] Those scoring over the 80% cut-off point
[d] Those scoring under the 20% cut-off point

Figure 1. Flow chart showing the participants in the study years.