



A Meta-analytic Review of School-Based Anti-bullying Programs with a Parent Component

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Abstract

Social-ecological theory of school bullying stresses the role parents play in students' engagement in bullying. School practitioners and the researchers who support practitioners are often recommended to involve parents in their efforts to implement school-based prevention efforts. Yet, empirical support for this recommendation is scarce. Although evidence on bullying prevention programs continues to burgeon, limited efforts have been made to synthesize the impacts of adding parental components to prevention programming. This meta-analysis attempts to fill this gap by reviewing and analyzing studies published after 2000 that evaluate school-based anti-bullying programs involving a parental component. Twenty-two studies with an overall sample of 212,211 students from kindergarten to 12th grade supported a small but significant effect on reducing bully perpetration ($d = 0.179$, 95% CI = [0.095, 0.264]) and victimization ($d = 0.162$, 95% CI = [0.059, 0.265]). Moderator analysis revealed that the effectiveness of the program on both perpetration and victimization was not affected by school level, country in which the program was implemented, or type of parental component. Current caveats and suggestions for incorporating parental components in school-based anti-bullying programs are discussed.

Keywords Anti-bullying · Prevention · Parent · Meta-analysis

Introduction

School bullying is a serious public health concern that affects both the short- and long-term well-being of children and adolescents (Craig 1998; Juvonen et al. 2011; Ttofi and Farrington 2008). *Bullying* is defined as recurring physical, verbal, or relational acts of aggression perpetrated by one or more youth, and can take place face-to-face or via online platforms (Gladden et al. 2014; Olweus 1993). In addition, as adolescents are spending more time on the internet and engaging with social media, cyberbullying, or electronic bullying, is becoming a serious problem (Slonje and Smith 2008; Smith

et al. 2008). Given the adverse consequences of bullying, scholars have explored and identified a number of risk and protective factors that contribute to bullying behavior. Studies on risk and protective factors for bullying have recognized the importance of the social-ecological framework. This framework suggests that adolescent behavior, such as bullying, occurs under the influence of complex, interrelated systems, which involve the interaction and reciprocal influence among individuals, their family, peers, school, community, and their culture (Astor et al. 2001; Bronfenbrenner 1994; Espelage and Swearer 2011). The social-ecological framework focuses on understanding how individual characteristics of children interact with environmental contexts or systems to promote or prevent bully victimization and perpetration (Bronfenbrenner 1994; Espelage 2016). One context that has received a significant amount of research attention is the family context.

The family context of adolescent development and behavior has been researched widely. Within the family context, parents are recognized as playing a significant role in the development of their children's socialization, and scholars have proposed that parents need to be included in bullying prevention efforts (Holt et al. 2009). A meta-analytic study by Ttofi and Farrington (2011) found that parent training/

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meetings was one of many components that contributed to reductions in bullying perpetration and victimization rates in intervention schools versus control schools. Although the meta-analytic findings highlight the importance of parental involvement in bully prevention efforts, it was limited because the type of parental intervention delivered was not coded (e.g., homework parent-child activities) or was not differentiated (e.g., informational meeting versus training), which makes it difficult to determine the differential effects of varying parental components on outcomes. Despite the significance of the meta-analytic study, scholars have raised concerns about the findings related to analyses and scope (Smith et al. 2012; Yeager et al. 2015). More information is needed, such as various efforts of involving parents in anti-bullying programs. Also, it is important to explore whether the effects of the anti-bullying programs are affected by certain characteristics of the research design.

The primary purpose of this meta-analytic review is to build on Ttofi and Farrington's (2011) findings by reviewing school-based anti-bullying evaluations of programs published from 2000 to 2017 that focused on different methods of involving parents in bullying prevention. The secondary purpose is to examine research characteristics that may have affected the effect of anti-bullying programs.

Parental Role in Adolescent Bullying and Victimization

The importance of understanding the role of parents in the prevention of bullying and peer victimization has been supported by various theories including attachment theory, social learning, and family systems theory (Holt et al. 2009). Studies examining family environmental factors found that exposure to problems within the home, such as family conflict, inter-parental violence, and child abuse increased the likelihood for both bully perpetration and victimization (Baldry 2003; Duncan 1999; Holt et al. 2007; Holt et al. 2009). Living in a single-parent household is also found to be associated with an increased risk of being bullied (Nordhagen et al. 2005). Moreover, parenting style is another factor that is linked to adolescents' engagement in bullying. Adolescents who report bullying others are more likely to have parents who are disengaged and unresponsive compared to those youth who do not bully others (Espelage et al. 2000; Georgiou 2008; Leemis et al. *in press*). In terms of peer victimization, research on the relationship between adolescents and their parents and victimization differed by sex (Duncan 2004). According to Duncan's (2004) study, male victims were more likely to report having overly close relationships with mothers, while female victims were more likely to report having mothers who were emotionally abusive, hostile and emotionally distant.

Studies also report that although parents usually understand what bullying is and what its negative influences are, they

typically underestimate their children's involvement in bullying, either as a perpetrator or victim (Holt et al. 2009; Stockdale et al. 2002). In addition, the difference between children and parents' reporting of bullying incidents may be due to lack of reporting. In one study with 2766 elementary school students, findings indicated that only 67% of bully-victims reported their victimization experiences to their parents (Fekkes et al. 2006). Another study with middle school students found that 40% of students who were bullied did not tell an adult, including parents, about their experience (Unnever and Cornell 2004). However, a limited number of studies also reveal that adolescents who report high levels of familial social support are more likely to confide in their parents about being victimized (e.g., Holt et al. 2009). Thus, it is critical that bully prevention programs provide parents with the knowledge and skills to provide support and assist their children in negotiating peer relations and in avoiding bullying involvement.

Parental Component of Anti-bullying Programs

Although parental components are often part of school-based anti-bullying programs, research has been challenged to isolate whether parental involvement is associated with a reduction of adolescent bullying. In a large-scale meta-analysis of over 40 studies examining correlations between study features and effect sizes in school bullying programs, Ttofi and Farrington (2011) found that parental training/meetings were among the most important elements that were associated with decreases in bully perpetration and victimization. They also found that providing information for parents was also correlated with a decrease in bullying (Ttofi and Farrington 2011). However, Evans et al.' (2014) systematic review of 32 articles on bullying interventions published between June 2009 and April 2013 showed that parent involvement in bullying programs did not predict a significant reduction in bullying and victimization. It should be noted that this review did not provide any further examination of the effect of different parental components. To date, no study has reviewed research on school-based bullying programs that incorporated parental involvement specifically, or focused on examining certain features of the parental components, such as informational meetings or communication sent home from schools.

A review of the literature included in the current meta-analysis has identified five main types of parental involvement. (1) Most programs provided parents with written information about bullying and resources about school bullying through, for example, school newsletters and guidebooks (Crean and Johnson 2013; Frey et al. 2005; Stevens et al. 2000). However, the description of the written information in most studies did not provide adequate information, such as pages of the guidebooks and frequency of newsletters to allow differentiation of the amount and depth of information

that was disseminated. (2) Some programs also included collaborations with parents in developing and implementing school discipline policies to raise parents' awareness and to provide mutual support and encourage parents' accountability for creating solutions for bullying (Beran et al. 2004; Wong et al. 2011). (3) A small number of programs also assigned student homework activities that required parents' participation (Joronen et al. 2011). (4) In other programs, schools were instructed to have meetings with parents, to share information about the anti-bullying initiative of the program and to enhance communication between parents and teachers. This usually took place by teachers organizing information sessions, having parent-teacher meetings, holding parent evenings/nights, and giving presentations. (Pepler et al. 2004; Raskauskas 2007). (5) There were also some programs that held parent training and workshops to educate parents on school bullying, parenting skills, and to discuss developmentally appropriate forms of parental discipline and communication with children (e.g., Bauer et al. 2007; Cross et al. 2012; Joronen et al. 2011). The duration of such programs ranged from a single 2-h workshop to eight weekly 1-h sessions.

Despite a movement towards involving parents in prevention programs, there is a paucity of information on how different types of parental involvement contribute to the efficacy of school-based anti-bullying programs.

Current Study

The purpose of this project is to extend the previous works (Evans et al. 2014; Ttofi and Farrington 2011) by assessing the effectiveness of school bullying intervention programs with a specific focus on parental components. This meta-analysis involved a synthesis of the extant research on prevention programs aimed at reducing bully perpetration/victimization in K-12 schools that involved parents. We conducted a systematic review and meta-analysis of the empirical studies in an effort to address the following two research questions:

- What are the effect sizes of these prevention programs in reducing bully perpetration and victimization?
- Are there any characteristics of these studies, especially factors that are related to parental intervention components, that are significantly associated with changes in bully perpetration or peer victimization?

Method

Eligibility Criteria

The present study evaluated school-based anti-bullying intervention programs that include a parental involvement component.

To build on the previous meta-analysis (Ttofi and Farrington 2011), we examined the effects of programs and studies that were published or conducted after 2000 and before 2018 and written in English. We reviewed studies that only included students from kindergarten through 12th grade as participants. The review was limited to quantitative, longitudinal studies that evaluated a school-based program. Programs outside of a school setting (e.g., community-based programs) were excluded. In addition, the study must have focused on bully perpetration and victimization behaviors rather than related behaviors, such as aggression or antisocial behaviors. Therefore, a study was included only if it focused on measuring bully perpetration and/or peer victimization as an outcome. Also, measures of attitudes towards bullying and knowledge about bullying were not considered as meeting the inclusion criteria. In terms of study designs, studies must have included at least two conditions for comparison. Without a comparable control condition, the research outcomes cannot be attributed to the program with confidence because there can be confounding factors such as age which could have also affected the result. Other than having a control or treatment as usual condition, age cohort designs were also considered as meeting the criteria because these designs largely eliminate confounding effects of selection, aging and attrition differences, by comparing students of a certain age in year one pre-intervention and students of the same age post-intervention in year two (Olweus 2005). Ttofi and Farrington (2011) argued that randomized experiments, intervention-control with/without before-and-after designs, and age-cohort designs are the best and most controlled designs that have been used in anti-bullying program evaluations. Most importantly, the programs should have actively involved parents beyond simply securing parental consent. We included studies that described specific parental components in the program description. We sent email queries to study authors when the study vaguely described efforts to involve parents but did not specify the methods or activities that involved parents (e.g., simply stating that the program involved all relevant personnel including parents; training teachers on communication with parents). Studies whose authors did not respond or responded by saying no parental component was part of the intervention were excluded from the review.

Search Strategy

This review draws data from an ongoing project that includes a large meta-analysis of multiple outcomes associated with all forms of school violence (Authors, 2018). As part of that review, we conducted comprehensive searches to retrieve literature published from 2000 to 2017 in 12 databases including Education Resources Information Center (ERIC), ProQuest Criminal Justice, ProQuest Dissertations and Theses, PsycINFO, and so on. We also searched five gray literature databases and hand-searched the *Journal of School Violence* and *Developmental Psychology*.

After we removed the duplicates, we were able to retrieve 14,957 total citations. After screening the titles and abstracts of each citation with Abstrackr (Byron et al. 2012), 2302 articles met the original eligibility criteria. A more thorough full-text screening was performed to screen studies that met the criteria and to place these studies into different “buckets” based on study characteristics, such as intervention versus non-intervention studies. From this total, we identified 340 studies that were eligible for further screening for this study.

Another round of screening was conducted on the 340 extracted studies to eliminate studies that did not meet the criteria for the current meta-analysis (see the next section for criteria). This included reviewing the full text of each study, as well as emailing queries to the authors for details on inclusion of parental components in their interventions. The response rate for the email queries was 41.6%. This generated ten studies that met the criteria for this review. Because the original search did not include all relevant keywords, we conducted reference harvesting of published meta-analyses (e.g., Evans et al. 2014; Merrell et al. 2008; Ttofi and Farrington 2011) and searched for additional studies that met the inclusion criteria. This generated an additional 23 studies to be further screened. The final search and screening process resulted in 22 studies that were included in the review (see Fig. 1 for Consort Diagram).

Coding

Study details were coded and entered to a Ninox database (2018) for the 22 included studies. The details included authors, publication year, program location, sample characteristics (e.g., age, gender, race/ethnicity, school level), and program characteristics (e.g., length of time, parental involvement component, and study design). Information (e.g., measurement name, reporter, item number) and statistics (e.g., mean, standard deviation, frequency, mean differences, odds ratio) of outcome measures (bully perpetration/victimization) were coded for effect size analysis. Even though we started the project with a goal to code and examine characteristics that were associated with parental components, such as its implementation fidelity and participation rate, most studies did not record or provide such information.

Missing Data

For the seven studies that lacked adequate information for computing the effect size, authors were contacted via email (Bowllan 2011; Brown et al. 2011; Fonagy et al. 2009; Kaiser-Ulrey 2003; Leadbeater and Sukhawathanakul 2011; Lester et al. 2012; Roland et al. 2010). Five authors did not respond to our request. One author responded but was unable to provide additional information due to a lack of data availability. One author responded with requested information, which was utilized in the meta-analysis. The six studies that failed to provide enough information were excluded from the analysis.

Data Analysis

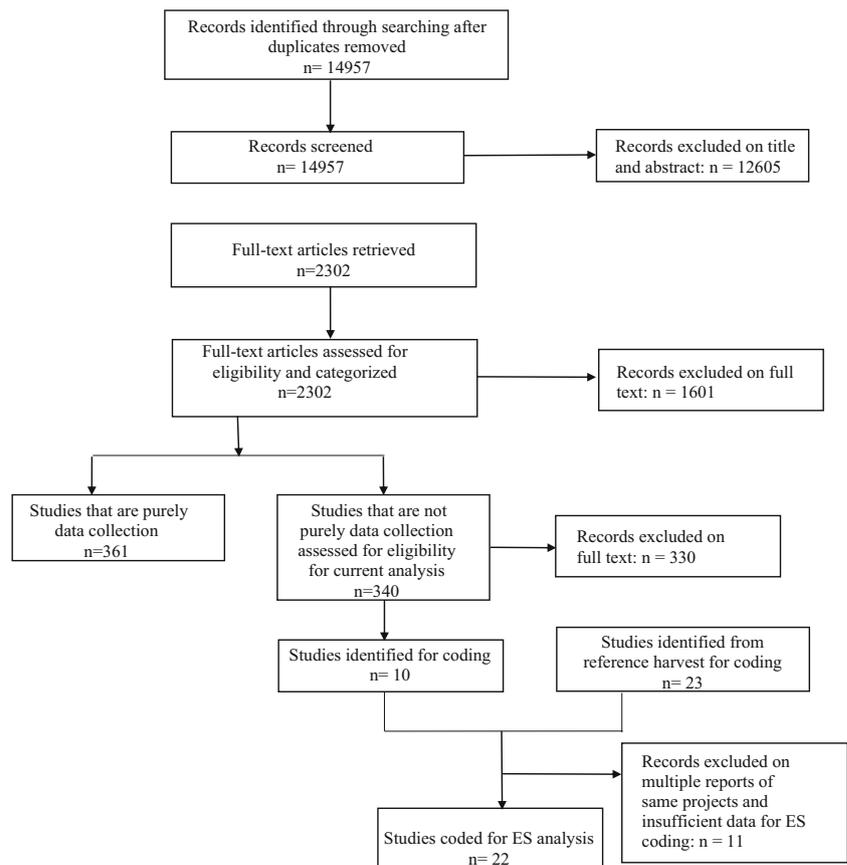
This study involved conducting a meta-analysis, a statistical method that allows for combining studies on a similar topic to estimate an overall treatment outcome (Cooper et al. 2009; Lipsey and Wilson 2001) to summarize the effectiveness of interventions that met specific criteria. We also identified study characteristics that predicted the magnitude of the treatment effect. Program effectiveness on bully perpetration and victimization was analyzed separately. We conducted the analyses using the MAAd (Del Re and Hoyt 2010) and robumeta (Fisher and Tipton 2015) packages in *R* for aggregating the effect sizes and conducting the analysis.

Computing Effect Sizes (ES) Some studies reported the outcomes on a continuous scale, for which computing a standardized mean difference ES, Cohen’s d (d) would be most suitable. Some studies reported the outcomes on a dichotomous scale, for which it would be most appropriate to compute an odds ratio ES (OR). To control for the group differences in the pre-test, we subtracted the pre-test ES from the post-test ES. Since the majority of the studies in this review reported outcomes on a continuous scale, ORs were converted to d s for summarizing and comparing the effects sizes across studies (Polanin and Sniltveit 2016). Further, for one study that had a small sample size ($N < 100$ Hedges’s (1981) small sample correction (g) was used to correct the bias of the d .

Effect Size Synthesis The effect sizes were synthesized using a random-effects model. We used an advanced meta-analysis technique, robust variance estimation, to estimate accurate standard errors (Tanner-Smith et al. 2016). While independence of the findings used to be the standard practice (Del Re 2015), robust variance estimation eliminates the need to aggregate or select one effect size per study and allowed us to include all estimated effect sizes for a study in the same model (Tanner-Smith and Tipton 2014). We conducted separate analyses for bully perpetration and victimization outcomes.

We then estimated the heterogeneity. Calculation of I^2 reveals the amount of heterogeneity among the studies beyond sample differences (Higgins and Thompson 2002). It is appropriate to conduct moderator analyses when the amount of heterogeneity reaches or exceeds moderate to large level, which is between 50 and 70%. Since the I^2 statistics suggested that there was large heterogeneity among the ESs, it was necessary to investigate what factors might have accounted for the dispersion in the summarized ES with moderator analyses. For this review, we were interested in exploring whether type of parental involvement, country where the program was delivered, and school level might moderate the intervention effect. These characteristics of the studies are presented in Table 1 along with their ESs and other program characteristics. Study characteristics that were coded include but are not limited to the following.

Fig. 1 Consort diagram



Type of Parental Component. We coded parental involvement activities into four categories: (1) written materials, which includes newsletters, brochures, pamphlets, guidebooks etc.; (2) in-person communication, which includes co-operation with parents in policy-making/ implementation, information sessions, sharing information about the program in parent meetings and parent evenings/nights; (3) home activities that require parental involvement; and (4) parent training/workshops. The categories were listed in an order of the involvement level from low to high. Studies that have more than one type of parental involvement were coded with the category of the highest level. We further dichotomized the categories into (1) without training/workshops, and (2) with training/workshops to evaluate the contribution of parent training and workshops.

Location. We coded the location where the programs were implemented: (1) North America (the USA and Canada), (2) Europe, (3) Australia, and (4) Asia.

School Level. The school level was coded into (1) kindergarten, (2) elementary school, (3) secondary school, and (4) mixed. We combined middle schools and high schools as secondary schools because the two school levels were studied together in the majority of the reviewed studies. In the moderator model, we only

included the studies with elementary and secondary school populations for the analysis.

Publication Bias To avoid making conclusions about the intervention effectiveness with a non-representative proportion of significant studies (Polanin et al. 2016), we first used the Egger’s regression test (Egger et al. 1997) to assess the symmetry of the funnel plot of this meta-analysis dataset. When asymmetry was detected, indicating potential publication bias, we used the nonparametric trim and fill procedure (Duval and Tweedie 2000) to further examine it.

Results

A total of 22 prevention/intervention programs met the eligibility criteria for the current review and provided adequate information for the effect size analyses. More specifically, 17 out of the 22 studies reported program effectiveness on reducing bully perpetration, while 19 out of the 22 studies reported program effectiveness on peer victimization. There were nine studies conducted in North America (the U.S. and Canada), eight in Europe, four in Australia, and one in Asia.

Table 1 Characteristics of the studies used in the current meta-analysis

Study (DoP)	Location	N (%F)	School level	Program name	Design	Parental involvement	ES on victimization (95% CI)	ES on perpetration (95% CI)
Alsaker and Vakanover (2012)	Switzerland	319 (44.8)	Kindergarten	Be-Prox	Randomized Controlled Trial	1) Meeting with parents at the beginning to introduce prevention goals	0.63 (0.33, 0.93)	0.06 (−0.25, 0.37)
Bauer et al. (2007)	USA	6518 (51)	Middle	Olweus Bullying Prevention Program	Not comparable control	1) Informing parents the start of the intervention; (2) holding events to actively educate parents	0.01 (−0.07, 0.09)	–
Beran et al. (2004)	USA	197 (61)	Elementary	Dare to Care	Matched Control	1) A presentation to parents on program's principles; 2) including parents in collaboration to develop a discipline policy on bullying; 3) materials such as artwork, books, and videos presented to parents	0.02 (−0.46, 0.50)	–
Berry and Hunt (2009)	Australia	46 (0)	Middle, High	No name	Randomized Controlled Trial	1) Parents were invited to attend weekly 1-h group sessions that were independent of their children's sessions, but the content areas were parallel. The topics covered were largely anxiety management and anti-bullying strategies, and aimed to generalize treatment gains.	1.26 (0.67, 1.85)	–
Crean and Johnson (2013)	USA	779 (57)	Elementary	PATHS	Randomized Controlled Trial	1) parent letters and information packets; 2) homework that involves parents	0.05 (−0.13, 0.23)	–
Cross et al. (2012)	Australia	2552	Elementary	Friendly Schools friendly families	Randomized controlled trial	1) Awareness raising (25 newsletter items, 25-page parent booklet, five scripted assembly items, six songs, and referral information); 2) Two-hour parent workshop; 3) Four 6-page parent-child communication sheets;	0.17 (−0.01, 0.36)	0.08 (−0.03, 0.19)
Cross et al. (2016)	Australia	3382 (53)	Middle	Cyber Friendly Schools	Randomized Controlled Trial	4) Six classroom-home activities 1) disseminating online resources to parents to increase awareness; 2) parents' cyberbullying prevention training	0.11 (0.05, 0.17)	0.07 (0.01, 0.13)
Domino (2011)	USA	323 (52.9)	Middle	Take the LEAD	Randomized Controlled Trial	1) A parent information letter describing the program; 2) parent received ongoing Parent Connections in the form of interactive homework assignment; 3) holding parent awareness sessions (seminars) aimed at raising social-emotional awareness, including supporting social competencies and handling social and emotional	0.94 (0.72, 1.16)	0.66 (0.44, 0.88)

Table 1 (continued)

Study (DoP)	Location	N (%F)	School level	Program name	Design	Parental involvement	ES on victimization (95% CI)	ES on perpetration (95% CI)
Evers et al. (2007)	USA	2452 (50)	Middle, High	Build Respect, Stop Bullying Program	Matched Control	1) A 10-page manual for parents that included optimal activities; 2) parent meetings	0.32 (0.11, 0.53)	0.28 (0.17, 0.39)
Fekkes et al. (2006)	Netherlands	3816 (50)	Elementary	no name	Randomized Controlled Trial	1) Organizing information meeting on bullying for parents	0.10 (0.02, 0.22)	0.06 (-0.15, 0.27)
Frey et al. (2005)	USA	544 (49.4)	Elementary	Steps to Respect	Matched Control	1) A scripted informational overview of the program for parents; 2) informing parents about the program and school's anti-bullying policy and procedures; 3) take home letters outlining key concepts, skills and activities	0 (-0.12, 0.12)	0.02 (-0.09, 0.13)
Hunt (2007)	Australia	318 (71.6)	Middle, High	an Education Program	Randomized Controlled Trial	1) Presenting information about bullying at parent meetings; 2) a summary of the information covered in meetings was published in sent-home school newsletters	-0.13 (-0.36, 0.10)	0.11 (-0.12, 0.34)
Joronen et al. (2011)	Finland	134 (47.4)	Elementary	Drama Program	Matched Control	1) Home activities that included interactional tasks between parent and child; 2) parent evenings based on themes which emerged from parents' and teachers' written suggestions, tutored by a drama teacher (AH) who used drama methods to enhance interaction between parents and parents and teachers	0.50 (0.02, 0.98)	0.11 (-0.39, 0.61)
Kämä et al. (2011)	Finland	150,000	Elementary, Middle, High	KiVa Nationwide	Age Cohort Design	1) Parents receive a guide that includes information about bullying and advice about what parents can do to prevent and reduce the problem. See above	0.11 (0.08, 0.14)	0.09 (0.05, 0.13)
Kämä et al. (2013)	Finland	31,667	Elementary, Middle, High	KiVa RCT			0.14 (0.05, 0.23)	0.14 (0.02, 0.26)
Leadbeater and Sukhawathanakul (2011)	Canada	830 (41.8)	Elementary	WITS	Matched control	1) Parents received information pamphlets about using WITS at home	0.14 (0.01, 0.27)	-
Lewis et al. (2013)	USA	374	Elementary, Middle			1) Family classes; 2) In-class Family Materials and At-Home Family Kits	-	0.39 (0.05, 0.73)
Pepler et al. (2004)	Canada	758	Elementary	The Canadian Anti-Bullying Intervention	Having some other comparable control condition	1) Information nights were held and communications were sent home related to the program and its objectives	-0.03 (-0.19, 0.13)	0.29 (0.13, 0.45)
Raskauskas (2007)	New Zealand	3155 (48)	Elementary, Middle, High	Kia Kaha Anti-Bullying Program	Matched control	1) Sent-home information for parents; 2) teachers hosted a parent night	0.17 (0.11, 0.23)	0.19 (0.13, 0.25)

Table 1 (continued)

Study (DoP)	Location	N (%F)	School level	Program name	Design	Parental involvement	ES on victimization (95% CI)	ES on perpetration (95% CI)
Salmivalli et al. (2005)	Finland	1220 (49.2)	Elementary	The Finnish Anti-Bullying Intervention	Aged cohort design	1) Communicating school policy against bullying to parents	0.22 (0.05, 0.39)	0.25 (0.08, 0.42)
Stevens et al. (2000)	Belgium	1347	Elementary, Middle, High	The Flemish	Randomized Controlled Trial	1) Information sessions aim at increasing awareness of bully/victim problems;	-0.06 (-0.21, 0.09)	-0.03 (-0.18, 0.13)
Wong et al. (2011)	Hong Kong, China	1480	High	Restorative whole-school approach	Having some other comparable control	1) Workshops and talks for parents	-	0.44 (0.29, 0.59)

Regarding parental involvement, 13 interventions included materials such as newsletters, booklets, and guidebooks to provide parents with information about school bullying and the intervention and strategies parents can use to raise parents’ awareness. Nine studies organized meetings with parents to communicate (1) information about bullying, (2) school policy and the intervention program, or (3) to solicit their input on policymaking. Four studies assigned home activities that required parent-child interactions. Seven studies held events, such as parent training, workshops, and classes to improve strategies for handling bullying; communication between parents and children and school officials; and family management skills, which are expected to enhance family environment for students to receive support and develop skills at home, as well as to strength ant parent-school bond (see Table 1).

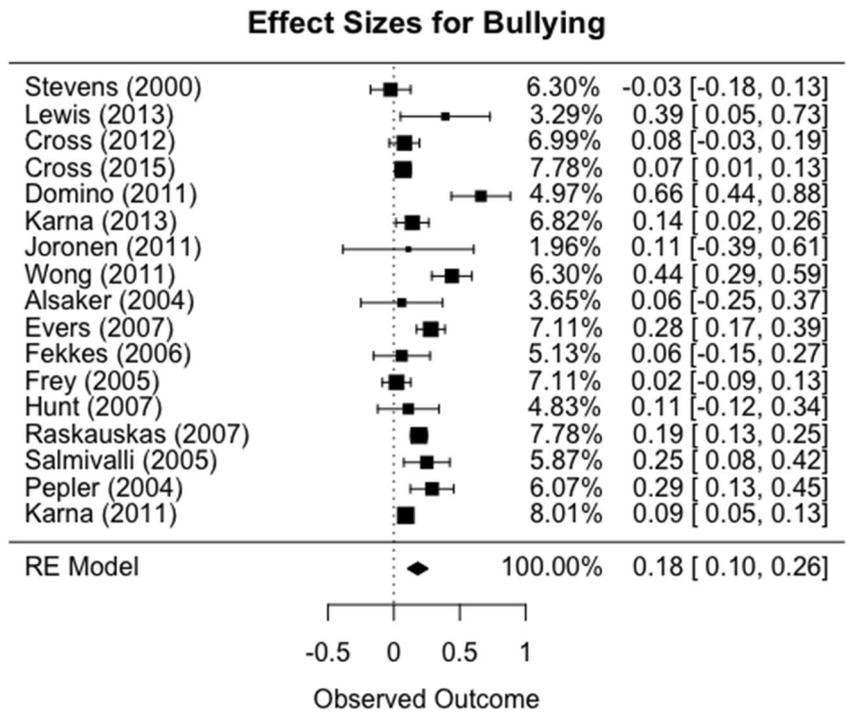
A total of 212,211 students participated in the 22 interventions. One intervention was conducted in kindergarten ($N = 319$), nine interventions were conducted among elementary school populations ($N = 10,830$), seven interventions were conducted among secondary school populations ($N = 14,519$), and five interventions used both elementary and secondary school populations as participants ($N = 186,543$). Approximately 50% of the participants were females in most studies.

Outcome Effect Sizes

Bully Perpetration Twenty-one effect sizes of the 17 programs on bully perpetration were synthesized to estimate the overall mean effect size. Results from a robust variance model showed that the overall effect of these programs was $d = 0.179$ (95% CI = [0.095, 0.264], $p < .001$), indicating that there was a small but significant treatment effect on bully perpetration at post-test of the programs. In other words, the average score on bully perpetration in the treatment condition was 0.179 standard deviation lower than that of the control condition. The heterogeneity output showed that $I^2 = 79.14%$, suggesting that there was a large degree of true between-study heterogeneity, which warranted moderator analyses (see Fig. 2 for program effect sizes on bullying).

Peer Victimization Twenty-six effect sizes out of the 20 studies on peer victimization were synthesized to estimate the overall mean effect size. The robust variance model for these programs showed a result that is slightly smaller than that of perpetration. The weighted overall effect was $d = 0.162$ (95% CI = [0.059, 0.265], $p = .004$), indicating a small but significant treatment effect on peer victimization at post-test of the programs. The heterogeneity output showed that $I^2 = 82.94%$, suggesting that there was also a large degree of true

Fig. 2 Effect sizes for bully perpetration. Confidential Intervals (presented in parenthesis) that contain zero suggests a non-significant effect



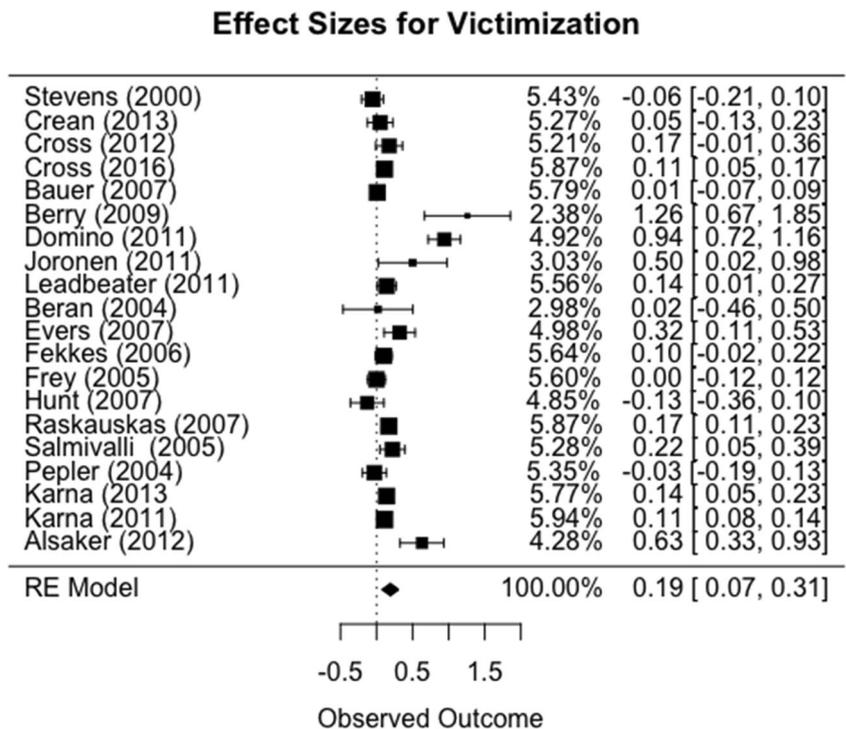
between-study heterogeneity (See Fig. 3 for program effect sizes on victimization).

Sensitivity Varying ρ between 0 and 1 did not change the overall average effect sizes for both bully perpetration and victimization. It is likely that the results were not impacted by within-study correlation.

Moderator Analysis

Because both random effect models had a large amount of heterogeneity, it was necessary to conduct moderator analyses to identify factors that contributed to the variance. After running the moderator analyses with each moderator individually on both outcomes respectively, none of the moderators,

Fig. 3 Effect sizes for bully victimization. Confidential Intervals (presented in parenthesis) that contain zero suggests a non-significant effect



including study location, school level, the four-class categorization of parental components, and the two-class categorization of parental components (training/workshops vs. non-training/workshops) failed to predict the effect sizes on either bully perpetration or victimization at a statistically significant level. However, interventions conducted in Australia had a smaller effect size compared to those conducted in the USA ($\Delta ES = -0.20$). Interventions in secondary schools had a greater effect size than those in elementary schools in general on both bully perpetration ($\Delta ES = 0.163$) and victimization ($\Delta ES = 0.193$). Moreover, programs where the parental components included parent training/workshops had greater effect sizes than those that did not on peer victimization ($\Delta ES = 0.210$).

Publication Bias

The Egger's regression test (Egger et al. 1997) suggested that there was no significant asymmetry in the funnel plots of the examined studies on bully perpetration ($t [df=20] = 1.15, p = 0.26$) and peer victimization ($t [df=24] = 1.18, p = 0.25$). The result of Duval and Tweedie's (2000) trim and fill procedure also showed that theoretically, there were no missing studies that would suggest publication bias.

Discussion

The present meta-analysis aimed at examining the treatment effects of school-based bullying prevention/intervention programs with a parental component on bully perpetration and victimization. In total, we reviewed evaluation reports for 22 intervention projects, among which 17 measured bully perpetration as an outcome and 20 measured peer victimization as an outcome. These studies included a total of 212,211 students attending schools that ranged from kindergarten to 12th grade.

Results of the meta-analysis suggested that after the implementation of the programs, students in the treatment conditions scored significantly lower on both bully perpetration and victimization than students in the control conditions. Given the number of studies included in the review, we can conclude with caution that up-to-date, school-based anti-bullying programs that have a parental component yielded small but significant intervention effects for reducing bully perpetration and peer victimization. The estimated overall ES were similar to the results from Ttofi and Farrington's (2011) study, which reported an overall OR of 1.57 ($k = 17$, Cohen's $d = 0.249$) on bully perpetration and 1.41 ($k = 17$, Cohen's $d = 0.189$) on peer victimization for anti-bullying programs that have parental training/meetings. This indicated that studies with parental components implemented or published from 2000 to 2017 did not differ significantly from those prior to 2009. The slightly smaller effect sizes from the meta-analysis might be attributed to the inclusion of studies that only included written materials for parents.

The moderator analyses showed that all moderators of interest did not affect the program effectiveness on both bully perpetration and victimization outcomes. The insignificant finding of the correlation between ES and school level indicated that among school-based anti-bullying programs that involved parents, school level did not affect the program efficacy. This result was consistent with previous results from Ttofi and Farrington's (2011) meta-analysis on the overall anti-bullying programs. However, the findings were inconsistent with another study that reported that anti-bullying programs in general are more effective in 7th grade and below (Yeager et al. 2015). This difference in findings may be explained by the fact that the current study grouped school levels to only two groups in the analyses, which did not allow for the more nuanced analyses to detect grade level differences.

In contrast to the Ttofi and Farrington's (2011) study, we did not find that geographic location of the prevention program affected the outcomes significantly. However, anti-bullying programs in Australian schools showed a marginally smaller effect size on reducing bullying compared to those implemented in the USA. Thus, we might conclude that school-based anti-bullying programs that involve parents are equally effective in general, regardless of the country where the program was implemented in. However, it appears that studies conducted in the USA were more effective than those conducted in Australia.

Parental Components In general, there was no significant difference in the effect size among school-based anti-bullying programs that implemented different types of parental components. This synthesis showed that programs with parent training/workshops were not significantly more effective than other programs. This result seemed to contrast Ttofi and Farrington's (2011) meta-analysis, which suggested that parent training/meetings were one of the most important elements that were associated with a decrease in bully perpetration and victimization. We should mention that the current study treated parent training and parent meetings as two types of parental components, while the previous meta-analysis placed them in the same category. In addition, the moderator analysis in the current meta-analysis was conducted among studies that had parental components, while Ttofi and Farrington (2011) compared programs with parent training and meetings with all other programs that may or may not have included a parental component.

Although the results indicated that the type of parental component did not affect the effectiveness of a school-based anti-bullying program, it is still important to examine this statement with caution. Most studies did not report whether the parental component was implemented successfully, what percentage of parents was involved, or the frequency of their described activities. Unknown or low compliance rates are common issues. In fact, some researchers had discussed the

challenges of implementing parental components in school-based anti-bullying programs and tracking them. For example, Pepler et al. (2004) found that in some schools with a large proportion of immigrant parents whose knowledge of English and the school system was limited, involving them in the intervention was a challenge. In larger scale studies, the attendance rate of parent meetings varied by site and may not be representative of all parents in the school system (Berry and Hunt 2009; Hunt 2007). Furthermore, parent meetings, information sessions, and even some training and workshops were usually given by teachers in school, which often fell out of researchers' tracking, and may not have been implemented in every study site (Bauer et al., 2006; Fekkes et al. 2006). Because of the focus on the parental components of anti-bullying programs, the current study focused on coding such potential moderators that may be related to the impact of parental component, such as numbers of parents involved and compliance score of implementing the parental components. However, many studies were not able to collect information or records of parental activities. Only a handful of studies reported these important data (e.g., Fekkes et al. 2006), which did not allow for additional analyses or comparisons.

Limitations

Despite the significance of the study, there are several limitations. First, this study used a subset of data from a larger project, for which the searching procedure and abstract screening procedure were not purposely designed to include intervention studies. As a result, it may have omitted some studies that met the criteria to be included in this meta-analysis. The reference harvesting resulted in an addition of 20 studies to be included in full-text coding, which suggests that the concern of not covering all desired studies should be recognized when generalizing the findings. Although a thorough reference harvesting was conducted to compensate for this issue, and test of publication bias indicated a very small effect of publication bias on the overall effect sizes, the findings should be interpreted with caution. Because the response rate of the author query was not high, and queries were not sent to studies identified from the reference harvest, most data on parental component were based on the study descriptions. Therefore, we may have neglected some information about the parental components that were not described in the articles. Further, because there were rarely surveys or measures on outcomes associated with the parental component given the nature of meta-analysis, it did not necessarily reflect the impact of parental component itself. For example, even if having parent training/workshops was associated with larger intervention effect, it is possible that more intensive programs are more likely to include parent training/workshops in their program. Therefore, the larger effect size may be, in fact, a result of the

greater intensity of such intervention programs. Finally, for some moderators, there were some factors with a relatively low number of studies in it. For example, in terms of study location, there was only one study that was conducted in Asia. The small numbers of studies in these factors may have resulted in biased estimated effect size of these factors.

Implications

Aside from these limitations, this meta-analysis provided some guidance for research on school-based intervention programs and their implementation. This meta-analysis has revealed a lack of reporting on the fidelity of implementation of the parental components and other elements of a school-based anti-bullying program in the extant literature. The difficulty in implementing parental components (Durlak and DuPre 2008; Kallestad and Olweus 2003; Stevens et al. 2000) has prevented authors from deciding whether parental involvement was an active component that had contributed to the program effect. It would be ideal for future research to include indexes, such as compliance scores in their data collection and analysis. This will not only enhance the comparability between studies but also help researchers understand how to better design and carry out their intervention programs. In terms of understanding which characteristics of the parental component in these school-based anti-bullying programs are associated with better outcomes, it is recommended that future research includes data on the percentage of parents involved, degree of engagement, and frequency of activities when possible. For tracking the utilization of send-home written materials, researchers can include an item on parent questionnaires about whether parents read the newsletters or guidebooks. It is also important for researchers to describe the content of written materials with greater detail in their manuscripts and reports. If the intervention includes homework that requires parent-child interaction, we recommend reporting the frequency of such homework and including an item on student measures that assess the extent to their parents participated in these homework assignments. Most importantly, more attention should be paid to exploring what these programs can do to best reach/teach/train parents. One way researchers can enhance our understanding of the issue is by reporting barriers they had encountered. For example, the knowledge of the difficulty in reaching parents of immigrant students (Pepler et al. 2004) informs actions interventionists could take to better involve parents. Also, researchers need to be mindful of the demographic characteristic of their targeted population, potentially provide translated versions of written materials, and encourage students to involve as translators in parent meetings and training. Interviewing school administrators and teachers who are responsible for including parents in bullying prevention efforts would also be informative.

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