A Systematic Review and Meta-Analysis of Interventions to Decrease Cyberbullying Perpetration and Victimization

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The purpose of this study was to conduct a large-scale systematic review and meta-analysis of studies that measured the impacts of school violence, bullying, and targeted cyberbullying prevention programming on cyberbullying perpetration and victimization outcomes, school performance indicators, and in-person bullying perpetration and victimization. Researchers have increased the implementation of interventions to target cyberbullying, and the results have been varied. Although several reviews on the topic have been conducted (Gaffney et al., 2019; Pyżalski & Poleszak, 2019), no systematic review or meta-analysis has been conducted that incorporates all available extant literature or the broader landscape of school violence studies, including unpublished grey literature. As such, to fill this gap, and with the goal of providing appropriate, specific, and concrete responses to school violence in policy and practice, we believed it was paramount to synthesize the various primary research findings. For this project, we conducted a systematic review and meta-analysis using comprehensive literature searches, thorough coding practices, and state-of-the-art meta-analysis techniques.

Project Design and Methods[4]

INCLUSION/EXCLUSION CRITERIA. Empirical research studies were selected based on the following inclusion and exclusion criteria:

1. Population. Eligible studies included only students in K–12 settings.

2. Intervention Studies. Eligible studies had to have tested the effects of an intervention on K–12 students. We did not exclude studies based on the type of intervention tested; that is, we

[4]The results of this systematic review and meta-analysis are the product of adhering to well-established standards and reporting guidelines outlined in the Campbell Collaboration's MECCIR (Methodological Expectations of Campbell Collaboration Intervention Reviews) checklist. Before we analyzed the final dataset and wrote the manuscript, the protocol and analysis plan were published online (see https://osf.io/dzn2p/) at Open Science Framework (OSF). The analytical dataset and the statistical R code have been uploaded to our OSF page. All analyses were conducted using the R package *metafor*, unless otherwise specified.

included a wide range of interventions and programs, which provided a robust database of studies. We included studies on direct interventions, whereby study authors implemented cyberbullying intervention programs specifically intended to reduce cyberbullying perpetration and victimization. We also included interventions such as general violence prevention programs, physical aggression and bullying prevention programs, and school climate models.

3. Comparison Group. To be included in the review, the study must have included an eligible comparison group. Several types of eligible comparison groups may have been used, such as those that received no intervention, treatment as usual, or minimal or proven-to-be ineffective treatment. For the comparison group to be eligible, the study had to have clearly demonstrated that the minimal treatment had been shown to be *ineffective*.

4. Research Design. We included studies that randomly assigned participants to a condition (randomized controlled trials) and studies that non-randomly assigned participants (quasi-experimental designs). In addition, we included studies that may have randomly or non-randomly assigned classrooms, schools, or school districts to conditions. We did not exclude studies based on the level of assignment, especially given the number of studies that assigned classrooms and schools to conditions.

5. Primary Outcome Measures. Although primary studies did not need to implement a direct cyberbullying intervention, they had to have measured a cyberbullying perpetration or victimization outcome variable to be included in the review. If the authors implemented a general violence or bullying prevention program but did not include a cyberbullying measure, we did not immediately exclude it. Instead, we queried the primary study author and asked whether cyberbullying was measured and not reported. (In our experience, it is common for

bullying prevention programs in particular to measure cyberbullying and yet not report it.) Notably, as the constructs of bullying and cyberbullying are studied using a variety of definitions, we did not impose our own definition on either construct. Instead, we used the labels that the primary study authors used in their manuscripts. In cases where the coder or senior researcher disagreed on the primary outcome measure, the review team arrived at a decision during team meetings. In rare cases, when a decision could not be reached, we emailed the original author to clarify.

6. Secondary Outcome Measures. We coded and attempted to include two additional outcome measure domains in this review. The first domain included traditional, in-person bullying perpetration or victimization. The rationale for including such measures was to test for differences in program impacts across the various types of programs implemented. As many other reviews (e.g., Ttofi & Farrington, 2011) have been conducted that synthesize the impacts of bullying prevention programs on bullying perpetration and victimization, these were collected as supplementary to the primary outcome. Notably, the only studies we coded with general bullying outcomes also included cyberbullying outcomes.

The second domain included measures of academic achievement, attendance, and high school completion. For two studies that reported only on academic achievement measures, we did not report the results.

In addition, because these outcome measures were secondary to cyberbullying outcomes, we included studies that did not report either bullying outcomes or school performance outcomes, or both. In other words, these outcomes did *not* need to be present in the study for the study to be included in the review.

7. Timeframe. We expected that the vast majority of studies would have been published on or after 2003 because that was the earliest date for which we found consistent mention of the terms *electronic bullying*, *computer bullying*, and *cyberbullying* in the literature. To ensure all studies were synthesized, we included any study published on or after 1995.

8. Publication Status. We included all types of study reports, published or unpublished, to ensure that every available study report was included in the review and decreased the well-known upward bias of studies published in peer-reviewed journals (Polanin, Tanner–Smith, & Hennessy, 2016). We comprehensively searched for, contacted, and attempted to locate all unpublished datasets that included measures of cyberbullying perpetration and victimization.

9. Language and Country of Origin. Studies must have been published in English, Spanish, or Turkish, which represented the native languages of our team members. However, as we did not identify any additional studies in other languages, we did not exclude other languages. We also did not exclude studies based on country of origin (i.e., where a study's sample originated).

LITERATURE SEARCH AND SCREENING. We used several complementary approaches, including searches of the traditional and grey literatures, forward and backward reference harvesting, and hand searching of targeted journals. First, we conducted an electronic bibliographic search[5] of the literature to identify qualifying studies. We then searched the following online databases, which included both published and unpublished studies, using search terms tailored to each database: Academic Search Complete, Education Full Text (H.W. Wilson), ERIC, National

[5]The following search terms and variants were used in different combinations with the Boolean operators "AND" and "OR": ("online bull*" "electronic bull*" "internet bull*" "cyber abuse" "cyber harass*" cyber-harass* cyberharass* cyberthreat* "cyber threat*" cyber-threat* cyberbull* "cyber bull*" cyber-bull* cyberstalk* "cyber stalk*" cyber-stalk* cyberaggress* "cyber aggress*" cyber-aggress* "cyber victim*" cyber-victim* cybervictim* "social media" "instant messag*" "electronic communication" sextortion) ("elementary school" "middle school" "high school" student* "school-based" k-12 adolescen* youth teen peer* child "junior high") ("control group*" random* "comparison group*" "matched group*" treatment experiment intervention* evaluat* impact* "effectiveness causal QED RCT" "propensity score matching" "quasi-experimental prevention program)."
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Criminal Justice Reference Service Abstracts, ProQuest Criminal Justice, ProQuest Dissertations and Theses, ProQuest Education Journals, ProQuest Social Science Journals, PsycINFO, PubMed (Medline), Social Sciences Abstracts (H.W. Wilson), CrimDoc (Criminology Library of Grey Literature), Grey Literature Database (Canadian), Social Care Online (UK), and the Social Science Research Network eLibrary. We conducted two rounds of electronic database searching, one on April 23, 2018, and a follow up on August 5, 2019, to capture additional materials from the previous year. This process ensured that the published review included the most recent and up-to-date studies.

We also conducted auxiliary searches to ensure that all available studies were found. First, we manually searched a certain number of key journals from 1995 through 2018 that have produced a considerable number of studies on school violence, bullying, and cyberbullying. In addition to *Prevention Science*, *Child Development*, and *Aggressive Behavior*, we identified and searched the two additional journals that produced the largest number of screened-in abstracts (*Journal of Interpersonal Violence, Computers in Human Behavior*). Second, we conducted reference harvesting by reviewing the reference lists of all included studies for other potential studies. Third, we conducted forward citation searching, whereby we collected all studies that cited included studies.

Most important, we contacted study authors of projects that implemented general violence or bullying prevention programs to inquire about any unpublished measures of cyberbullying. We did so on the assumption that primary study authors who implemented general violence or bullying prevention programs may have measured cyberbullying but failed to publish the results. We emailed 600 primary authors asking for this missing information, and 75 authors responded to our request. After reviewing the returned materials, we added three studies that would have otherwise

not been included. This novel approach is documented in Polanin, Espelage, Grotpeter, Valido, Ingram, Torgal, El Sheikh, and Robinson (in press).

After completing the searches, we uploaded the 11,304 found citations into a Zotero database. Using this software, duplicate citations were removed (i.e., citations found through searches of multiple databases), resulting in a total of 8,356 citations to screen (see **Figure 1** for the full PRISMA flowchart).

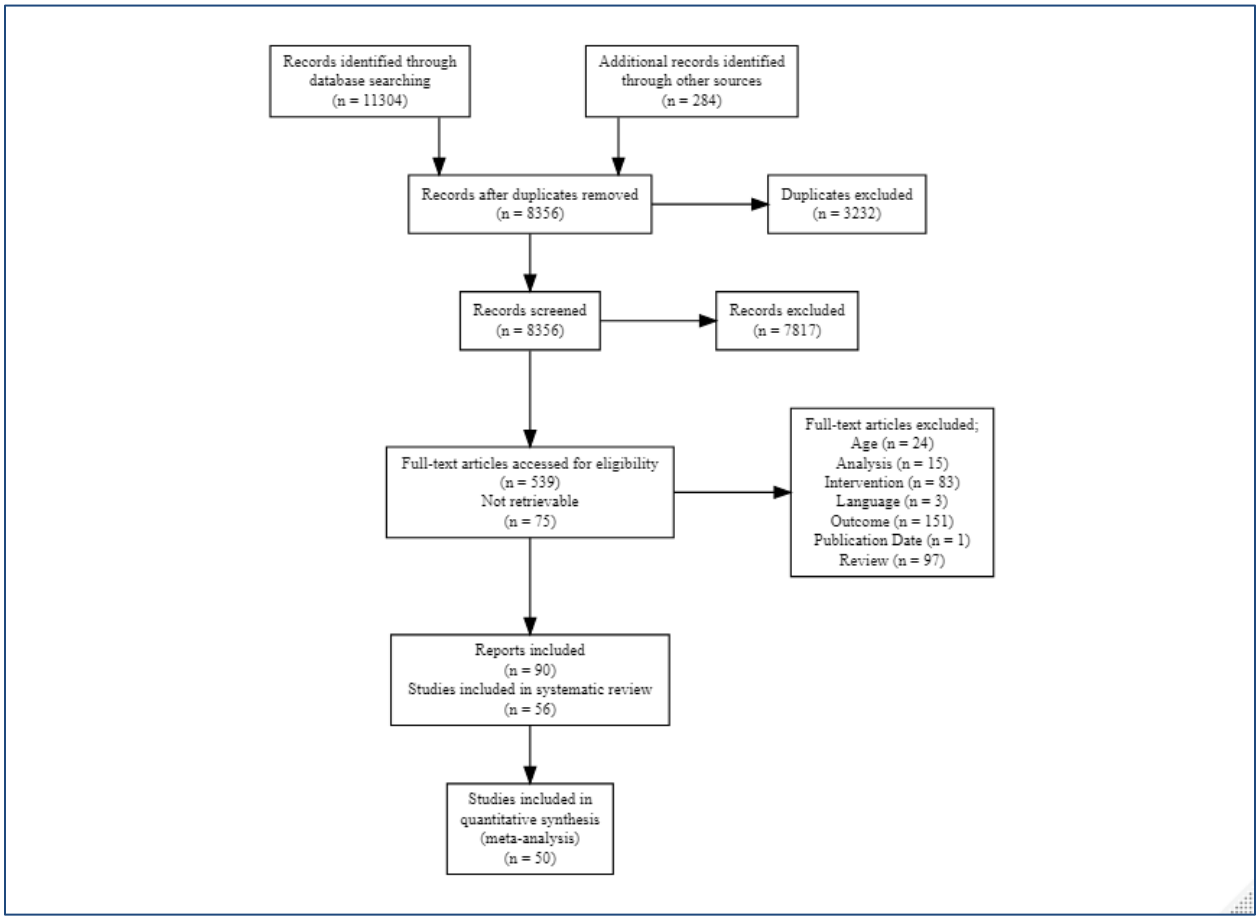

Figure 1. PRISMA Flowchart

Abstract Screening. We developed an abstract screening guide and screened the abstracts using the free Abstrackr software (Wallace et al., 2012), which provides open-source, web-based abstract screening. Abstracts were screened by all review team members, including the principal and co–principal investigators, the research coordinator, the graduate and undergraduate research

assistants, and the professional research assistants. To screen the large number of studies identified in this round, we used a unique methodology, as published by the research team (detailed in Polanin et al., 2019). Of the 8,356 citations imported, 7,820 were dropped, and 526 were kept.

Full-Text Retrieval. Team members located full-text PDFs for all abstracts that screened in during the first round of screening, in preparation for a second round using a full-text screening tool. A total of 462 full-text PDFs were found.

Full-Text Screening. We developed a screening tool, using the previously described inclusion/exclusion criteria to guide this process. The principal investigator constructed a relational database using FileMaker (Apple Inc., 2016) to organize the results from all phases of the project (i.e., search results, abstract screening, full-text screening, and data extraction), and team members entered full-text screening responses into the "eligibility" screen. As with abstract screening, team members received extensive training led by the first author, after which pilot screening was conducted. The accuracy of the screening process was ensured as all the "keep" or "drop" results were validated by the senior staff members (i.e., the principal investigator or the research coordinator). Of the 462 full-text PDFs retrieved and reviewed, we retained 95. We then grouped these 95 PDFs together when the same sample was used across multiple PDFs, creating independent studies. Thus, we reduced the total number of eligible studies to be coded to 56.

Data Extraction. A codebook details all information extracted from each study, and the principal investigator further developed the relational database in FileMaker. We extracted study-level information such as details on the sample demographics and how the individuals were placed in groups, characteristics of the intervention and comparison conditions (including who developed and implemented the intervention and information on implementation fidelity), construct-level information (such as how the predictor and outcome variables were measured), and the summary

data that could be used to estimate effect sizes (such as semi-partial correlations and/or adjusted-odds ratios derived from a regression model). Coders extracted information about each study and entered it into FileMaker coding screens dedicated to that information (e.g., samples, conditions, constructs, effect sizes).

Data Analysis and Findings

The final database consisted of a total of 56 research reports from 90 independent studies. Separate analyses were conducted for each of four outcome variable categories: 1) cyberbullying perpetration (44 studies, 96 effect sizes), 2) cyberbullying victimization (39 studies, 75 effect sizes), 3) traditional bullying perpetration (22 studies, 67 effect sizes); and 4) traditional bullying victimization (24 studies, 82 effect sizes). Summary statistics for the included studies (e.g., publication status, program target, research design, and location), are presented in **Table 1.** Specific study details for each of the included studies are presented in **Appendix A1.**

OVERVIEW OF ANALYSES. First, we estimated separate meta-analytic models that predicted each of the four major outcome variable categories. We used a random-effects model with robust variance estimation (Hedges, Tipton, & Johnson, 2010), which weights each effect size by the inverse of its variance (Borenstein et al., 2010) to produce a weighted average of the effect sizes.

Next, we conducted four confirmatory meta-regression analyses predicting each of the four behavioral outcome variables (i.e., cyberbullying perpetration, cyberbullying victimization, traditional bullying perpetration, traditional bullying victimization). The meta-regressions were conducted using the following predictor variables: 1) country of origin (i.e., U.S. versus non-U.S.); 2) program target (i.e., specifically targeted cyberbullying versus did not specifically target cyberbullying); 3) timepoint of second measurement (i.e., posttest versus follow up); 4) effect size

type (i.e., dichotomous versus continuous), 5) percentage of males, and 6) percentage of nonwhite participants.

Table 1. Summary Statistics of Included Studies

Variable	Summary Statistic
N	56
Publication Status	
Published	12 (24%)
Unpublished	38 (76%)
Program Target	
Cyberbullying	38 (76%)
Not Cyberbullying	12 (24%)
Design	
2NR-Cls	5 (10%)
2NR-Ind	7 (14%)
2NR-Scl	11 (22%)
2R-Cls	10 (20%)
2R-Ind	17 (34%)
Location	
U.S.	18 (36%)
Non-U.S.	32 (64%)
SES	
1	11 (22%)
2	8 (16%)
3	12 (24%)
4	12 (24%)
5	7 (14%)
Funding	
Funded	23 (46%)
Not Funded	27 (54%)
Mean Percentage Male	47%
Mean Percentage Nonwhite	35%
Mean Age (SD)	13 (1.73)
Mean Time Between Measurements (SD)	22 (25.5)

Note: Design: 2NR-Cls = 2-groups non-random assignment at the classroom level, 2NR-Ind=2-groups non-random assignment at the individual level, 2NR-Scl=2-groups non-random assignment at the school level, 2R-Cls=2-groups random assignment at the classroom level, 2R-Ind=2-groups random assignment at the individual level; SES: 1=Low, 2=Medium-low, 3=Medium, 4=Medium-high, 5=High; Time=Number of weeks; Age=Number of years.

Our systematic review yielded a variety of types of programs, including named programs, some of which have been the subject of systematic programs of research. Other programs we found, however, were not named and to the best of our knowledge, were only implemented in the context of that evaluation study. To examine the effects of programs that have name recognition, we conducted a named program analysis to assess the overall effects of these programs.

Table 2. Outcomes for School-Based Programs That Measured Cyberbullying

Outcome Variable	Number of Studies	Number of Effect Sizes	Average Effect Size	Standard Error	95% CI (Lower)	95% CI (Upper)	Tau^2
Cyberbullying Perpetration	44	96	-0.19	0.05	-0.28	-0.09	0.06
Cyberbullying Victimization	39	75	-0.13	0.04	-0.21	-0.05	0.02
Traditional Bullying Perpetration	22	67	-0.18	0.05	-0.28	-0.08	0.06
Traditional Bullying Victimization	24	82	-0.16	0.06	-0.27	-0.05	0.05

Legend: CI = confidence interval

OVERALL META-ANALYSIS RESULTS. Overall, the results, presented in **Table 2**, indicated that school-based prevention or intervention programs that measured cyberbullying outcomes were associated with statistically significant reductions in all four outcome variables of interest. Specifically, the programs were associated with significant reductions in cyberbullying perpetration (g = -0.19, SE = 0.05, 95% CI[-0.28, -0.09]) and cyberbullying victimization (g = -0.13, SE = 0.04, 95% CI[-0.21, -0.05]). They were also associated with significant reductions in traditional bullying perpetration (g = -0.18, SE = 0.05, 95% CI[-0.28, -0.08]), and traditional bullying victimization (g = -0.16, SE = 0.06, 95% CI[-0.27, -0.05]).

CONFIRMATORY META-REGRESSION ANALYSES. The results of these analyses did not identify any study characteristics that significantly moderated the relationship between the antibullying programs in this review and the targeted cyberbullying and traditional bullying outcomes. Results for the prediction of cyberbullying perpetration and victimization are presented in **Tables 3 and 4**, respectively. Results for the prediction of traditional bullying perpetration and

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victimization are presented in **Appendices A2 and A3**, respectively.

Table 3. Confirmatory Meta-Regression Results for Cyberbullying Perpetration

Variable	Level	Number of Studies	Number of Effect Sizes	Average Effect Size or Coefficient	Standard Error	95% CI (Lower)	95% CI (Upper)	*t*-value	*p*-value
Country of Origin								0.87	0.39
	Non-U.S.	30	30	-0.22	0.04	-0.31	-0.13		
	U.S.	14	30	-0.11	0.11	-0.33	0.10		
Program Target								-0.53	0.61
	No Cyber Target	9	26	-0.15	0.08	-0.3	0.01		
	Targets Cyberbullying	0	0	-0.2	0.06	-0.3	-0.09		
Timepoint								0.10	0.92
	Posttest	42	79	-0.18	0.05	-0.28	-0.09		
	Follow-up	8	17	-0.18	0.06	-0.29	-0.07		
Effect Size Type								2.21	0.12
	Dichotomous	36	80	-0.20	0.05	-0.29	-0.11		
	Continuous	9	16	-0.05	0.08	-0.20	0.11		
Percentage Male				0.03	0.03	-0.03	0.08	0.98	0.49
Percentage Nonwhite				-0.11	0.12	-0.34	0.12	-0.94	0.36

Legend: CI = confidence interval

Table 4. Confirmatory Meta-Regression Results for Cyberbullying Victimization

Variable	Level	Number of Studies	Number of Effect Sizes	Average Effect Size or Coefficient	Standard Error	95% CI (Lower)	95% CI (Upper)	*t*-value	*p*-value
Country of Origin								0.56	0.58
	Non-U.S.	24	28	-0.15	0.05	-0.26	-0.04		
	U.S.	15	28	-0.11	0.06	-0.21	0		
Program Target								-0.5	0.62
	No Cyber Target	12	27	-0.11	0.06	-0.23	0.02		
	Targets Cyberbullying	0	0	-0.15	0.05	-0.24	-0.05		
Timepoint								0.55	0.60
	Posttest	36	57	-0.14	0.04	-0.22	-0.05		
	Follow Up	8	18	-0.11	0.04	-0.18	-0.04		
Effect Size Type								1.21	0.26
	Dichotomous	29	53	-0.16	0.04	-0.24	-0.09		
	Continuous	10	22	0	0.13	-0.25	0.25		
Percentage Male				-0.39	0.17	-0.72	-0.06	-2.29	0.11
Percentage Non-White				-0.13	0.10	-0.32	0.07	-1.28	0.22

Legend: CI = confidence interval

EXPLORATORY ANALYSIS: NAMED PROGRAMS. Finally, we conducted an analysis of the overall effect sizes for each of the named programs identified through our systematic review. **Figure 2** provides details for the effect sizes of named programs on cyberbullying perpetration outcomes, including details on the number of studies we identified that examined cyberbullying outcomes and the types of assignment used in the studies. **Figure 3** provides the same information for cyberbullying victimization outcomes. Each individual bar represents the average effect size for the named program. The lines within each bar represent the 95% confidence interval for that program's effect size. The bars with a red outline represent those that used a random assignment design; those with blue used a non-random design. Bars with a darker shading indicate an increased number of independent evaluations. For example, the No Trap! program has had three independent evaluations conducted; however, all three used a non-random design.

The results indicated statistically significant heterogeneity among the programs. For cyberbullying perpetration, the largest program impact was for the EMOTIC program, and the smallest was for i-SAFE. For cyberbullying victimization, the EMOTIC program again had the largest effect, and The Skills for Life program had the smallest effect. Although the EMOTIC program had the largest impact, we found only one independent evaluation, and this study used a non-random design. The program with the second largest effects for cyberbullying perpetration, Cyberprogram 2.0, has been evaluated twice and used a random design. Although several other programs look promising, the results from Cyberprogram 2.0 show the most promise.

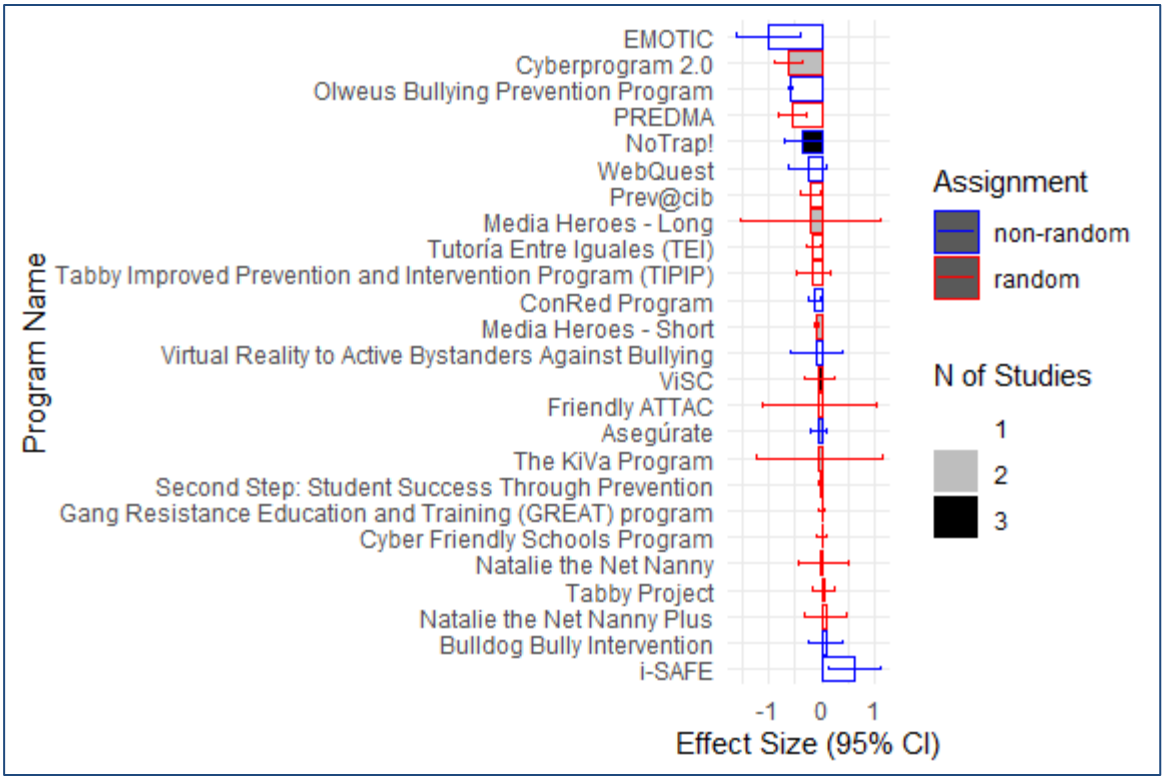

Figure 2. Named Program Analysis Results for Cyberbullying Perpetration

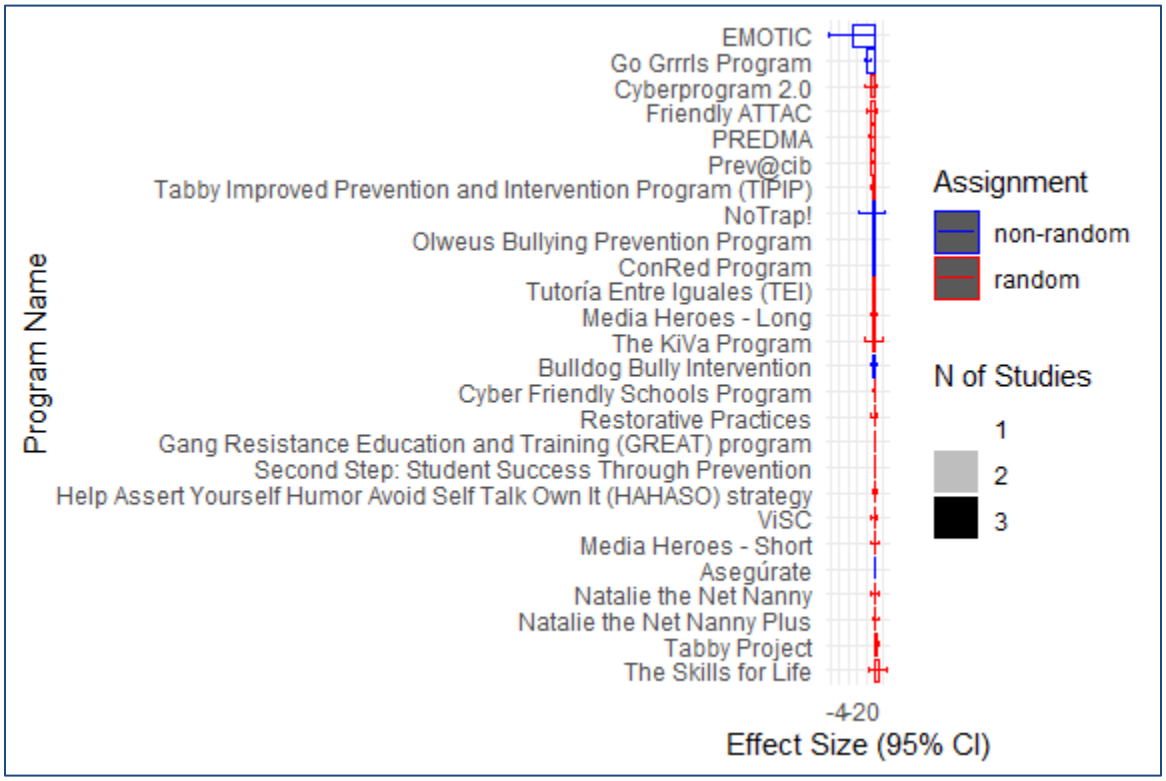

Figure 3. Named Program Analysis Results for Cyberbullying Victimization

Implications for Criminal Justice Policy and Practice

These overview analyses provide consistent evidence that, overall, cyberbullying prevention programs show promise in reducing cyberbullying and some traditional bullying behaviors. However, more specific analyses indicated that this result was driven by programs that targeted cyberbullying—that is, programs that did not specifically target cyberbullying behavior were not associated with reductions in cyberbullying. This finding will be critical for school personnel, as the evidence does not suggest that the effects of traditional antibullying programs carry over to reduce cyberbullying. However, there is some evidence that anti-cyberbullying programs do make some impact on traditional bullying behavior. Thus, the results of this study indicate that school personnel who wish to prevent or reduce cyberbullying within their student population will need to address cyberbullying with specific programming. These results further point to the need to implement existing cyberbullying programs, to develop new programs that may be more effective than current programs, and, potentially, to develop anti-cyberbullying modules that can augment traditional antibullying programs.

References

Apple, Inc. (2016). *Filmmaker Pro* [Computer software]. Santa Clara, CA: Apple, Inc.

Borenstein, M., Hedges, L.V., Higgins, J.P.T., & Rothstein, H. (2010). A basic introduction to fixed-effect and random-effects models for meta-analysis. *Research Synthesis Methods, 1*(2):97–111.

Gaffney, H., Farrington, D.P., Espelage, D.L., & Ttofi, M.M. (2019). Are cyberbullying intervention and prevention programs effective? A systematic and meta-analytical review. *Aggression and Violent Behavior, 45*,134–153.

Hedges, L.V., Tipton, E., & Johnson, M.C. (2010). Robust variance estimation in meta-regression with dependent effect size estimates. *Research Synthesis Methods, 1*(1):39–65.

Polanin, J.R., Espelage, D.L., Grotpeter, J.K., Valido, A., Ingram, K., Torgal, C., El Sheikh, A., & Robinson, L. (in press). *Locating unregistered and unreported data for use in a systematic review and meta-analysis*. *Systematic Reviews.*

Polanin, J.P., Pigott, T.D., Espelage, D.L., & Grotpeter, J.K. (2019). Best practice guidelines for abstract screening large-evidence systematic reviews and meta-analyses. *Research Synthesis Methods, 10*,330–342. https://onlinelibrary.wiley.com/doi/pdf/10.1002/jrsm.1354

Polanin, J.R., Tanner–Smith, E.E., & Hennessy, E. (2016). Estimating the difference between published and unpublished effect sizes: A meta-review. *Review of Educational Research, 86*,207–236. doi:10.3102/0034654315582067

Pyżalski, J., & Poleszak, W. (2019). Peer violence and cyberbullying prevention programmes. In R. Porzak (Ed.), *Prevention in school: Current situation and future prospects for prevention in Poland* (p.186–190). Lublin, Poland: You Have a Chance Foundation.

Ttofi, M.M., & Farrington, D.P. (2011). Effectiveness of school-based programs to reduce bullying: A systematic and meta-analytic review. *Journal of Experimental Criminology, 7*(1):27–56.

Wallace, B.C., Small, K., Brodley, C.E., Lau, J., & Trikalinos, T.A. (2012). Deploying an interactive machine learning system in an evidence-based practice center: Abstrackr. *IHI '12: Proceedings of the 2nd ACM SIGHIT International Health Informatics Symposium*, 819–824.

Appendices

Appendix A1. Study Details

Study	Title	Published	Target	Region	Design	SES	% Non-White	Age	% Males	Time	Funded
1093	Del Rey et al. (2016)	Y	Cyber	Non-U.S.	2NR-Scl	4	1.00	13.80	0.53	12	Y
1096	Cross et al. (2016)	Y	Cyber	Non-U.S.	2R-Ind	4	0.00	13.50	0.47	104	Y
1160	Wölfer et al. (2014)	Y	Cyber	Non-U.S.	2R-Cls	5	0.20	13.30	0.47	10	Y
1228	Gradinger et al. (2016)	Y	Not-Cyber	Non-U.S.	2R-Ind	4	0.19	11.70	0.52	52	Y
1310	Menesini et al. (2012)	Y	Cyber	Non-U.S.	2NR-Scl	3	0.00	16.47	0.00	24	Y
1385	Zagorscak et al. (2018)	Y	Cyber	Non-U.S.	2R-Cls	3	0.00	13.36	0.46	10	Y
1398	Barkoukis et al. (2016)	Y	Cyber	Non-U.S.	2R-Ind	3	0.00	14.70	0.44	8	Y
1525	Rawlings (2017)	Y	Not-Cyber	US	2NR-Ind	1	0.69	11.67	0.51	52	Y
1870	Saarento et al. (2015)	Y	Cyber	Non-U.S.	2R-Ind	4	0.01	11.25	0.49	36	N
2027	Peker (2013)	N	Cyber	Non-U.S.	2R-Ind	2	0.99	15.00	0.50	36	N
2324	Palladino et al. (2012)	Y	Cyber	Non-U.S.	2NR-Scl	3	0.10	15.97	0.20	26	Y
4133	Carter (2012)	N	Cyber	US	2R-Ind	4	0.36	11.38	0.64	8	N
4255	Corso (2010)	N	Cyber	US	2R-Cls	5	0.04	12.50	0.51	8	N

4323	Salvatore (2006)	N	Cyber	US	2R-Cls	4	0.00	11.00	0.60	5	N
4555	Garaigordobil et al. (2016)	Y	Cyber	Non-U.S.	2R-Cls	3	1.00	14.00	0.44	19	Y
4705	Athanasiade et al. (2015)	Y	Cyber	Non-U.S.	2R-Ind	1	0.00	13.50	0.50	0	Y
4719	Salazar et al. (2017)	Y	Cyber	US	2R-Cls	5	0.00	12.58	0.47	0	N
4803	Harshman (2014)	N	Cyber	US	2NR-Cls	4	0.28	12.00	0.49	2	N
5099	Dare (2011)	N	Not-Cyber	US	2NR-Ind	2	0.17	12.00	0.51	32	N
5745	Zambuto et al. (2018)	Y	Cyber	Non-U.S.	2NR-Scl	1	0.00	14.50	0.00	28	Y
5982	Lee et al. (2013)	Y	Cyber	Non-U.S.	2NR-Cls	2	1.00	12.50	0.44	4	N
6134	DeSmet et al. (2018)	Y	Cyber	Non-U.S.	2R-Ind	5	0.06	13.49	0.38	1	Y
6142	McCuddy et al. (2017)	Y	Not-Cyber	US	2R-Cls	2	0.65	11.42	0.49	13	Y
6499	Espelage et al. (2015)	Y	Not-Cyber	US	2R-Ind	1	0.76	11.22	0.48	40	Y
7508	Van Royen et al. (2017)	Y	Cyber	Non-U.S.	2R-Ind	1	0.12	15.60	0.41	0	Y
7545	Bumpas (2015)	N	Cyber	U.S.	2NR-Scl	2	0.47	11.50	0.38	2	N
7561	del Rey-Alamillo et al. (2018)	Y	Cyber	Non-U.S.	2NR-Scl	1	1.00	13.84	0.46	12	Y
7563	Dogan et al. (2017)	Y	Not-Cyber	Non-U.S.	2NR-Cls	4	0.00	10.06	0.48	13	Y
7582	Garaigordobil et al. (2018)	Y	Cyber	Non-U.S.	2R-Cls	3	0.00	14.01	0.57	25	Y
7606	Martínez-Vilchis et al. (2018)	Y	Not-Cyber	Non-U.S.	2NR-Ind	3	1.00	15.49	0.42	8	N
7630	Peagram (2014)	N	Cyber	U.S.	2NR-Scl	3	0.04	12.50	0.50	8	N

7636	Rivera et al. (2018)	Y	Not-Cyber	Non-U.S.	2NR-Ind	1	1.00	16.50	0.46	8	N
7650	Solomontos-Kountouri et al. (2016)	Y	Cyber	Non-U.S.	2NR-Scl	3	0.00	12.60	0.51	16	N
7668	Lecroy (2004)	Y	Not-Cyber	U.S.	2NR-Ind	3	0.35	12.70	0.00	12	N
7670	Olweus et al. (2019)	Y	Cyber	U.S.	2NR-Cls	3	0.19	11.00	0.50	36	N
7688	Williford et al. (2013)	Y	Cyber	Non-U.S.	2R-Ind	4	0.01	13.98	0.48	36	N
7704	Ingram et al. (2019)	Y	Cyber	U.S.	2NR-Scl	1	0.39	12.50	0.43	6	Y
7708	Sorrentino et al. (2018)	Y	Cyber	Non-U.S.	2R-Cls	5	0.00	12.14	1.00	24	N
7712	Del Rey et al. (2019)	Y	Cyber	Non-U.S.	2NR-Scl	2	0.00	12.76	0.51	12	Y
7714	Ferrer-Cascales et al. (2019)	Y	Cyber	Non-U.S.	2R-Ind	1	1.00	13.08	0.50	28	Y
7736	Fekkes et al. (2016)	Y	Cyber	Non-U.S.	2R-Ind	1	1.00	13.50	0.51	104	Y
7783	Tanrikulu (2013)	N	Cyber	Non-U.S.	2NR-Ind	4	1.00	16.37	0.75	8	N
7899	Schoeps et al. (2018)	Y	Not-Cyber	Non-U.S.	2R-Ind	4	0.00	12.63	0.43	12	Y
7912	Gilman (2018)	N	Not-Cyber	US	2NR-Cls	5	0.00	10.00	0.52	0	N
8105	Tiiri et al. (2019)	Y	Cyber	Non-U.S.	2NR-Ind	4	0.05	14.35	1.00	52	Y
8106	Ortega-Barón et al. (2019)	Y	Cyber	Non-U.S.	2R-Ind	3	1.00	13.58	0.47	39	Y
8270	Martin (2018)	N	Cyber	U.S.	2NR-Scl	1	0.54	9.00	0.50	10	N
8561	Acosta et al. (2019)	Y	Not-Cyber	U.S.	2R-Ind	2	0.24	11.50	0.51	104	Y

9143	Pfetsch et al. (2018)	Y	Cyber	Non-U.S.	2R-Ind	2	0.41	13.50	0.48	0	N
9371	Cummings (2019)	N	Cyber	U.S.	2R-Cls	5	0.23	10.50	0.49	4	N

Note: Y=Yes, N=No; Design: 2NR-Cls = 2-groups non-random assignment at the classroom level, 2NR-Ind=2-groups non-random assignment at the individual level, 2NR-Scl, 2-groups non-random assignment at the school level, 2R-Cls=2-groups random assignment at the classroom level; 2R-Ind=2-groups random assignment at the individual level; SES: 1=Low, 2=Medium-low, 3=Medium, 4=Medium-high, 5=High; Time=Number of weeks; Age=Number of years.

Appendix A2. Confirmatory Meta-Regression Results for Bullying Perpetration

Variable	Level	Number of Studies	Number of Effect Sizes	Average Effect Size or Coefficient	Standard Error	95% CI (Lower)	95% CI (Upper)	*t*-value	*p*-value
Country of Origin								0.42	0.68
	Non-U.S.	16	17	-0.20	0.06	-0.31	-0.09		
	U.S.	6	17	-0.14	0.12	-0.38	0.09		
Program Target								-3.11	0.01
	No Cyber Target	6	27	-0.02	0.04	-0.10	0.05		
	Targets Cyberbullying	0	0	-0.26	0.07	-0.39	-0.13		
Timepoint								-0.77	0.51
	Posttest	20	44	-0.18	0.06	-0.28	-0.07		
	Follow-up	6	23	-0.20	0.05	-0.30	-0.10		
Effect Size Type								0.31	0.78
	Dichotomous	18	59	-0.18	0.05	-0.3	-0.07		
	Continuous	4	8	-0.16	0.08	-0.31	0		
Percentage Male				-0.29	0.26	-0.79	0.21	-1.12	0.45
Percentage Nonwhite				0.06	0.12	-0.18	0.3	0.48	0.64

Legend: CI = confidence interval

Appendix A3. Confirmatory Meta-Regression Results for Bullying Victimization

Variable	Level	Number of Studies	Number of Effect Sizes	Average Effect Size or Coefficient	Standard Error	95% CI (Lower)	95% CI (Upper)	*t*-value	*p*-value
Country of Origin								0.76	0.46
	Non-U.S.	15	22	-0.20	0.05	-0.30	-0.10		
	U.S.	9	22	-0.10	0.12	-0.34	0.13		
Program Target								-2.67	0.02
	No Cyber Target	8	29	-0.01	0.05	-0.11	0.08		
	Targets Cyberbullying	0	0	-0.25	0.07	-0.39	-0.11		
Timepoint								-1.34	0.28
	Posttest	23	61	-0.16	0.06	-0.27	-0.04		
	Follow-up	6	21	-0.19	0.05	-0.29	-0.09		
Effect Size Type								-0.04	0.97
	Dichotomous	19	59	-0.16	0.06	-0.28	-0.04		
	Continuous	6	23	-0.17	0.09	-0.35	0.02		
Percentage Male				-0.12	0.18	-0.47	0.24	-0.63	0.63
Percentage Nonwhite				0.01	0.09	-0.17	0.19	0.11	0.92

Legend: CI = confidence interval