The Effectiveness of Intervention Programs for Cyberbullying in Schools: A Systematic Review and Meta-Analysis

Jonathon Wirth

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ABSTRACT

Background: Cyberbullying is a problem that affects children in schools around the world. Many intervention programs have been introduced to combat this threat. The ever-changing nature of this phenomenon necessitates an updated systematic review on the literature concerning the implementation of intervention programs. *Objective:* To produce a systematic review and meta-analysis of the existing literature to discover whether cyberbullying intervention programs are effective at reducing perpetration and victimisation. *Methods:* Data from twelve independent studies were gathered from a comprehensive search of seven databases. The studies investigated intervention programs which compared an intervention group who participated in the program to a control group which consisted of a classroom from either the same or a different school. Random effects models were produced to compare the standardized mean differences of the studies which enabled the calculation of an overall effect size for the outcome in question. Heterogeneity statistics and 95% confidence intervals were utilised to assess the significance of the effect sizes of the meta-analyses. *Results:* Significant effects were found with relation to cyberbullying perpetration (-0.30 [-0.56, -0.04]) and cybervictimisation (-0.28 [-0.51, -0.05]). High levels of heterogeneity were also found with regards to cyberbullying perpetration, which produced an I^2 value of 96% and cybervictimisation which produced an I^2 value of 92%. *Conclusions:* The existing cyberbullying intervention programs were found to be effective at reducing cyberbullying perpetration and cybervictimisation. The results of the meta analyses should be treated with caution however, due to their heterogeneity levels exceeding the recommended limit.

DECLARATION

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge, this thesis contains no material previously published except where due reference is made. I give permission for the digital version of this thesis to be made available on the web, via the University of Adelaide's digital thesis repository, the Library Search and through web search engines, unless permission has been granted by the School to restrict access for a period of time.

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CHAPTER 1

Introduction

1.1 Negative Outcomes

Cyberbullying has been linked with many of the same negative psychological health outcomes as traditional bullying. This is true for both perpetrators and victims and can include depression, anxiety and loneliness (Bauman, Toomey & Walker, 2013; Sahin, 2012). In addition to having an immediate effect, cyberbullying can also lay the foundation for negative outcomes later in life. These can include decreased performance in academia mediated by negative psychosocial outcomes (Busch et al., 2014), and bullying behaviour within the workplace (Matthiesen & Einarsen, 2007). Beyond these, there has been evidence to suggest involvement in cyberbullying as a victim or perpetrator can lead to long-term physical health problems (Kowalski & Limber, 2013). In other words, cyberbullying poses not only an immediate threat to an individual's well-being but can also have significant detrimental effects in the long term.

1.2 Definition

Two terms which will be used throughout this thesis are cyberbullying perpetration (or cyberperpetration) and cybervictimisation. Though there are different views regarding what exactly constitutes these behaviours, it is agreed that cyberperpetration broadly refers to the perpetration of cyberbullying whereas cybervictimisation is concerned with the student's experience of being cyberbullied (Williford, Elledge, Boulton, Depaolis, Little, Salmivalli, 2013). There has been much contention however, surrounding the definition of cyberbullying and the term has been used in a wide variety of contexts (see table 1). The definitions most frequently used can capture a broad spectrum of behaviour but are typically said to include: "the use of digital technology to inflict harm repeatedly or to bully" (Englander et al., 2017). Traditional bullying is generally defined to include a power imbalance, repeated harm, and aggressive behaviour that involves unwanted negative actions (Olweus,1993). Given

Table 1

Conceptual definitions of cyberbullying used in research (Tokunaga, 2010)

Study	**Conceptual definition of cyberbullying**
Besley (2009)	The use of information and communication technologies to support deliberate, repeated, and hostile behavior by an individual or group, that is intended to harm others
Finkelhor et al. (2000)	Online harassment: Threats or other offensive behavior (not sexual solicitation) sent online to the youth or posted online about the youth for others to see (p. x)
Juvoven and Gross (2008)	The use of the Internet or other digital communication devices to insult or threaten someone (p. 497)
Li (2008)	Bullying via electronic communication tools such as e-mail, cell phone, personal digital assistant (PDA), instant messaging, or the World Wide Web (p. 224)
Patchin and Hinduja (2006)	Willful and repeated harm inflicted through the medium of electronic text (p. 152)
Slonje and Smith (2007)	Aggression that occurs through modern technological devices and specifically mobile phones or the Internet (p. 147)
Smith et al. (2008)	An aggressive, intentional act carried out by a group or individual, using electronic forms of contact, repeatedly or over time against a victim who cannot easily defend him or herself (p. 376)
Willard (2007)	Sending or posting harmful or cruel texts or images using the Internet or other digital communication devices (p. 1)
Ybarra and Mitchell (2004)	Internet harassment: An overt, intentional act of aggression towards another person online

that there is significant overlap between traditional and cyberbullying (Ybarra et al., 2014), many definitions used have been an extension of the traditional definitions of bullying. In other words, cyberbullying has often been defined merely as traditional bullying that occurs through digital or electronic media. There are differences between the two forms of bullying however, which suggest cyberbullying should be defined and therefore treated as a separate problem (Cross, Lester & Barnes 2015).

1.3 Difference between traditional and cyberbullying

As mentioned earlier, commonly cited definitions of bullying in the literature usually stem from Olweus' (1993), and include in their criteria: power imbalance, repetition, and an intent to cause harm. These three components can take significantly different forms in cyberbullying in comparison to traditional bullying. In the context of traditional bullying, repetition could involve a group of people intentionally causing harm to an individual over an extended period of time. Online however, this repetition may simply involve the rapid sharing of one image by multiple people. Consequently, this repetition of the bullying potentially means the image can reach a wider audience. Schneider, O'Donnell, Stueve & Coulter (2012) described the differences between cyberbullying and traditional bullying as pragmatically negligible, implying that it requires little special attention. However, there are significant differences between the two, which gives cyberbullying the potential to cause harm of a different nature (Cross et al., 2015) or of a far greater magnitude. This includes the persistence of the content and the fact that content can be edited and altered (Lenhart, 2010). Cyberbullying can also be perpetrated anonymously, potentially leading to more harmful attacks due to the decreased likelihood of repercussions for the perpetrator. It has also been argued that cyberbullying has the potential to cause more concerning levels of depression, anxiety, self-esteem issues, absenteeism, and physical health in comparison to traditional bullying (Kowalski, Giumetti, Schroeder, & Lattanner, 2016).

Studies support the notion that cyberbullying could cause problems which are not posed by traditional bullying (Cross et al, 2015). The permanent nature of internet is such that repetition can be of

far greater significance online than it is in a traditional setting. For example, in a traditional setting, a perpetrator may persistently abuse their victim over a few months and this would be considered bullying. In the case of cyberbullying, a single, altered, unflattering photo of a victim could be shared amongst a small group of school students one day, be seen by the wider community the next, and go viral by the end of the week. This would satisfy Olweus' 1993 criterion of repetition but the fact that the image can resurface at any time means that the repetition can potentially never cease. It is of note here that the humiliation does not have to be administered by one individual and can come from many sources; including those who have no connection to the victim in the 'real world'.

Another threat that is unique to cyberbullying as opposed to traditional bullying is the possibility of anonymity. Whilst in a school setting, an anonymous insult or threat is possible, it is, for pragmatic reasons very difficult to achieve. In most cases at least one student will be aware of the perpetrator's identity and when faced with repercussions or due to a guilty conscience will provide this information. There is also a limited amount of people that the anonymous message may have come from and that number can usually be made smaller still, through the use of common sense or information gathering. For example, the content of the message, or a history between the victim and certain other students may give some insight into the perpetrator's identity. This is not necessarily the case online. The nature of technology allows for an individual to set up as many fake accounts as they wish for any number of reasons. With the veil of anonymity as a protection, truly anonymous bullying can occur which poses a few problems in itself (Patchin & Hinduja, 2006).

When anonymity is an option, it has been found that students who would not normally engage in bullying behaviours are likely to do so (Cioppa, 2015). This could be partly due to the fact that when operating on a fake account, or anonymously, children are less fearful of the repercussions for bullying, whether these be from an authority figure or from the victim. It is also likely that removing the immediate reaction one receives from bullying makes it easier to perpetrate morally, because they are not fully aware of the effect they are having. Anonymity can also lead to students bullying in a way that they might not normally and can sometimes lead to them being more severe in their actions (Cioppa, 2015).

Another way in which cyberbullying differs from traditional bullying and a reason for students being less fearful of repercussions concerns potential location (Patchin & Hinduja, 2006). That is, where traditional bullying generally only occurs within school hours and confines, cyberbullying can occur within the household, or at any time and place that a child has access to an electronic device. The potential of location also leads to the problem of online activity not being able to be monitored. Given that it's outside of school hours, the supervision children are provided with can be significantly less. This not only leads to riskier online behaviour but contributes to the diminished fear of repercussions.

1.4 Prevalence and cost

Reported rates of cyberbullying in Australian schools vary from around 5 to 30 percent (Srivastava, Gamble & Bowey, 2013). More specifically, this figure refers to the number of students who are either reported or have self-reported to be engaging in cyberbullying behaviour. This behaviour may involve activity as a bully or as a victim. Research approved by the Australian government showed that in 2013, at least 71% of school reported at least one incident of cyberbullying (IRIS Research, 2014). Cyberbullying behaviour has been shown to be especially prevalent in Australia during the early adolescent years (8-14), with 7% of students reporting being the victim of cyberbullying and 3.5% reporting cyberbullying others (Cross et al. 2009). Part of the reason for the variance in this rate is due to the contentious definitions of bullying which were discussed above. In other words, while there is no agreed upon definition of cyberbullying, there can be no definitive scale for the measurement of its prevalence. Repetition is another cause of difficulty for measurement; one image can be shared numerous times and it is not clear whether this should be counted as one or multiple cases of cyberbullying.

The cost to the government is also a difficult thing to measure when considering the effects of cyberbullying. The long-term physical and psychological health risks associated with cyberbullying could alone account for a great deal of spending. Mental health issues continue to be a leading cause of health problems in Australia (Harvey, Deady, Wang, Mykletun, Butterworth, Christensen & Mitchell, 2017) and

it seems possible that at least some of this could be avoided by decreasing the prevalence of cyberbullying in both primary and high schools.

1.5 Risk factors for victims and perpetrators

The findings of studies aimed at gender differences for cyberbullies and victims have been somewhat inconsistent. Though there have been studies that found females to be more often both the victim and perpetrators of cyberbullying, studies have also found no significant difference between the genders (Brown, Demaray & Secord, 2014). Similarly, there have been inconsistent findings with regard to the developmental stage of a student and its relationship to being a cyberbully or victim. Though there are inconsistencies within the findings, research has revealed that more cyberbullying occurs in adolescence (Juvonen & Gross, 2008), and may be more prevalent around the ages of 13-15 (Slonje and Smith, 2008). Additionally, there are certain characteristics which are associated with a child's likelihood of being involved in cyberbullying. As with traditional bullying, certain groups are more likely to be the victim of cyberbullying, including LGBT children, kids with disabilities and overweight children (Robb, 2018). The role of race with regards to cyberbullying is also unclear. Patchin and Hinduja's (2006) study showed no statistically significant differences in rates of cyberbullying with regards to race. Wang, Ianotti and Nansel's (2009) study on the other hand, reported that adolescents of an African American background were more likely to be involved in cyberbullying perpetration when compared to Caucasians. Further, it found that Hispanic adolescents were more likely to report being the victims of cyberbullying than Caucasians.

1.6 Previous Systematic Reviews

One of the most recent systematic reviews of cyberbullying prevention and intervention programs in schools was by Tanrikulu (2018). This review served as one of the earliest guides for the subject of this thesis and made many conclusions regarding the efficacy of cyberbullying programs in schools. It was

found that for the most part the intervention programs were effective at reducing cyberbullying in schools. These intervention programs varied in session frequency and duration, theoretical backgrounds and country of implementation. This will be the case for the intervention programs reviewed in the current study. This systematic review differs from the current study in that it did not include a meta-analysis of any empirical effects of the programs. The Tanrikulu (2018) study also only utilised research which was published before August 2016, necessitating an update to the current literature. The current study will investigate research which was published before and after August 2016 which means there is potential for it to uncover a more modern trend in intervention efficacy. Another important finding of Tanrikulu's systematic review was that the included studies originated in nine different countries which indicates that cyberbullying is an international problem.

Another recent systematic review which researched the efficacy of cyberbullying intervention (Hutson, Kelly & Militello, 2018) had the goal of providing recommendations on effective intervention components to guide clinical practice. It found many pertinent patterns with regard to the effective implementation of intervention programs in a clinical setting. One of the major themes discovered through this process was that intervention programs which included the education of parents and caregivers were especially effective. The search terms used in this study served as a guide for the current study though were kept quite narrow, including only "cyberbullying" as the primary term. The current study will use other terms to refer to this phenomenon e.g. "cybervictimization", in an attempt to find as many studies as possible. Also, as with the Tanrikulu (2018) study, this systematic review did not include a meta-analysis and only used research published before October 2016. The current study will therefore update the existing literature in this area to include more modern research.

1.7 Current Study

There are suggestions that current anti bullying programs in Australia may not sufficiently address the problem of cyberbullying (Cross et al. 2015). Certainly, from the findings of Cross's (2015) review,

the intervention programs were not implemented as they ought to have been. The longitudinal study included 35 separate schools in Western Australia and data was taken over two years. The findings found a reduced effect in intervention efficacy due to teachers implementing less than a third of the program modules. The teachers were interviewed as to why this may have been and stated reasons such as “lack of curriculum time to teach the modules, and a lack of confidence to teach and respond to student queries about cyber-related content”. Though this systematic review and meta-analysis will not focus on Australian cyberbullying programs exclusively, the results could be especially pertinent given these suggestions. It could be for example, that this meta-analysis reveals more condensed intervention programs to be effective at reducing cyberbullying, addressing the problem of having insufficient curriculum time. A meta-analysis which concisely reports the efficacy of intervention programs may also be of use to teachers as this could increase their confidence in responding to student queries regarding cyber-related content.

Because of the aforementioned long-term effects on cyberbullying, this study will focus solely on intervention programs which were conducted within schools. This is also the most common place that intervention programs are implemented (Hutson, Kelly & Militello, 2018). Beyond preventing long term effects as the reasoning for this, there is also evidence to suggest that cyberbullying is at its most prevalent in schools or mid adolescent years (Juvonen & Gross, 2008), as opposed to a workplace or community group. A school environment is also a particularly practical and pertinent place to conduct a cyberbullying prevention program as this is when children's minds are being shaped and the inclination not to bully others is typically something one should have by their adult years.

Research question – Are school cyberbullying intervention programs effective at reducing cyberbullying perpetration and victimisation according to the evidence?

CHAPTER 2

Method

2.1 Literature Search

A comprehensive literature search of seven online electronic databases (Embase, ERIC, Psycinfo, Pubmed, CINAHL, Scopus and Informit) was conducted to find studies which examined intervention strategies for cyberbullying in schools (see table 2). E-mail alerts were set up by saving the search specifications for Embase, PsycInfo, PubMed and Scopus so that any new results that matched the search criteria would be e-mailed through to the author. Search terms included a broad list of keywords and phrases and were tailored to suit each individual database (see appendix A). To assist in this process, a logic grid was created for each database. Search terms were added incrementally and any which did not produce more results than what was previously found, were removed from the logic grids. On multiple occasions a research librarian who specialises in psychological studies was consulted to ensure the accuracy and assist in the refining of the search terms. No restrictions were placed on the publishing dates to ensure all possible articles were included. In addition to the initial search results, the 'similar articles' function of suitable articles was utilised to discover any articles which may also apply. The reference lists of applicable studies and systematic reviews were also searched to find any articles which may have been missed.

2.2 Eligibility Criteria

Studies were eligible for the meta-analysis if they included the use of a program designed specifically to reduce cyberbullying in a school setting. The study also needed to state the definition of cyberbullying so that it was clear exactly what was being measured. Cyberbullying needed to be measured using peer ratings, observational data, peer ratings or self-report questionnaires. There needed to be a control group and an experimental group in the evaluation of the program and only published literature was used. No grey literature was used, and studies could be included regardless of the year in

which they were published. Studies were eligible only if they were either written in English or had an English translation available. This was due to time constraints, though is found not to affect estimates of treatment effects substantially (Jüni, Holenstein, Sterne, Bartlett & Egger, 2002). The number of participants in the study needed to be more than one, which precluded case studies from the meta-analysis.

Table 2

Search Terms and Boolean (Logical) Operators used in the Database Searches

	CYBERBULLYING ⇨ AND	SCHOOLS
	Cyberbull*	Schools
OR ⇩	Cyber bull*	School*
	Cyber victim*	Educational institution*
	Cybervictim*	Educational institut*
	Online bull*	

Note. Search terms includes stated terms and derivatives *. Both plural and singular terms searched. Search terms which garnered no added results were excluded from this table.

Finally, an effect size which was available for extraction was necessary for inclusion in the meta-analysis. Studies that did not report on means and standard deviations were excluded. Each study was checked for overlapping samples to address any issues of dependency between studies (Lipsey & Wilson, 2001). This is a requirement of meta-analysis, and all of the studies were found to have used independent samples.

Studies were excluded if they did not include a quantitative measure of some form of cyberbullying behaviour or if they were simply qualitative in nature e.g. discourse analysis or case studies. They were also excluded if they did not use some form of control group, whether this be a different school or another classroom within the school. Some studies used multivariate statistical data (e.g. unstandardised B and standardised β), as their outcome measure and were excluded from the meta-analyses. This was due to these methods involving different combinations of predictor and outcome variables (Lipsey & Wilson, 2001). Literature not published in a peer reviewed journal was excluded to decrease the chances of including studies which involved insufficient methodological rigour. In addition to this, the methodological details and effect sizes are more likely to be easily extractable in published literature.

2.3 Data Extraction

In line with recommendations for Preferred Reporting Items for Systematic Reviews and Meta-Analyses (Moher, Liberati, Tetzlaff, & Altman, 2009), a data extraction sheet was developed which summarised key information from each study (see Appendix A). This included: (a) study authors, (b) year of publication, (c) study title, (d) country of origin, (e) study design, e.g. randomised clinical trial, quasi experimental, (f) sample size and age range or grade levels (g) cyberbullying outcome, e.g. cyberbullying, cybervictimisation, (h) intervention program e.g. Kiva, Conred, (i) length of intervention, (j) cyberbullying measure, e.g. self-report, teacher evaluation, (k) effect size data e.g. prevalence, odds ratio, (i) other notes (see appendix B). After the data extraction was completed the process was then repeated by another student to account for any errors. The

discrepancies between the two independent assessors were investigated together and the decision to include or exclude a study was reached by consensus. The information obtained was then reflected in the meta-analysis software Review Manager (RevMan Version 5.3. Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2014). To allow for the consistency in the calculation of effect sizes it was necessary to report on the means and standard deviations (*SD*) (Lipsey & Wilson, 2001). The studies which provided the means and *SD*'s were subsequently used to calculate the standardised mean difference using RevMan.

2.4 Data Preparation

Before any statistical analysis could be performed, the studies were grouped according to their measures of cyberbullying. This involved identifying which studies investigated cyberbullying perpetration as an outcome and which looked at cybervictimisation, then determining which had an extractable effect size. They were subsequently grouped according to these outcomes in preparation of the statistical analysis. The two groups were not made mutually exclusive as some of the studies involved looking at both cybervictimisation and cyberbullying perpetration as separate and distinct outcomes. Studies which combined the two of these outcomes together e.g. as cyberbullying behaviour, were put in another group. Any studies which broke the cyberbullying and cybervictimisation into specific behaviours, e.g. "shared someone's personal secrets or images online without that person's permission", "Someone pretended to be you and sent or posted material that damaged your reputation or friendships" were grouped accordingly. These groups were then assessed independently either quantitatively (meta-analysis) or qualitatively, to discover any patterns.

In studies where data were taken at different time periods e.g. during the intervention program, only the data from the final time was taken. This was to ensure that the intervention program had ample time to take effect and that these effects were more representative of the efficacy of the program.

Standardised mean difference effect sizes were calculated for each of the individual studies. They were calculated such that a negative effect size would indicate a favourable outcome. That is, a negative effect size meant that the implementation of the intervention program was associated with a lower score of cyberbullying perpetration or cybervictimisation. These effect sizes were interpreted as Cohen (1988) recommends, effects sizes ≤-.2 were defined as small, ≤-.5 as moderate, and ≤-.8 as large.

2.5 Statistical Analysis

Two separate meta analyses were conducted: one which explored the effect that intervention programs have on cyberbullying perpetration behaviour and one which looked at the effect these programs had on cybervictimization. For the most part, the process of these meta-analyses was identical, except for the studies which were included in each. Not all of the studies reported the necessary data for extraction of effect sizes for both cyberbullying perpetration and cybervictimization, rendering them eligible for only one of the meta-analyses.

The means, SD's, and total participant numbers were entered into RevMan and saved under their respective studies' headings and titles. Standardized mean difference was the effect size calculated from these studies and used to estimate the difference between the two groups (intervention and control). The standardized mean difference of each of the studies was calculated by entering the raw data provided in the results sections of these papers. After entering the total number of participants for both the control and experimental group, and the means and standard deviations of each group individually, an effect size was calculated for each study. Each of these effect sizes is then combined to establish if the intervention group leads to a favourable outcome and create an accompanying forest plot reflecting this information.

For ease of comparison, the studies which reported the same psychological health outcome, (e.g. cyberbullying, sometimes cyber perpetration) were pooled. RevMan was used to calculate the

relative weights of each of the studies or, how much they contributed to the overall meta-analysis. This can also be seen in Appendix B. These weights are calculated by using the Generic Inverse Variance Method (GIVM). For each of the studies included in a meta-analysis, the GIVM utilises an estimate for the treatment effect and its standard error. Each study is then given its respective weight which equates to the inverse of the variance of the effect estimate (i.e. one divided by the standard error squared) (Cochrane, 2018).

For the purpose of both meta-analyses conducted, random effects models were chosen as the method. This was in part due to the potential consequences of applying random-effects models to fixed-effects data. The risks of applying a fixed-effect model to random-effects data are far greater than the other way around (Field & Gillett, 2010). In addition to this, the decision between fixed and random-effects models are said to be best made a priori rather than ad hoc pending the results of a meta-analysis. The results of these meta-analyses are to be generalised to other intervention programs rather than confined simply to the studies included within, which also necessitates a random-effects model. (Field and Gillett, 2010). The random-effects model also operates under the assumption that true effect sizes are similar but not identical across separate studies. It differs to the fixed-effect model in this way and this is due to sample and methodological differences (Borenstein Hedges, Higgins, & Rothstein, 2009). This is of particular relevance given that studies which explore cyberbullying are naturally diverse in nature (Ttofi & Farrington, 2010).

95% confidence intervals (CIs) were then calculated to determine the accuracy of weighted effect sizes. CIs are a set of values within which the true value is thought to lie and a CI that does not contain zero is considered statistically significant (Thompson, 2007). There is still a 5% chance that the true effect size will lie outside the range of values indicated by the CI At the 95% level. (Stratford, 2010). Between-study heterogeneity was then calculated using the associated chi-squared (Chi^2), tau-squared, (T^2) I-squared (I^2) and p-values.

2.6 Risk of bias and methodological rigour

In line with the PRISMA guidelines, a meta-analysis should assess the risk of bias, and evaluate the strength of evidence (Moher et al., 2009). This assessment should help to determine the varying levels of methodological rigour or detail in reporting. To achieve this, the Cochrane risk of bias tool was used (see appendix C). This checklist was used for each included study to be marked against its criteria. RevMan was used to create both a Risk of Bias summary table and a Risk of Bias Graph for the studies included in the meta-analyses. These figures reflected the author's opinion of how the studies fit Cochran's criteria. The studies were checked by another student to ensure consistency of measure. Any discrepancies between the two independent assessors were discussed further and a consensus was reached on how to rate the studies.

An ethics application was made internally through the School of Psychology at Adelaide University. Being a meta-analysis, it only had to undergo a minimal application process and was approved shortly after.

CHAPTER 3

Results

3.1 Search and selection Strategy

The initial literature search yielded 3,878 articles which were all imported to Endnote (Endnote x8.2 Bld 11343). 2,132 duplicates were then removed from the initial search. From these 1,746 articles, abstracts and titles were screened against the aforementioned inclusion and exclusion criteria resulting in the removal of 1,669 articles. The final 77 articles were reviewed in full text against the eligibility criteria and 65 were removed resulting in 12 eligible studies. The studies that were excluded up until this point did not report a rate of cyberbullying or did not provide necessary data e.g. standard deviations and means, to extract an effect size. No additional studies were added through the process of searching relevant reference lists (see figure 1).

3.2 Study characteristics

Four randomised control trials were included in the first meta-analysis which explored cyberbullying perpetration. All four of these studies were published between the dates of 2013 and 2016 in peer-reviewed journals. Three of these studies were conducted in Europe (Germany, Spain and Italy) and the fourth was conducted in Australia (see table 3). The samples of these studies varied in both size and grade level. All of the participants included were students at schools in the respective countries. The smallest sample (Garaigordobil, Martínez-Valderrey, 2015) had just 176 participants with an age range of 13-15. The largest sample (Cross, Shaw, Hadwen, Cardoso, Slee, Roberts, Thomas, Barnes, 2016) had 2874 participants from the 8th and 9th grade.

All of the studies used self-report data for the reporting of cyberbullying perpetration but recorded it using different measures. Two of the studies in the first meta-analysis constructed their own scales for this measurement while the other two relied on existing scales. All four of the studies utilised a continuous scale for measurement. The measures across all studies involved students

answering questions regarding their own specific cyberbullying behaviours that would fall into categories of cyberperpetration or cybervictimization. They would then receive scores which correlated with how much cyberbullying behaviour they were exhibiting in relation to their peers.

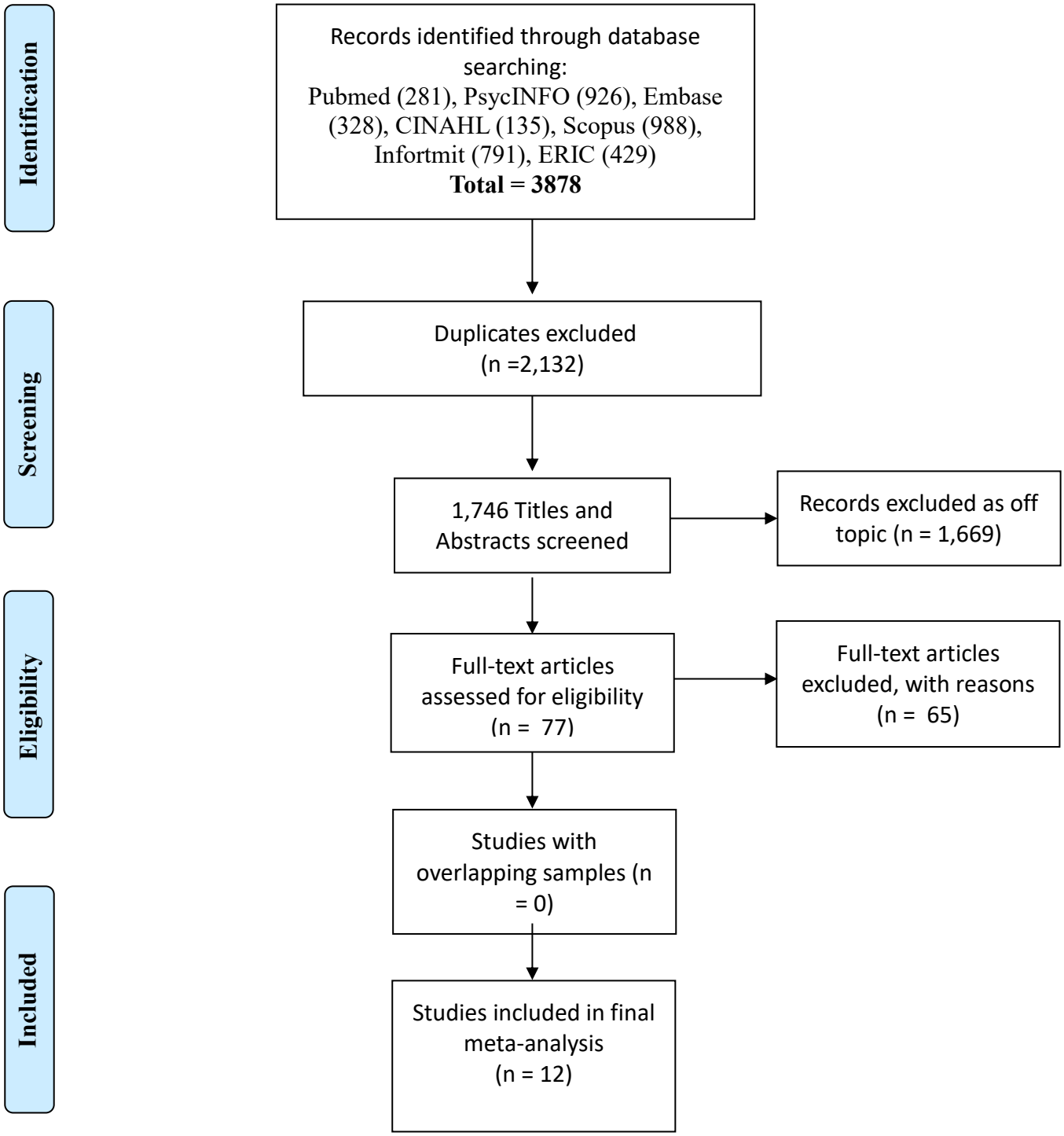

Figure 1. PRISMA flowchart diagram of study selection process.

Table 3

Study characteristics

AUTHOR	YEAR	TITLE	COUNTRY	DESIGN	SAMPLE	RELEVANT VARIABLES	INTERVENTION	LENGTH	MEASURE	CYBERBULLINYG OUTCOMES
Espelage, Low, Ryzin, Polanin	2015	Clinical Trial of Second Step Middle School Program: Impact on Bullying, Cyberbullying, Homophobic Teasing, and Sexual Harassment Perpetration	U.S.A	Randomized clinical trial	3651 students (6^{th} grade)	Bullying, cyberbullying, homophobic name calling, sexual harassment perpetration	Second Step	3 years	Self report	Unstandardized beta, correlations
Tangen, Campbell	2010	Cyberbullying: One Primary School's Approach	Australia	Longitudinal	70 students (aged 10-13)	Cyberbullying, Cybervictimization, Traditional Bullying, Traditional victimization	P4C (ongoing whole school)	-	Self report	Prevalence, beta, odds ratio
Pieschl, Urbasik	2013	Does the Cyberbullying Prevention Program Surf-Fair Work? An Evaluation Study	Germany	Pre Post Follow up Quasi Experimental	87 students (6^{th} grade)	Cyber target prevalence, cyber perpetrator prevalence	Surf Fair	2 months	Self report	Prevalence, beta, odds ratio
Garaigordobil, Martínez-Valderrey	2015	Effects of Cyberprogram 2.0 on “face-to-face” bullying, cyberbullying, and empathy	Spain	Pre test post test repeated measures	176 students (aged 13-15)	Cyberbullying, Cybervictimization, Traditional Bullying, Traditional victimization	Cyberprogram 2.0	1 year	Self report	Prevalence, mean scores

Williford, Elledge, Boulton, DePaolis, Little, Salmivalli	2013	Effects of the Kiva Antibullying Program on Cyberbullying and Cybervictimization Frequency Among Finnish Youth	Finland	Group Randomized Control Trial	18,412 students (4th 5th 6th 8th and 9th grade)	Cyberbullying, Cybervictimization, Traditional Bullying, Traditional victimization	Kiva	2 years	Self report, teacher evaluation	Odds ratio
Muller, Pfetsch, Ittel	2014	Ethical Media Competence as a Protective Factor Against Cyberbullying and Cybervictimization Among German School Students	Germany	Longitudinal	934 students (aged 10-17)	Cyberbullying, Cybervictimization, Traditional Bullying, Traditional victimization	-	-	Self report	Beta
Palladino, Nocentini, Menesini	2016	Evidence Based Intervention Against Bullying and Cyberbullying: Evaluation of the NoTrap! Program in Two Independent Trials	Italy	2 Quasi Experimental Trials	Trial 1: 622 students (9th grade) Trial 2: 461 students (9th grade)	Cyberbullying, Cybervictimization, Traditional Bullying, Traditional victimization	NoTrap!	6 months	Self report	x2, RMSEA, CFI
Gradinger, Yanagida, Strohmeier, Spiel	2016	Effectiveness and Sustainability of the ViSC Social Competence Program to Prevent Cyberbullying and Cyber-Victimization: Class	Austria	Longitudinal Randomized control group	2042 students	Cyberbullying, Cybervictimization Traditional aggression, Traditional victimization	ViSC	1 year	Self report	Prevalence, mean scores

		and Individual Level Moderators								
Del Rey, Casas, Ortega	2016	Impact of the Conred Program on Different Cyberbullying Roles	Spain	Quasi Experimental	875 students (aged 11-19)	Cyberbullying, Cybervictimization, Traditional Bullying, Traditional victimization	ConRed	3 months	Self report, expert retrieval	Cohen's D
Athanasiades, Kamariotis, Psalti, Baldry, Sorrentino	2015	Internet use and Cyberbullying Among Adolescent Students in Greece: The “Tabby” Project	Greece	Quasi Experimental?	314 students	Cyberbullying (many), Cybervictimization (many)	Tabby	6 months	Self report	Prevalence, mean scores
Cross, Shaw, Hadwen, Cardoso, Slee, Roberts, Thomas, Barnes	2016	Longitudinal Impact of the Cyber Friendly Schools Program on Adolescents’ Cyberbullying Behavior	Australia	Group Randomized Control Trial	2874 students (8^{th} and 9^{th} grade)	Cyberbullying, Cybervictimization	Cyber Friendly Schools	2 years	Self report	Coefficient
Wolfer, Schultze-Krumbholz, Zagorscak, Jäkel, Göbel, Scheithauer	2013	Prevention 2.0 Targeting Cyberbullying at School	Germany	Pre test Post test	593 students (7th - 10th grade)	Cyberbullying	Media Heroes	9 months	Self report, research assistants	Prevalence, mean scores
Del Rey, Casas, Ortega	2012	The ConRed Program an Evidence-based Practice	Spain	Quasi Experimental	893 students (aged 11-19)	Cyberbullying, Cybervictimization	ConRed	3 months	Self report	T Test

3.3 Intervention Characteristics

Each of the four studies involved research into a different intervention program. All of these intervention programs employed a whole school approach. The studies all differed in terms of how long after the intervention data on cyberbullying behaviour was taken. This ranged from six months (Palladino, Nocentini, & Menesini, 2016) to two years (Cross et al., 2016). The second meta-analysis focused on cybervictimisation drew data from three of the four studies used in the first. The study by Wolfer, Schultze-Krumbholz, Zagorscak, Jäkel (2013), was excluded as it did not incorporate cybervictimisation as an outcome.

Some of the 12 studies included in the systematic review employed a whole school approach while others involved a classroom curriculum implementation. Because of this, for the whole school studies, the schools which received the intervention program were treated as the experimental group and schools which received no intervention were treated as control groups. In the classroom curriculum styled interventions, the classrooms which were a part of the intervention were treated as experimental, and the classrooms which did not were the control.

The intervention programs generally took around 6 months to a year to implement in full though this took a different form in one of the studies. The Tangen & Campbell (2010) study included a school which implemented a P4C approach. This was a school which implemented a philosophy-based discussion once weekly to every student in the school and had been doing so since 1997. It used purposive sampling to match students from this school to many non-P4C school's students to discover any effects the school philosophy had. Interestingly the results indicated a lack of significant differences.

3.4 Participant Characteristics

Participants in the studies included in the meta-analysis were recruited from schools within Australia, Germany, Spain and Italy. These students were selected due to their grade level

containing the age group for students wherein cyberbullying is thought to be most prevalent. The students had no other unique characteristics applicable to the study. That is, the students were not selected because they had a pre-existing problem with cyberbullying or lack thereof, they were simply selected due to their grade level and corresponding age. For many of the studies, participants' sociodemographic and general information including age or background were not reported. Cyberbullying behaviour was reported by the students in each of the studies both pre and post intervention.

3.5 Impact of Intervention Programs on Cyberbullying Perpetration

The overall effect size of the association between cyberbullying intervention programs and mean scores on a cyberbullying perpetration test was shown to be statistically significant, -0.30 [-0.56, -0.04], p = 0.02. This indicates that participating in a cyberbullying intervention program was associated with lower levels of involvement in cyberbullying perpetration.

Three of the four studies involved in the first meta-analysis were shown to be effective at reducing cyberbullying perpetration in their student participants (see figure 2). This meant that the overall effect of the meta-analysis showed a favourable outcome for the experimental condition with regards to cyberbullying perpetration. The results from the fourth study (Cross et al. 2016) showed little to no effect on cyberbullying perpetration behaviour.

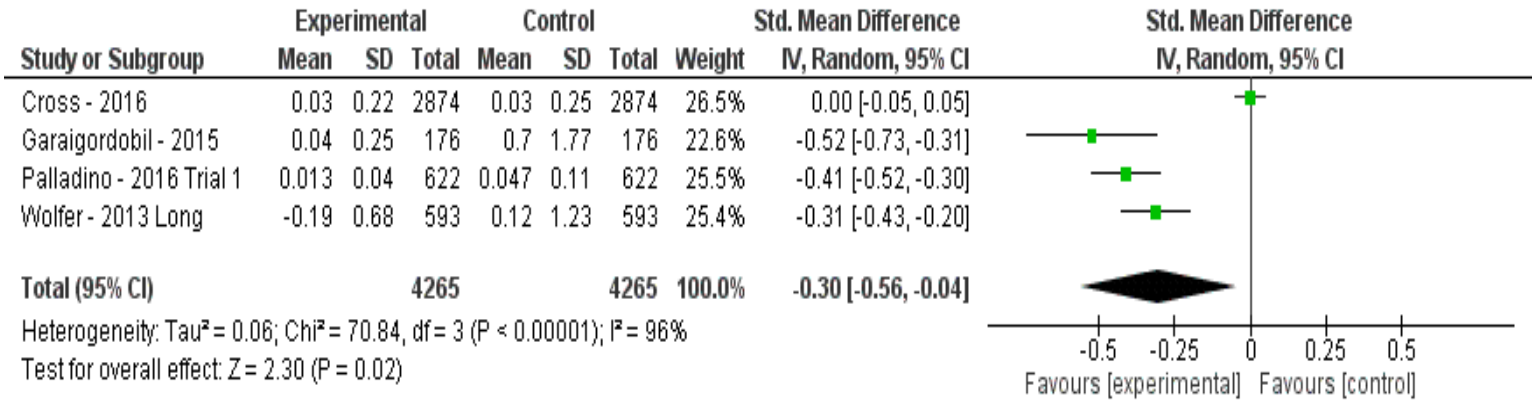

Figure 2: Intervention programs' effect on cyberbullying perpetration

The four studies were weighted relatively equally in the meta-analysis, which means they each contributed a similar amount to the overall effect size. The strongest effect size of an individual study was from (Garaigordobil et al 2015) which reported a medium effect size between the two variables -0.52 [-0.73, -0.31].

This was contrasted with the weakest effect size, (Cross et al. 2016) 0.00 [-0.05, 0.05]. The effect sizes were interpreted in terms of strength according to Cohen's (1988) recommendations which are that effects sizes ≥.2 are defined as small, ≥.5 as moderate, and ≥.8 as large. Heterogeneity between the studies was calculated and the I^2 value (96%) indicated a high level of diversity.

3.6 Impact of Intervention Programs on Cyberbullying Victimisation

The overall effect size of the association between cyberbullying intervention programs and mean scores of cybervictimisation was shown to be statistically significant, -0.28 [-0.51, -0.05] p = 0.02. This indicates that participating in a cyberbullying intervention program was associated with a decreased involvement in cybervictimisation.

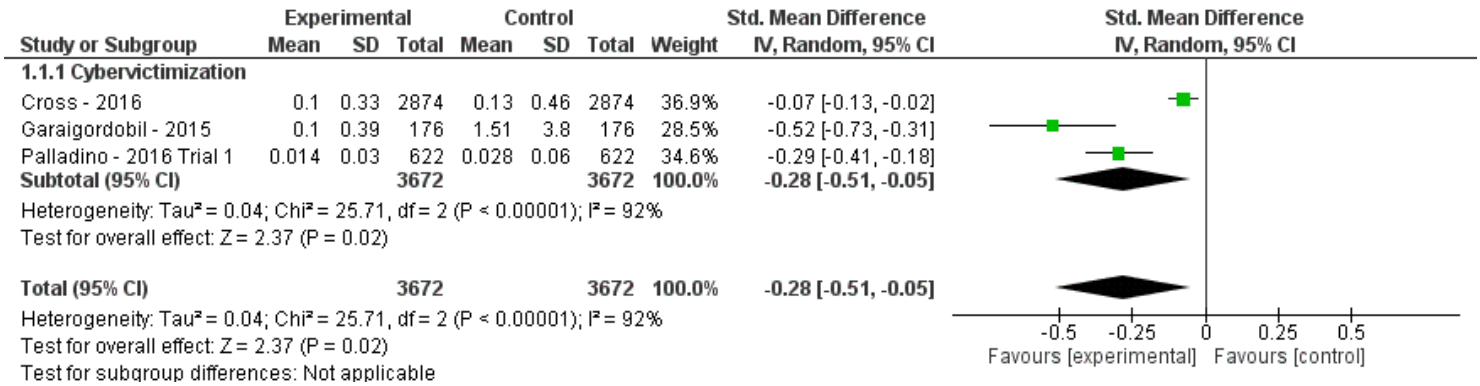

Figure 3: Intervention programs' effect on cybervictimization

All three of the studies included in the second meta-analysis were shown to be effective at reducing cybervictimisation (see figure 3)**.** This resulted in a favourable overall effect size for the

experimental condition with regards to cybervictimisation. The Cross et al. (2016) study contributed the largest weight to the overall effect size (36.9%) and had the weakest individual effect size -0.07 [-0.13, -0.02]. This indicates a small to negligible effect of the intervention program on cybervictimisation. This was contrasted with the Garaigordobil et al. (2015) study which contributed the smallest weight to the overall effect size (28.5%) and the largest individual effect size -0.52 [-0.73, -0.31]. This indicates that the study's intervention program had a moderate effect on cybervictimisation within the school. Heterogeneity was calculated, and the I^2 value (92%) indicated a high level of diversity between the studies.

3.7 Risk of Bias Assessment

The Cochrane's Risk of Bias assessment tool was employed to measure the levels of possible bias involved in the studies included in the meta-analyses (see figure 4). Random sequence generation was at low risk in 75% of studies and unclear in 25%. 100% of the studies showed a low risk of bias in the domains of allocation concealment, incomplete outcome data and other biases. 25% Of the studies showed a low risk of blinding of outcome bias, and 75% were at a high level of risk. 75% of the studies displayed a low risk of selective reporting bias with 25% of the studies indicated an unclear risk. 100% of the studies included in the meta-analyses were at high risk of bias in the domain of blinding of participants and personnel (see figure 5).

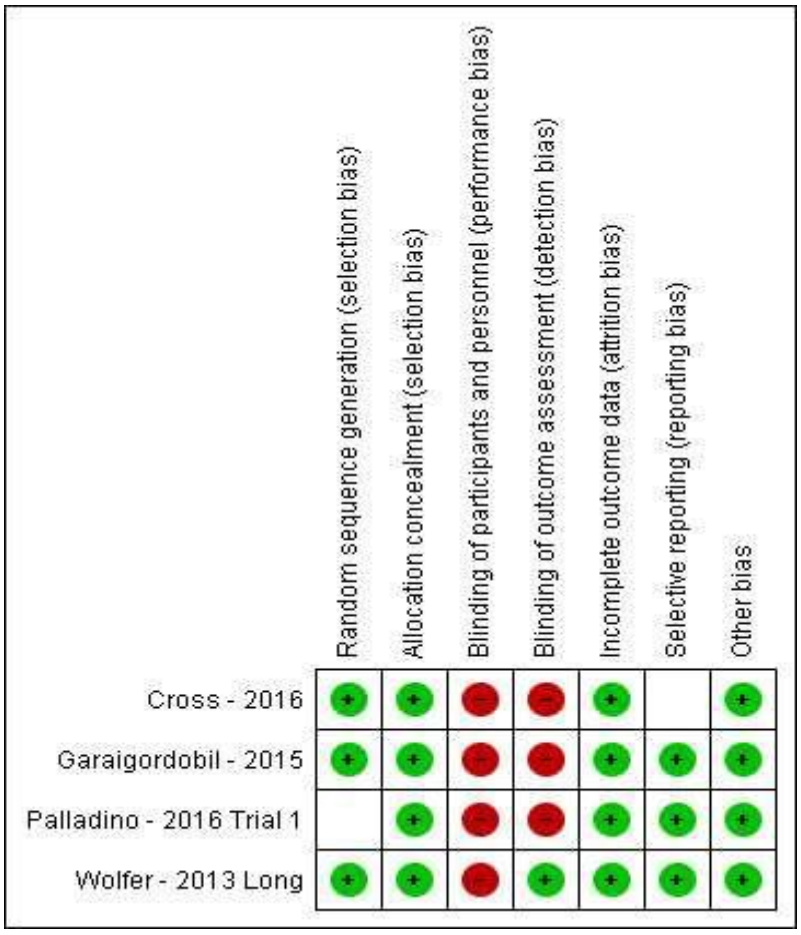

Figure 4: Risk of Bias Summary. Note: Green = low risk, Red = high risk, Blank = unclear risk.

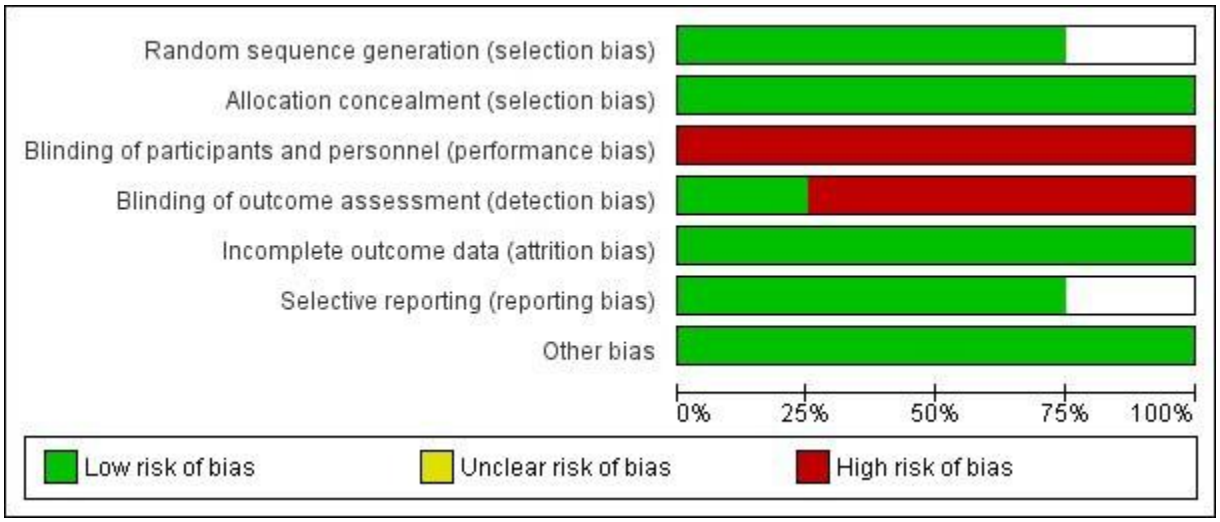

Figure 5. Risk of bias graph

The majority of studies used broad recruitment methods, which involved sending an invitation to secondary schools in the area of the study in an attempt to gain consent. This is in contrast to a narrower focus which would only involve working within the confines of a single school. Recruiting this way helps to increase the representativeness of the sample and increase the likelihood of generalisability to the general public. It does however, also increase the risk of bias due to the adding of extraneous variables. In other words, there are differences between schools which cannot be controlled for.

CHAPTER 4

Discussion

4.1 Key Findings

The results from the four studies included in the meta-analyses were analysed in order to determine whether school cyberbullying intervention programs are effective at reducing cyberbullying behaviour. The 8530 participants were all school students in their mid-adolescent years. The forest plots depicted the standardised mean differences between control and experimental groups for cyberbullying intervention programs and were of significant interest to the author. There was evidence found in these effect sizes which supports the hypothesis that cyberbullying intervention programs are indeed effective at reducing the rates of cyberbullying perpetration in schools. Similarly, the investigation into the intervention programs' effect on cybervictimisation showed them to be effective. The overall effect size of the meta-analysis was in favour of the experimental group, or, lowering the amount of cybervictimisation occurring at the school.

Apart from the Tangen & Campbell (2010) study, all of the interventions in the current review focussed on students who were around their mid-adolescence. This is a possible factor which contributed to its apparent ineffectiveness at reducing cyberbullying behaviour. The Tangen & Campbell (2010) study instead investigated the effects of the P4C approach which educates all age groups throughout the school. It cannot be concluded that this was the only reason however, as there were other variables which may have affected the outcome. Some of these include the country of origin, methodological differences, and a generally different approach which was outlined in the results section. Given that adolescence is where cyberbullying is thought to be at its most prevalent however, focussing on this demographic may lead to an exaggerated effect. In other words, if the baseline of cyberbullying is higher at the inception of the intervention program, the ability to lower it will be increased.

As was mentioned in the method section, this review only incorporated studies which had been published. This could potentially affect the results of the meta-analysis as it can lead to the

well documented problem of publication bias (Borenstein, Rothstein & Sutton, 2005). The phenomenon of publication bias refers to the increased likelihood of significant and strong results being published. It may be, that the effect observed in the meta-analyses were stronger because more significant and strong results were used than what may have been if grey literature were included.

Though one (Cross, et al. 2016) of the four studies contributing to the meta-analysis was found to have no effect on the amount of cyberbullying perpetration, and a negligible effect on cybervictimisation within the school it was implemented, the study itself posited possible reasons for this. It was hypothesised firstly that this lack of effect could have been due to the teachers in the involved schools implementing only one third of the program content. The fact that the study showed the program to have no impact on how often cyberbullying occurred, was thought perhaps to be due to the low frequency of cyberbullying behaviour. In other words, students were reporting a low level of cyberbullying behaviour: "on average equivalent to three to four events within the 10-week period of a term" (Cross, et al. 2016, p. 175). Because of this, the ability to change the frequency of cyberbullying behaviour overall was somewhat limited. The suggestion was also made that whole school programs have a reduced effectiveness for student perpetrators of bullying. The reason for this is thought to be that the whole school problems target all students when only a small proportion of them are actually engaged in cyberbullying perpetration.

Some of these seem reasonable as explanations for why the (Cross, et al. 2016) study was shown to be largely ineffective. The fact that the program was not completely implemented is an enormous flaw to consider when interpreting the results of this study. This was not the case in the other programs as they were all implemented in full. This variable alone seems adequate to account for the difference in results between the (Cross, et al. 2016) study and the others in the review. The fact that it was dealing with a low overall rate of cyberbullying at baseline however seems less likely as an attribute as this rate is consistent with schools universally, so all programs implemented in a school setting would face this same challenge. Similarly, this study using a whole school

program rather than targeting students potentially vulnerable to cyberbullying behaviour is not dissimilar to the other studies included in this review. It is possible however that these two variables in conjunction with the first, amalgamated to cause the lack of effect found in the results.

4.2 Potential Benefits of Current Study

The current study has many potential benefits for the psychological community. It is an update on the existing systematic reviews in a similar research area and has reinforced the existing evidence on the efficacy of cyberbullying prevention programs in schools. In addition to this, it included intervention implementations which have not previously been assessed quantitatively (Cross et al, 2016, Garaigordobil et al, 2015, Palladino et al, 2016). The results have potentially given insight into which particular programs are effective at reducing cyberbullying in a school setting. There is also evidence for programs reducing cyberbullying more effectively within a certain context such as the country or region in which the effective interventions took place. The effectiveness of the intervention programs on mid adolescents is another example of a factor explored which could be contributing to the success of these intervention programs. Beyond updating the existing literature, this study added to the Tanrikulu (2018) and Hutson, Kelly & Militello, (2018) systematic reviews by incorporating meta-analysis. While the findings of the current study supported these systematic reviews, by performing the meta-analyses, a quantitative level of support was added.

The patterns that have emerged relating to these factors, could help to advise the implementation of cyberbullying prevention programs in schools. For example, the programs were shown to be most efficacious at the earlier years of high school, so this could be useful information for any schools planning on implementing programs. They could use this information when running their own interventions and focus on this age group specifically.

The aforementioned links between bullying and mental and physical health have long been established and as such, many intervention strategies have been implemented. Cyberbullying being

a more recent phenomenon however, has necessarily had fewer intervention programs aimed at it specifically and so, less literature exists exploring the subject. A systematic review is an appropriate way to address this as it is an efficient method to summarise the literature that currently exists. Given that cyberbullying is likely to change its form in line with advances in technology, the more recent prevention programs are likely to follow this trend in an attempt to address the ever-changing nature of technology. Snapchat is one such relatively recent advancement in technology which allows the instantaneous sharing and editing of images. Snapchat is one of the most popular methods of communication for young people, with only Facebook and Instagram being used more frequently (Pew Research Center, 2015b). It is of note because the style of communication is almost exclusively image based and allows for image modification. For this reason, and the fact that cyberbullying literature accumulates every year due to its increasing relevance, systematic reviews of its prevention programs need to be conducted regularly to stay up to date (Tanrikulu, 2018).

4.3 Potential limits of current study

The meta-analyses specifically looked at the efficacy of cyberbullying prevention programs which have taken a measure of cyberbullying behaviour before and after an intervention program. Using this narrow scope, it does not consider the efficacy of programs which may prevent cyberbullying rather than cure the symptoms. Some programs of this nature are designed to teach children safe online behaviour at an early age, and this could be preventing an enormous amount of cyberbullying before it is even perpetrated. Though one study of this kind was included in the review, it did not provide data appropriate for these meta-analyses and was found to be ineffective. A future meta-analysis could therefore look at the potential effects of more studies of this sort.

All of the studies included in this review utilised some form of self-report. Though there were three, (Wolfer et. al, 2013; Del Rey, Casas, Ortega, 2016; Williford et. al, 2013) which used another form of reporting measure, they also relied on at least some form of self-report for their cyberbullying outcomes. The concern here being that not all children will be truthful when

reporting their levels of cyberbullying behaviour for fear of repercussions (Patchin & Hinduja, 2006). However, given that cyberbullying behaviour occurs online and therefore cannot be observed by an expert, this is unavoidable and so the limit applies to all studies which investigate cyberbullying. To elaborate, for a researcher to observe cyberbullying behaviour, they would necessarily need to implement complicated and potentially unethical methods such as accessing a student's phone to monitor online activity. Another limitation with regards to the study characteristics was the length of the studies. If there were more longitudinal studies included in the review, more data could have been acquired, and the relationship between interventions and cyberbullying behaviour could have been more well observed. Longitudinal studies require more resources however, so this limitation is not easily addressed.

The high I^2 values (92%, 96%) indicated a high level of diversity between the studies included in both meta-analyses. This score indicates that the meta-analyses results should be interpreted with caution. This high value of heterogeneity between the studies included in the meta-analyses could be due to them utilising different psychological measures to assess cyberbullying perpetration and cybervictimisation. Beyond this, the sample sizes of the studies were rather varied (ranging from 176 to 2874), and this was also likely to have contributed to the heterogeneity levels.

Blinding of participants and personnel bias was at high risk for each of the studies included in the meta-analyses. This was due to the nature of cyberbullying intervention programs. It would have been impossible for a student or staff member to not know which students were being given the experimental treatment. This is a universal issue for cyberbullying however and should not taint the results of the study in comparison to other literature in the area.

The inclusion and exclusion criteria for the current study were rather stringent, to allow for the author to draw meaningful conclusions from the analysis. This meant that some studies which could have had some meaningful implications were ineligible for the meta-analyses. Beyond this, It is possible that the literature search failed to capture all relevant studies. For example, the search terms used in the process outlined above could have potentially missed some studies which used

other keywords. Every attempt was made to reduce the likelihood of this such as searching many databases, utilising the reference list of the studies, and consulting a research librarian who specialises in this field on multiple occasions. There were of course still databases which were not searched however, and this was in the interest of time. This potential limit to the study is a factor to consider when interpreting the results of this review.

4.4 Future Studies

This systematic review incorporated studies which were conducted in many different countries. This observation is of note because it provides evidence for the theory that cyberbullying is a universal problem. Beyond this, it shows that the intervention programs are effective regardless of the country in which they are implemented. It is not clear from this systematic review however, whether or not intervention programs translate well across countries. For this notion to be supported, intervention programs would need to be translated and implemented outside of their country of origin.

One study (Gradinger, Yanagida, Strohmeier, Spiehl, 2016) was excluded from the meta-analyses as it looked at the impact a general intervention program would have on cyberbullying. Interestingly this study showed that a general intervention program was effective at reducing cyberbullying and this is a possible avenue for future studies. If this could be replicated in other environments, it could give credence to the idea that cyberbullying could be treated simply as traditional bullying occurring online. If enough studies of this sort are conducted, a meta-analysis could be done on them to determine whether or not cyberbullying specific interventions are indeed necessary. In other words, to be able to generalise the results, the study would need to be replicated in different schools, countries and grade levels.

4.5 Conclusion

The current systematic review and meta-analyses provided an update to the current literature and incorporated studies which hadn't previously been included in a meta-analysis. It supported the previous reviews of a similar nature and provided evidence that cyberbullying intervention programs are effective at reducing levels of cyberbullying in schools. The high levels of heterogeneity indicate that this evidence should be treated with caution however. Future meta-analyses of this kind could attempt to reduce heterogeneity by methods such as, including a greater range of studies. This could be achieved by attempting to gather the appropriate quantitative data from studies where this was not made readily available, leading to an increased number of eligible studies.

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Appendices

Appendix A

Search Strategies by Database

CINAHL Logic Grid

AND →

Cyberbullying	School
cyberbull* OR “cyber bull*” OR cybervictim* OR “cyber victim*” OR “online bull*”	school* OR "educational institut*"

Embase (Elsevier) Logic Grid

AND →

Cyberbullying	School
cyberbullying/de OR cyberbull*:ti,ab OR 'cyber bull*':ti,ab OR cybervictim*:ti,ab OR 'cyber victim*':ti,ab OR 'online bull*':ti,ab	school/exp OR school*:ti,ab OR 'educational institut*:ti,ab'

ERIC Logic Grid

AND →

Cyberbulling	School
cyberbull* OR “cyber bull*” OR cybervictim* OR “cyber victim*” OR “online bull*”	school* OR "educational institut*"

Informit Logic Grid

AND →

Cyberbullying	School
Cyberbull* OR “cyber bull*” OR cybervictim* OR “cyber victim*” OR “online bull*”	school* OR “educational institut*”

PsycInfo Logic Grid

AND →

Cyberbulling	School
Cyberbull*.tw OR cyber bull*.tw OR cyber victim*.tw OR cybervictim*.tw OR online bull*.tw	School.sh OR school*.tw OR educational institut*.tw

PubMed Logic Grid

AND →

Cyberbullying	School
cyberbull* OR “cyber bull*” OR cybervictim* OR “cyber victim*” OR “online bull*”	school* OR "educational institut*"

Scopus Logic Grid

AND →

Cyberbullying	School
cyberbull*[tw] OR cyber bull*[tw] OR cyber victim*[tw] OR cybervictim*[tw] OR online bull*[tw]	schools [mh:noexp] OR school* [tw] OR educational institution*[tw]

Appendix B

Data Extraction Sheet Example

Article Title:
Author:
Year:

Sample

Participants: _____

Age range/grade level: _____

Study design

_____

Intervention Program:

_____

Length of intervention:

_____

Study country:

_____

Cyberbullying measure:

Self report:_____

Other:_____

Cyberbullying Outcome:

Cyberbullying:_____

Cybervictimisation:_____

Other:_____

Effect size data:

_____

Other notes:

_____

Appendix C

Cochran's Risk of Bias Tool

AUB KQ1 Risk of Bias Assessment

Selection bias ***Random sequence generation***	Described the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups	Selection bias (biased allocation to interventions) due to inadequate generation of a randomized sequence	Random sequence generation method should produce comparable groups	Not described in sufficient detail	**High** **Low** **Unclear**
Selection bias ***Allocation concealment***	Described the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen before or during enrollment	Selection bias (biased allocation to interventions) due to inadequate concealment of allocations prior to assignment	Intervention allocations likely could not have been foreseen in before or during enrollment	Not described in sufficient detail	**High** **Low** **Unclear**
Reporting bias ***Selective reporting***	Stated how the possibility of selective outcome reporting was examined by the authors and what was found	Reporting bias due to selective outcome reporting	Selective outcome reporting bias not detected	Insufficient information to permit judgment†	**High** **Low** **Unclear**
Other bias ***Other sources of bias***	Any important concerns about bias not addressed above*	Bias due to problems not covered elsewhere in the table	No other bias detected	There may be a risk of bias, but there is either insufficient information to assess whether an important risk of bias exists or insufficient rationale or evidence that an identified problem will introduce bias	**High** **Low** **Unclear**

* If particular questions/entries were pre-specified in the study's protocol, responses should be provided for each question/entry.

† It is likely that the majority of studies will fall into this category.

Assess each main or class of outcomes for each of the following. Indicate the specific outcome.

AUB KQ1 Risk of Bias Assessment (Reference ID #)

Outcome:

Performance bias ***Blinding (participants and personnel)***	Described all measures used, if any, to blind study participants and personnel from knowledge of which intervention a participant received. Provided any information relating to whether the intended blinding was effective.	Performance bias due to knowledge of the allocated interventions by participants and personnel during the study.	Blinding was likely effective.	Not described in sufficient detail	**High** **Low** **Unclear**
Detection bias ***Blinding (outcome assessment)***	Described all measures used, if any, to blind outcome assessors from knowledge of which intervention a participant received. Provided any information relating to whether the intended blinding was effective.	Detection bias due to knowledge of the allocated interventions by outcome assessors.	Blinding was likely effective.	Not described in sufficient detail	**High** **Low** **Unclear**
Attrition bias ***Incomplete outcome data***	Described the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. Stated whether attrition and exclusions were reported, the numbers in each intervention group (compared with total randomized participants), reasons for attrition/exclusions where reported.	Attrition bias due to amount, nature or handling of incomplete outcome data.	Handling of incomplete outcome data was complete and unlikely to have produced bias	Insufficient reporting of attrition/exclusions to permit judgment (e.g., number randomized not stated, no reasons for missing data provided)	**High** **Low** **Unclear**