

Longitudinal associations between peer victimisation subtypes and children and adolescents' anxiety: A meta-analysis

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ABSTRACT

This meta-analysis examined the bidirectional effects between types of peer victimisation and anxiety. It also investigated types of anxiety as a potential moderator of this relationship, which has not been examined within a meta-analytic framework previously. Five electronic databases were searched and longitudinal studies exclusively utilising published and validated measures for peer victimisation subtypes and anxiety symptomatology were included. A total of 3760 articles were screened and 14 studies with a total of 11,307 participants met inclusion criteria. Results showed significant bidirectional effects between anxiety and several subtypes of victimisations including cyber, overt, relational, and reputational victimisation. Although significant effects were seen among all associations, these were all deemed as small, except for relational peer victimisation predicting anxiety over time which was considered to be a moderate effect size. Moderator analysis of anxiety types suggested that relational peer victimisation predicted social anxiety to a greater and more significant extent than general symptoms of anxiety. It was also found that general anxiety symptoms were significantly greater at predicting overt peer victimisation over time than social anxiety symptoms. These results hold implications for theories around the development and maintenance of anxiety, as well as providing evidence to inform treatments and interventions for both anxiety disorders and programmes aimed to prevent peer victimisation.

1. Introduction

Peer victimisation is defined as being the recipient of physical or psychological harm from peers (De Los Reyes & Prinstein, 2004), and is associated with mental health comorbidities (Ranta et al., 2009; Reijntjes et al., 2010). It is estimated that one in three children experience peer victimisation throughout their school years (Modecki et al., 2014), with 25 % of schools considering peer victimisation to be a daily or weekly occurrence (Dinkes et al., 2007). Rigby (1998) has estimated that 50 % of adolescents experience face-to-face peer victimisation at least once throughout each academic year and that this high prevalence rate is consistent across a variety of schools, cultures, and countries (Craig et al., 2009).

Peer victimisation types can be classified as direct forms which include overt victimisation (i.e., being hit, pushed, or verbally threatened by peers), indirect/covert forms such as relational victimisation (i.e., being socially excluded by peers or by encouraging others to dislike the victim and threaten to end friendships) and reputational victimisation (i.e., being the focus of peers' attempts to impair one's reputation

for example through rumour spreading among peers; De Los Reyes & Prinstein, 2004; Siegel et al., 2009; Dawes & Malamut, 2020; Ferraz de Camargo et al., 2022). Cybervictimisation refers to peer victimisation of any type that occurs via the internet or other electronic media (Landoll et al., 2015; Tokunaga, 2010).

1.1. The relationship between peer victimisation and mental health

Research has shown that peer victimisation has been associated both cross-sectionally and prospectively to internalising symptoms such as anxious symptomatology (Graham et al., 2009; Olweus, 1994), leading to several clinical and developmental implications (Forbes et al., 2019). In addition, a review found that mental health difficulties associated with peer victimisation are stable over time (Pouwels et al., 2016), and may persist into adulthood and impact physical and socioeconomic outcomes (Arseneault, 2017). It is therefore unsurprising that peer victimisation has been defined as a critical public health issue internationally (World Health Organisation, 2010).

Different forms of peer victimisation have been shown to have a

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unique and distinct impact on mental health difficulties (La Greca & Harrison, 2005; Ranta et al., 2009; Siegel et al., 2009). Few studies have investigated the unique contributions of individual forms of victimisation, with some showing the distinctive role of relational victimisation in predicting symptoms of internalised distress (Storch et al., 2005) and others showing no significant associations (Khatri et al., 2000; McLaughlin et al., 2009; Tran et al., 2012). In addition, it has been shown that relational peer victimisation is more strongly related to symptoms of social anxiety compared with overt or reputational victimisation among adolescents (La Greca & Harrison, 2005; Siegel et al., 2009), with some studies suggesting that relational and reputational types of peer victimisation are the most common in childhood (De Los Reyes & Prinstein, 2004; Herge et al., 2016; La Greca & Harrison, 2005; Siegel et al., 2009). Additionally, research has shown that face-to-face forms of peer victimisation were more directly associated with social anxiety compared with cybervictimisation (Ranta et al., 2009). However, some studies have shown that children who are victimised in a face-to-face context are often also victimised by peers online (Del Rey et al., 2012; Salmivalli et al., 2013), highlighting the complexity and multifaceted nature of peer victimisation. Therefore, although fewer studies have explored the potential unique contributions of distinct types of peer victimisation (Doyle & Sullivan, 2017), there are benefits to viewing and examining these different forms as separate constructs.

1.2. The association between peer victimisation and anxiety

Due to the high comorbidity between anxiety and depression, many studies use general measures of internalised distress to investigate the association between peer victimisation and mental health difficulties, rather than utilising distinct and separate measures for anxiety and depression (Casper & Card, 2016a, 2016b). However, anxiety and depression have numerous distinctive differences in their characteristics, prevalence rate, and outcomes (Trosper et al., 2012). This reinforces the value and importance of viewing and exploring them as separate constructs. A unique study found that peer victimisation was more directly related to social anxiety than depression, and that the association between depression and peer victimisation could be explained by the shared characteristics between the two conditions (Ranta et al., 2009). Despite this, fewer studies have examined the association between peer victimisation and anxiety exclusively, in comparison with depression. In a recent meta-analysis that investigated the bidirectional effects between internalised distress and peer victimisation, it was observed that a majority of studies included exclusively looked at depression ($n = 41$) in comparison with studies examining anxiety ($n = 9$) (Christina et al., 2021), therefore demonstrating a gap in the evidence-base that needs addressing. The current review aims to explore this identified gap further by examining anxiety exclusively as either a predictor or outcome of peer victimisation.

While all forms of anxiety have been shown to be relevant to peer victimisation, research has also demonstrated unique relationships between peer victimisation and specific types of anxiety, for instance, social anxiety has been found to be a stronger precursor to victimisation in longitudinal studies among early adolescence (Tillfors et al., 2012; van den Eijnden et al., 2014). Social anxiety is defined as persistent and excessive fear of negative evaluation or judgement in social situations (i.e., fearing humiliation or embarrassment) and thus such situations are avoided or experienced with high levels of anxiety (American Psychiatric Association [APA], 2013). It has been shown that those experiencing social anxiety also experience greater levels of peer victimisation (de Lijster et al., 2018). In addition, the relationship between anxiety and peer victimisation appears to vary depending on the subtype of peer victimisation; for example, anxiety levels appear to be greater for indirect relational victimisation as opposed to overt forms of victimisation (Casper & Card, 2016a, 2016b). Therefore, this evidence suggests that different types of anxiety may moderate different types of victimisations, and the current review will aim to explore and review this.

Early research that investigated the longitudinal relationship between peer victimisation and anxiety tended to assume a unidirectional association with peer victimisation leading to the development of anxiety symptoms (Olweus, 1993; Slee, 1994). However, recent research has indicated that high levels of anxiety have been shown as both an antecedent and consequence of peer victimisation types (Christina et al., 2021; Forbes et al., 2019). Having said this, potential theories or mechanisms for these associations are mostly unexplored. In experimental research studies, children and adolescents report that peers with emotional behaviours are disliked and have a strong belief among them that these peers will be victimised (Luchetti & Rapee, 2014). Additionally, it has been suggested that the social behaviours of anxious children may evoke unfavourable peer reactions that may lead to peer rejection or victimisation (Leigh & Clark, 2018), and that it may be these negative peer interactions that reinforce social fears and avoidance that maintain anxiety symptoms (Epkins & Heckler, 2011; Sentse et al., 2017). This concept is supported by a proposal that peer victimisation and negative peer evaluations, are likely to largely impact the development and maintenance of anxiety (Wong & Rapee, 2016). This concept is also in line with the stress generation hypothesis, which predicts that those experiencing internalised distress will generate greater interpersonal stress than those without (Liu & Alloy, 2010).

1.3. The importance of the social context

Several longitudinal studies have shown that children with strong social relationships are less likely to be victimised despite the display of overtly emotional behaviours (Egan & Perry, 1998), and that supportive friendships among peers may act as a protective factor against peer victimisation (Fitzpatrick & Bussey, 2011; Singh & Bussey, 2011a, 2011b). Therefore, it is necessary to consider the social context more broadly, including other peer relations, that may influence the likelihood that anxious children will be victimised. Children tend to spend more time with their peers during their schooling years than at any other time in their lives (Furman & Buhrmester, 1992), therefore their ability to build positive peer relations and integrate in their peer group effectively is of great significance (Prinstein et al., 2000). Having said this, children who are victimised by their peers regardless of the subtype, are reported to have great difficulties bonding with their peers and feeling connected to their school group (Bierman, 2004), and may behave in ways that prevent them forming or maintaining positive peer relationships (Biggs et al., 2012).

1.4. Focus of the current meta-analysis

Two recent meta-analyses examined similar bidirectional relationships (Chiu et al., 2021; Christina et al., 2021) and both showed significant bidirectional correlations between the two variables. However, limitations of the literature were highlighted in these reviews; for example, a large number of studies included in the analysis used variable measures of victimisation and anxiety that were study-specific, unpublished and unvalidated, and many of which relied on single items only (Christina et al., 2021).

Limitations observed in both studies, is that they lacked exploration of the social context in which the victimisation takes place (i.e., school, community, clinical samples), which may impact the generalisability and validity of the findings about the relationship in different contexts. Additionally, Chiu et al. (2021) did not examine or explore different types of anxiety or peer victimisation subtypes. Although, the review by Christina et al. (2021) did measure anxiety, depression, and types of victimisations as moderators, the study largely looked at depression and internalised distress and thus did not reflect on or explore different types of anxiety as potential moderators of the relationship.

To address the limitations noted above outlined above, the current meta-analysis was conducted to examine bidirectional associations between types of peer victimisation and types of anxiety within a meta-

analytic framework, while viewing types of anxiety and types of peer victimisation as separate constructs in order to draw conclusions on these factors distinctly. The studies included were required to be of longitudinal design carried out in any social context (i.e., school, community or clinical), and measures were required to be published, validated, and distinct measures for both peer victimisation and anxiety subtypes.

Due to the limited studies that met inclusion criteria ($n = 14$), age, sex, country, ethnicity, social environment, and interval length (i.e., the period of time between baseline and follow-up data collection) were identified and described, but moderator analysis was not conducted for these variables. Previous reviews have shown that sex, age, and interval variables were not found to be significant moderators of this bidirectional relationship (Chiu et al., 2021; Christina et al., 2021). It has been observed that multiple studies have shown similar sized relationships regardless of age or gender (Moore et al., 2017a, 2017b; Siegel et al., 2009), however some show some minor differences (Juvonen & Graham, 2014). Generally, most studies have shown relatively consistent results across a variety of demographic factors.

2. Method

The protocol for the current meta-analysis was registered on the International Prospective Register of Systematic Reviews (PROSPERO; protocol number: CRD 42022314946) on the 24th of March 2022.

2.1. Search strategy

Five electronic databases (Web of Science, MEDLINE, PsychINFO, CINAHL and ERIC) were searched from inception until 9th December 2022. The details for the search terms and syntax for each database are available in the PROSPERO protocol (see Appendix A). Reference lists of relevant review articles were screened to identify further studies that may have been missed by the electronic search. Two records were identified through this method and included in this review.

2.2. Eligibility criteria

Studies were included if they met the following criteria:

1. Participants who completed outcome measures must be children or adolescents who are 18.0 years old or under, or the mean age of the sample is equal to or <18.0 years old. This aligns with the definition of a child or adolescent within the context of the United Kingdom.
2. Participants must include children or adolescents who have reported anxiety symptoms through a validated, standardised, and distinct outcome measure or a recognised diagnostic tool for anxiety. Measures without specific subscales for anxiety symptomatology were not included e.g., general internalised distress symptom measures.
3. Participants must include children or adolescents who have reported experiencing a subtype of victimisation by their peers through a validated, standardised, and distinct measure. Measures collecting data on the bully/victim role or bullying perpetration were not included.
4. Papers were required to be written in the English language or with a published translation.
5. Papers were required to either have a longitudinal or prospective research design that examined the relationship between peer victimisation and anxiety symptomatology over time.
6. Papers were required to be published in a peer-reviewed journal.

Studies without primary data (e.g., reviews, secondary analysis of data, or use of an existing sample that has been identified and included in the current review) were excluded, along with studies that report qualitative data exclusively. In circumstances where the full text was unavailable and inaccessible, authors were contacted via email and

given four weeks to provide the information required, before the study was excluded from the analysis. In addition, studies were excluded if they failed to report baseline and follow-up data examining the direct relationship between anxiety symptoms and peer victimisation. This data was crucial as it enabled conclusions drawn to reflect direction and change over time. There was no restriction on date of publication for studies included in the review. Studies that exclusively focused on samples of children and adolescents with intellectual disabilities, neurodevelopmental disorders or specific health conditions were also excluded as the current review is focused on drawing broad associations from the general population. Research has shown that power imbalance is an important feature between victims and preparators of peer victimisation, and that it can be especially difficult to capture among those with disabilities or intellectual differences (Arseneault, 2017). Therefore, more specific criteria may be required to illustrate particular findings relating to these groups, and this may be an area for future research to address and explore.

Building on limitations recorded in previous meta-analyses in this area (Chiu et al., 2021; Christina et al., 2021), papers without validated measures that analyse specific types or constructs of peer victimisation were excluded. Peer victimisation was defined as involving several subtypes including overt (defined as physical or verbal threats by peers), relational (which is largely characterised by social exclusion and rejection by peers), reputational (i.e., being the focus of peers' attempts to damage one's reputation) and cybervictimisation (i.e., peer victimisation of any type that occurs via electronic media and the internet) (De Los Reyes & Prinstein, 2004; Tokunaga, 2010). This review focuses solely on studies that used standardised, validated, and distinct measures of peer victimisation and anxiety constructs. Measures were considered appropriate for this review if they have been previously published in a peer-reviewed journal either as a full measure or as an adaptation of an existing measure with validation data. Stewart et al. (2012) highlights that any modification or adaptation of a published measure which will have likely undergone extensive development or testing, may be problematic and that there is limited practical and appropriate guidance on how to retain the strength of a measure following modifications. Therefore, adaptations must be avoided to help retain and preserve the existing reliability and validity of the measure (Juniper, 2009). Thus, any modifications of any published measure without a previous validation study would mean the measure was no longer valid for the purpose of this review and were excluded.

2.3. Study selection

Fig. 1 shows a summary of the search and screening method using a Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flowchart. Two authors (EN and HR) independently screened 20 % of retrieved abstracts and titles ($n = 340$) for eligibility. There was 95.6 % agreement on eligibility between raters at this stage. The inter-rater reliability calculated between raters was deemed as 'almost perfect', Cohen's $\kappa = 0.91$ (Landis & Koch, 1977; Altman, 1999). EN and HR independently screened 20 % of the full texts of eligible studies ($n = 130$). There was an agreement of 82.3 % on inclusion between raters, where the inter-rater reliability was classified as 'substantial', Cohen's $\kappa = 0.65$ (Landis & Koch, 1977; Altman, 1999). Any disagreements were resolved through discussion.

2.4. Data extraction

Data was extracted and coded by EN. To ensure accuracy, 100 % of studies were cross-checked by HR. The following information was extracted: author, year, study design, sample size, mean and SD of age, majority ethnicity (%), female (%), country, setting for data collection (i.e., school, clinical or community), interval length between baseline and follow-up data, type of peer victimisation and anxiety, the names of the validated measures for peer victimisation and anxiety, the direction

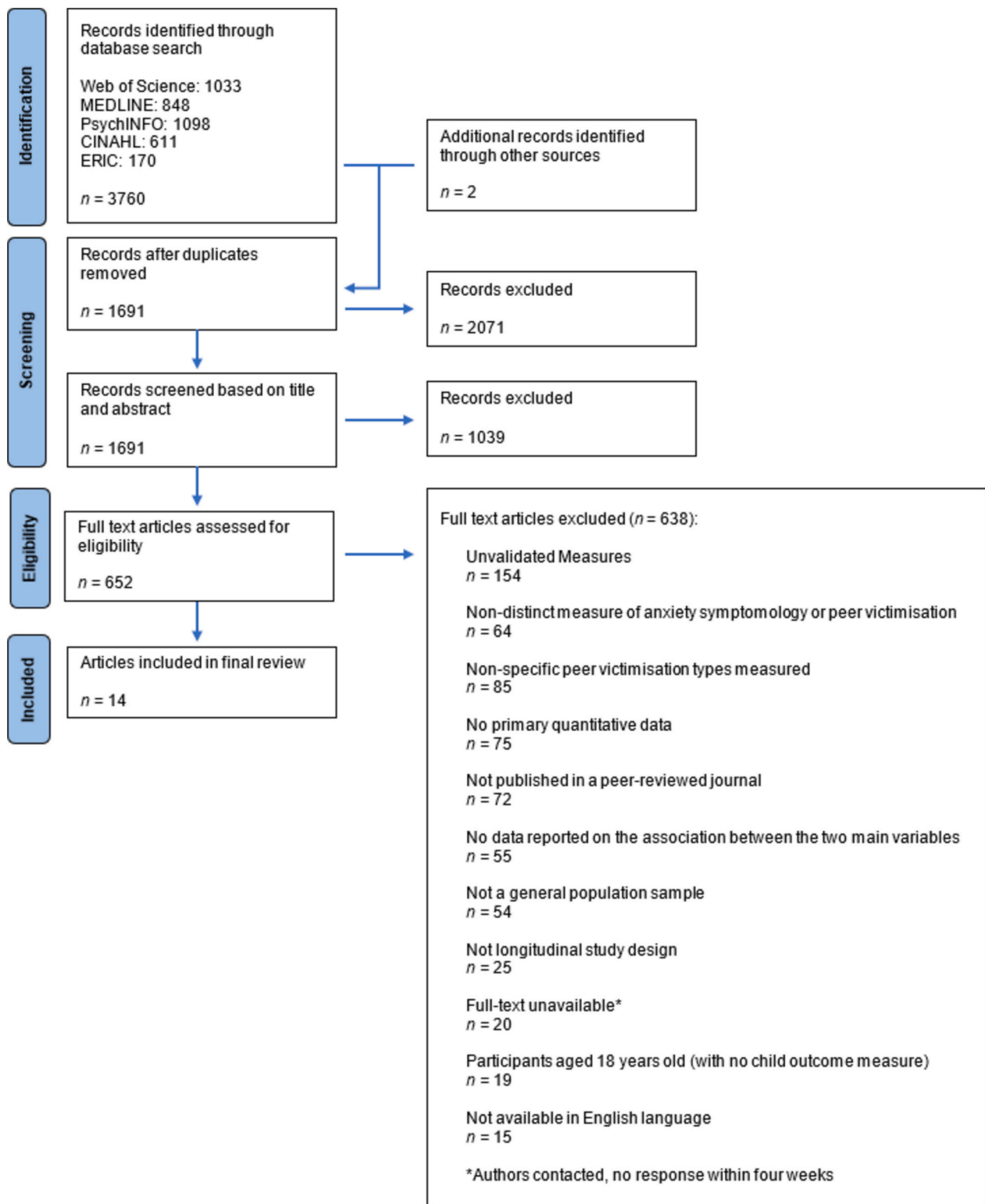


Fig. 1. PRISMA diagram of the study selection process.

of the relationship and the reported effect sizes for each direction. Authors were contacted when there was insufficient data for extraction detailed in the study and were asked to provide the required information. See Table 1 for the characteristics and outcomes of the included studies.

2.5. Assessment of study quality

Study quality was assessed using the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (National Heart, Lung, & Blood Institute, 2014). This 14-question checklist is well-established, comprehensive and is regarded as a suitable tool for assessing key characteristics of longitudinal cohort studies (Ma et al.,

Table 1
Characteristics and outcomes of included studies.

Study	Sample size	Mean age or age range	Majority ethnicity %	Female %	Country	Situation	Interval (months)	Type of PV	Validated measure for PV	Type of anxiety	Validated measure for anxiety	Reported effect size T1 PV - T2 AX	Reported effect size T1 AX - T2 PV	Quality assessment score total
Chen and Zhu (2022)	1987	12.32	Chinese (% NR)	43.9	China	School	6	Cyber	EBQ	General Anxiety	DASS	0.22	0.24	12 (Good)
Chu et al. (2019)	661	12.86	Chinese (% NR)	39.2	China	School	6	Cyber	R-CBI	General Anxiety	DASS-21 & SCSR-SA	0.13	0.15	13 (Good)
Díaz & Fite (2019)	260	12.24	Caucasian (% NR)	47	United States	School	5	Cyber Relational Overt	ECIPQ & SEQ	General Anxiety	PROMIS EDAS	0.22	NR	12 (Good)
Doyle and Sullivan (2017)	485	11–12	African American (65.2 %)	52	United States	School	6	Overt Relational	PBFS -Youth Form	General Anxiety	RCMAS	0.34	0.37	11 (Good)
Fahy et al. (2016)	2480	12–13	White UK (16.9 %)	44.8	United Kingdom	School	12	Cyber	CI	Social Anxiety	M-SPI	0.11	NR	10 (Fair)
Hamilton et al. (2016)	410	12.84	African American (51 %)	53	United States	School	9	Relational	SEQ-S	Social Anxiety	MASC	0.37	0.16	11 (Good)
Herge et al. (2016)	1162	15.8	Hispanic (80 %)	57	United States	School	1.38 (6 weeks)	Overt Relational Reputational	R-PEQ; C-PEQ	Social Anxiety	SAS-A	0.26	NR	11 (Good)
Landoll et al. (2015)	839	15.8	Hispanic (73 %)	58	United States	School	1.38 (6 weeks)	Relational	R-PEQ	Social Anxiety	SAS-A	0.27	NR	11 (Good)
McLaughlin and Nolen-Hoeksema (2012)	1065	12.2	Non-Hispanic White (13.2 %)	48.8	United States	School	7	Overt Relational Reputational	R-PEQ	General Anxiety	MASC	0.24	0.26	11 (Good)
Rose and Tynes (2015)	559	11–18	African American (32.7 %)	55.1	United States	School	10–12	Cyber	OVS	General Anxiety	POMS-A	0.15	0.20	11 (Good)
Siegel et al. (2009)	228	16	Hispanic (78 %)	58	United States	School	2	Overt Relational Reputational	R-PEQ	Social Anxiety	SAS-A	0.22	0.20	12 (Good)
Storch et al. (2005)	144	13.9	Caucasian (83 %)	64	United States	School	12	Overt Relational	SEQ-S	Social Anxiety	SAS-A and SPAI-C	0.45	0.25	10 (Fair)
Tynes et al. (2020)	526	14.47	African American (62.6 %)	56	United States	School	12	Cyber	OVS	General Anxiety	POMS-A	0.11	0.14	10 (Fair)
Van Zalk and Van Zalk (2019)	501	13.96	Swedish (% NR)	51.9	Sweden	Community	8	Cyber	CV	Social Anxiety	SPSQ	0.11	0.10	10 (Fair)

Notes: NR - Not Reported, PV – Peer Victimization, AX – Anxiety, EBQ - Chinese version of the brief adaptation of the Electronic Bullying Questionnaire (Moore et al., 2012; Tian et al., 2018), RCI - The Revised Cyberbullying Inventory (Chinese Version; Chu & Fan, 2017), ECIPQ - European Cyberbullying Intervention Project Questionnaire Items (Del Rey et al., 2015), SEQ - Social Experience Questionnaire (Cullerton-Sen & Crick, 2005), PBFS – The Problem Behaviour Frequency Scale–Youth Form (Farrell et al., 2000), CI - Cyberbullying Involvement (Ybarra et al., 2007), R-PEQ - Revised Peer Experiences Questionnaire (De Los Reyes & Prinstein, 2004), C-PEQ - Cyber Peer Experiences Questionnaire - (Landoll et al., 2015), OVS - Online Victimization Scale (Tynes et al., 2010), CV - Cybervictimisation (Katzner et al., 2009), SEQ-S - Social Experience Questionnaire—Self Report Form (Crick & Grotpeter, 1996), DASS - The Depression Anxiety Stress Scales (Chinese Version; Moussa et al., 2001), DASS-21 - The 21-item Depression Anxiety Stress Scale (Chinese Version; Chan et al., 2012), SCSR – SA - Social Anxiety Subscale in the Self-Consciousness Scale (Chinese Version; Wang et al., 1999), PROMIS EDAS – The PROMIS Emotional Distress and Anxiety Scale (PROMIS Health Organization; Ader, 2007), RCMAS - Revised Children’s Manifest Anxiety Scale (Reynolds & Richmond, 1978), MSPI - Mini Social Phobia Inventory (Connor et al., 2001), SAS-A -Social Anxiety Scale for Adolescents (La Greca & Lopez, 1998), MASC - The Multidimensional Anxiety Scale for Children (March et al., 1997), POMS – A – The Profile of Mood States-Adolescent (Terry et al., 1999), SPSQ - Social Phobia Screening Questionnaire for Children (Gren-Landell et al., 2009), SPAI- C - The Social Phobia and Anxiety Inventory for Children (Beidel et al., 1995).

2020). A total quality score was calculated by tallying the responses (yes = 1, no = 0) and one of three total quality ratings were allocated to each study depending on the value of the total score (<10 'poor', 10 = 'fair', >10 'good'), which is consistent with similar reviews (Chiu et al., 2021). Studies were assessed independently by two assessors (EN and HR). Percentage agreement for the individual items in the scale was 96.4 %, and the inter-reliability utilising the interclass correlation coefficient (ICC) was calculated to be 0.76, indicating a good reliability between raters. Any discrepancies in scorings were discussed and resolved.

2.6. Data synthesis

Analyses were performed using Meta-Analysis via Shiny (MAVIS version 1.1.3; Hamilton et al., 2017). Random effects models were used to account for the expected heterogeneity in effect sizes between studies due to the diversity in type of outcome measures used, duration of intervals and age range of participants. All outcome statistics were transformed into Pearson's r for the analysis. Standardised regression coefficients ($n = 1$; Landoll et al., 2015) were converted to r as suggested by Peterson and Brown (2005). Odds ratios ($n = 1$; Fahy et al., 2016) were transformed to r following the recommendations by Borenstein et al. (2009). When studies used two or more questionnaire measures for the anxiety variable, effect sizes obtained from each measure were averaged.

The effect size of each study was transformed to Fisher's Z for the meta-analysis, and the summary Fisher's Z score was transformed back to a summary correlation (Pearson's r). Cohen's guidelines (Cohen, 1988) were referred to for interpretation of effect sizes ($r = 0.10$ 'small', $r = 0.30$ 'moderate', $r = 0.50$ 'large') as recommended in the guidance by Akoglu (2018). To assess the degree of heterogeneity between studies, the Cochran's Q test and the Higgins and Thompsons I^2 test were applied. The presence of heterogeneity is suggested if a statistically significant result from the Cochran's Q test is produced ($p < 0.05$). A greater I^2 value signifies a larger degree of heterogeneity (25 % = 'low', 50 % = 'moderate', 75 % = 'substantial') (Higgins et al., 2003). The risk of publication bias across studies was assessed by examining funnel plots generated by performing the Egger's test (Egger et al., 1997). A significant Egger's test result ($p < 0.05$) indicates asymmetry is present in the funnel plot and therefore is suggestive of publication bias. Several meta-regressions were conducted to examine types of anxiety (i.e., general anxiety symptoms or social anxiety) as potential moderators of the relationship between anxiety symptoms and types of peer victimisations. Table 2 summaries the effect sizes determined through the moderator analyses.

3. Results

3.1. Study selection

A total of 3762 records were identified through the search procedure described. Six studies investigated cybervictimisation in isolation and one study studied cybervictimisation along with other types of in-person peer victimisation. Six studies investigated overt victimisation (verbal or physical or both), eight studies explored relational victimisation and three studies assessed reputational victimisation. Out of the 14 included studies, a majority of studies examined bidirectional effects ($n = 10$) and the remainder looked exclusively at peer victimisation as a predictor of anxiety symptoms ($n = 4$). Regarding the types of anxiety, six studies explored general anxiety symptoms and seven studies looked at social anxiety specifically. One study (Chu et al., 2019) used two measures that captured different dimensions of anxiety. The effect sizes of these questionnaires were averaged for the purpose of this review and this value was included in the general anxiety moderator group.

Table 2
Moderator analysis of anxiety types.

Relationship	Social anxiety moderator effect size	General anxiety moderator effect size	Difference between anxiety types
PV predicting AX	$r = 0.25, p < 0.000$	$r = 0.20, p < 0.000$	$p = 0.39$
AX predicting PV	$r = 0.23, p = 0.0006$	$r = 0.17, p = 0.32$	$p = 0.205$
CV predicting AX	$r = 0.11, p < 0.000$	$r = 0.16, p = 0.0000$	$p = 0.2$
AX predicting CV	$r = 0.1, p = 0.1045$	$r = 0.19, p < 0.000$	$p = 0.18$
OV predicting AX	$r = 0.19, p < 0.000$	$r = 0.29, p < 0.000$	$p = 0.08$
AX predicting OV	$r = 0.16, p = 0.0044$	$r = 0.33, p < 0.000$	$p = 0.0052$
RLV predicting AX	$r = 0.36, p < 0.000$	$r = 0.26, p < 0.000$	$p = 0.0435$
AX predicting RLV	$r = 0.23, p < 0.000$	$r = 0.31, p < 0.000$	$p = 0.3223$
RPV predicting AX	$r = 0.21, p < 0.000$	$r = 0.22, p < 0.000$	$p = 0.77$
AX predicting RPV	Unable to calculate ^a	Unable to calculate ^a	Unable to calculate ^a

Notes: Significance was considered when $p < 0.05$, PV – Peer Victimization, AX – Anxiety, CV – Cybervictimisation, OV – Overt/Direct Victimization, RLV – relational victimisation, RPV – reputational victimisation.

^a Moderator analysis of anxiety types within the relationship was not performed due to a small number of studies ($n = 2$).

3.2. Study characteristics

Table 1 summaries the characteristics of all the studies and participants included in the meta-analyses, as well as the outcomes and results. A total of 11,307 participants were included. The majority of studies were carried out in the United States ($n = 10$), but participants' ethnicity varied greatly among these studies. Four studies stated, 'African American' as the majority ethnicity of participants, two studies indicated 'Caucasian' participants as the majority, three described 'Hispanic' participants as the majority and the remaining study described the majority ethnicity as 'non-Hispanic White'. The remaining four studies were conducted in China ($n = 2$) with 'Chinese' population groups; United Kingdom with 'White UK' being described as the majority ($n = 1$); and Sweden with a 'Swedish' population group ($n = 1$). Participants mean age ranged between 12.2 years (McLaughlin & Nolen-Hoeksema, 2012) and 16.0 years (Siegel et al., 2009). Two studies (Doyle & Sullivan, 2017; Rose & Tynes, 2015) did not report the mean age of participants, however age ranges were estimated through school years that had been reported. These authors were contacted for more specific data, but no responses were received. All but one study (Van Zalk & Van Zalk, 2019) collected data exclusively from school-based samples, whereas this study collected data both from a school-based sample and through online data collection open to the wider community. Sex was generally balanced across all studies (ranging from 39.2 % - 64 % female). Despite all studies employing a longitudinal design, the intervals between the data collection points differed greatly, from six weeks (Herge et al., 2016; Landoll et al., 2015) to a year (Fahy et al., 2016; Rose & Tynes, 2015; Storch et al., 2005; Tynes et al., 2020).

Although standardised, published, and validated measures were exclusively included in this meta-analysis, a variety of measures were still present. The most common measures for peer victimisation were the Revised Peer Experiences Questionnaire (R-PEQ; De Los Reyes & Prinstein, 2004; $n = 4$), the Social Experience Questionnaire (SEQ; Cullerton-Sen & Crick, 2005; $n = 3$), and the Online Victimization Scale (OVS;

Tynes et al., 2010; $n = 2$). The most common measures for anxiety symptoms were the Social Anxiety Scale for Adolescents (SAS; La Greca & Lopez, 1998; $n = 4$), the Multidimensional Anxiety Scale for Children (MASC; March et al., 1997, $n = 2$), the Depression and Anxiety Scale (DASS; Moussa et al., 2001, $n = 2$) and the Profile of Mood States-Adolescent (POMS; Terry et al., 1999; $n = 2$).

3.3. Bidirectional relationships

3.3.1. Overall peer victimisation

The meta-analysis ($n = 14$) examining peer victimisation (T1) as predictor of anxiety symptoms (T2) showed a significant and small correlation effect size, $r = 0.22$, $p < 0.0001$, 95 % CI (0.17, 0.27). This result suggests higher levels of peer victimisation at baseline were associated with higher levels of anxiety at follow-up. Heterogeneity was statistically significant and substantial across studies, $Q = 79.81$, $p < 0.0001$, $I^2 = 83.7$ %. The forest plot of the weights assigned for each study is shown in Fig. 2a. Additional analyses were conducted to evaluate whether types of anxiety were potential moderators of the relationship between anxiety symptoms and peer victimisation. Types of anxiety were found to be a significant moderator of this relationship ($Q = 79.81$, $df = 13$, $p < 0.000$) with the largest effects in studies measuring social anxiety ($n = 7$, $r = 0.25$, $p < 0.000$, $z = 1$, 95 % CI 0.17, 0.31), followed by studies measuring overall general anxiety ($n = 7$, $r = 0.20$, $z = 1.0$, $p < 0.000$, 95 % CI 0.13, 0.27). These two types of anxiety were not found to be significantly different from each other ($p = 0.39$).

The meta-analysis ($n = 10$) exploring anxiety (T1) as a predictor of general peer victimisation (T2) showed a significant and small correlation effect size, $r = 0.21$, $p < 0.0001$, 95 % CI (0.16, 0.26). This suggests that higher levels of anxiety at baseline were associated with higher levels of peer victimisation at follow-up. Heterogeneity was statistically significant and moderate across studies, $Q = 31.57$, $p = 0.0002$, $I^2 = 71.5$ %. The forest plot of the weights assigned for each study is shown in Fig. 2b. Types of anxiety were a significant moderator of the relationship between peer victimisation and anxiety symptoms ($Q = 31.57$, $df = 9$, $p = 0.0002$) with the largest effects in studies measuring overall general anxiety ($n = 6$, $r = 0.23$, $z = 1.0$, $p = 0.0006$, 95 % CI 0.17, 0.28). Studies measuring social anxiety specifically were found to be a non-significant moderator ($n = 4$, $r = 0.17$, $z = 1.00$, $p = 0.32$, 95 % CI 0.09, 0.24). The two different types of anxiety were not found to be significantly different from each other ($p = 0.205$).

3.3.2. Cybervictimisation

The meta-analysis ($n = 7$) investigating cybervictimisation (T1) as a predictor of anxiety symptoms (T2) showed a significant and small

correlation effect size, $r = 0.14$, $p < 0.0001$, 95 % CI (0.10, 0.18). This result suggests higher levels of cybervictimisation at baseline were associated with higher levels of anxiety at follow-up. Heterogeneity was statistically significant and moderate across studies, $Q = 15.59$, $p = 0.0162$, $I^2 = 61.5$ %. The forest plot of the weights assigned for each study is shown in Fig. 3a. Types of anxiety were found to be a significant moderator of the relationship between cybervictimisation and anxiety symptoms ($Q = 15.59$, $df = 6$, $p < 0.0000$) with the largest effects in studies measuring general anxiety symptoms ($n = 5$, $r = 0.16$, $p = 0.0000$, $z = 1$, 95 % CI 0.12, 0.21), followed by studies measuring social anxiety ($n = 2$, $r = 0.11$, $z = 1.0$, $p < 0.000$, 95 % CI 0.05, 0.17). These two types of anxiety were not significantly different from each other ($p = 0.2$).

The meta-analysis ($n = 5$) assessing anxiety symptoms (T1) as a predictor of cybervictimisation (T2) showed a significant and small correlation effect size, $r = 0.17$, $p < 0.0001$, 95 % CI (0.12, 0.23). This result suggests higher levels of anxiety symptoms at baseline were associated with higher levels of cybervictimisation at follow-up. Heterogeneity was statistically significant and moderate across studies, $Q = 12.34$, $p = 0.015$, $I^2 = 67.6$ %. The forest plot of the weights assigned for each study in this relationship is shown in Fig. 3b. Type of anxiety measured was found to be a significant moderator of the relationship between cybervictimisation and anxiety symptoms ($Q = 12.34$, $df = 4$, $p < 0.000$) in studies measuring general anxiety ($n = 4$, $r = 0.19$, $p < 0.000$, $z = 1$, 95 % CI 0.14, 0.24). Studies measuring social anxiety specifically were found to be a non-significant moderator ($n = 1$, $r = 0.1$, $z = 0.92$, $p = 0.1045$, 95 % CI -0.02 , 0.22). These two types of anxiety were not found to be significantly different from each other ($p = 0.18$).

3.3.3. Direct (overt) peer victimisation

The meta-analysis ($n = 6$) examining overt peer victimisation (T1) as a predictor of anxiety symptoms (T2) showed a significant and small correlation effect size, $r = 0.25$, $p < 0.0001$, 95 % CI (0.18, 0.31). This result suggests higher levels of peer victimisation at baseline were associated with higher levels of anxiety at follow-up. Heterogeneity was statistically significant and moderate across studies, $Q = 19.53$, $p = 0.0015$, $I^2 = 74.4$ %. The forest plot of the weights assigned for each study is shown in Fig. 4a. The type of anxiety measured were seen to be significant moderators of the relationship between overt peer victimisation and anxiety symptoms ($Q = 19.53$, $df = 5$, $p < 0.000$) with the largest effects seen in studies measuring general anxiety ($n = 3$, $r = 0.29$, $p < 0.000$, $z = 1$, 95 % CI 0.21, 0.36), followed by social anxiety ($n = 3$, $r = 0.19$, $z = 1.0$, $p < 0.000$, 95 % CI 0.10, 0.27). These two types of anxiety were not found to be significantly different from each other in this relationship ($p = 0.08$).

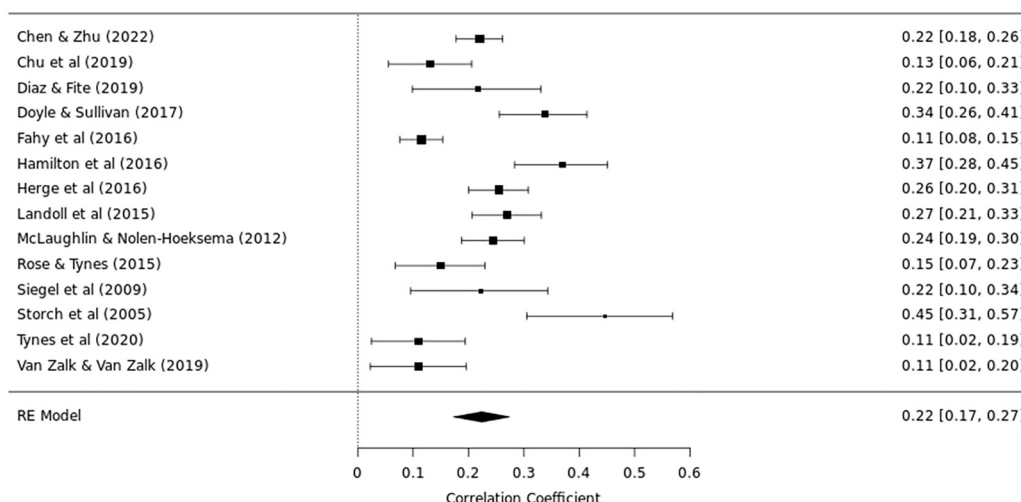


Fig. 2a. Forest plot of peer victimisation predicting anxiety over time.

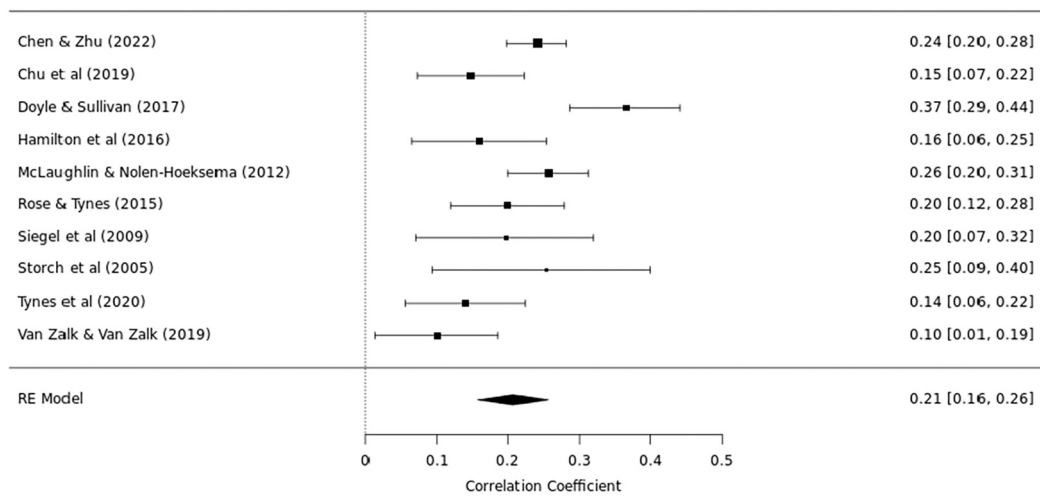


Fig. 2b. Forest plot of anxiety predicted peer victimisation over time.

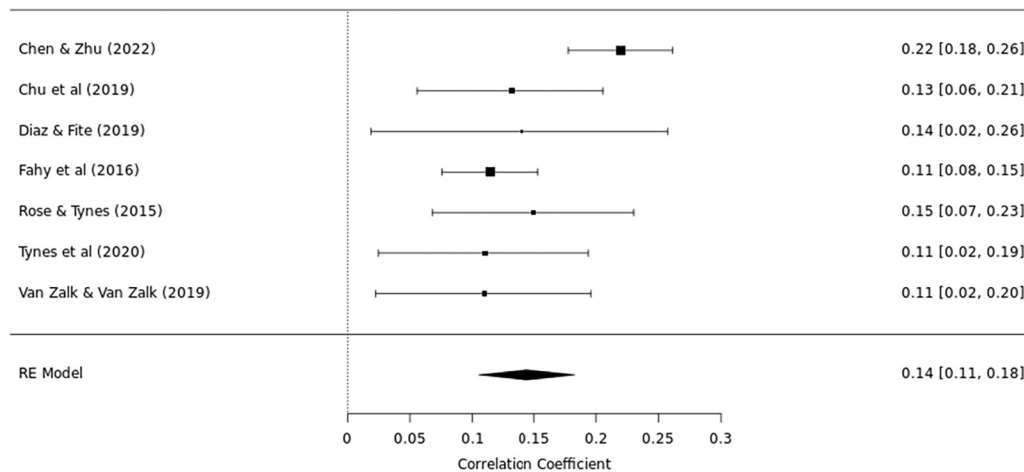


Fig. 3a. Forest plot of cybervictimisation predicting anxiety over time.

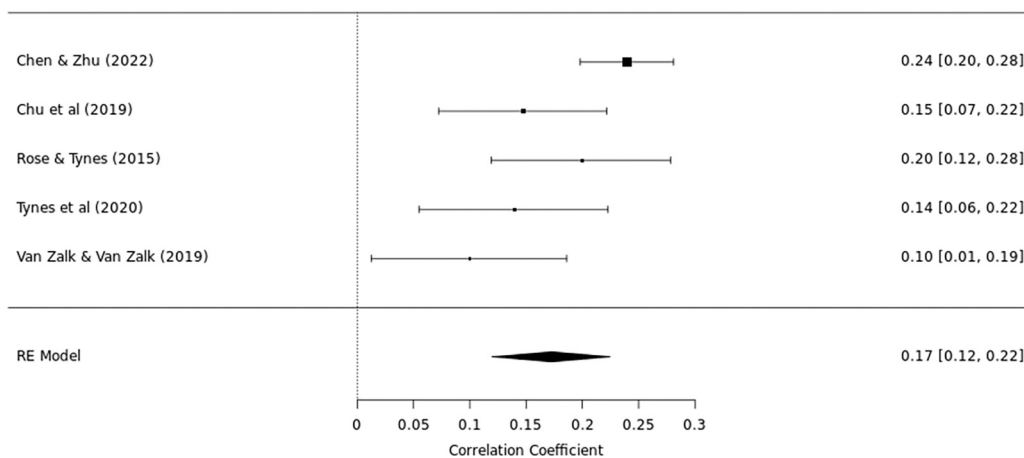


Fig. 3b. Forest plot of anxiety predicting cybervictimisation over time.

The meta-analysis ($n = 4$) exploring anxiety symptoms (T1) as a predictor of overt victimisation (CV) showed a significant and small correlation effect size, $r = 0.27$, $p < 0.0001$, 95 % CI (0.17, 0.36). This result suggests higher levels of anxiety symptoms at baseline were associated with higher levels of overt victimisation at follow-up.

Heterogeneity was statistically significant and substantial across studies, $Q = 13.19$, $p = 0.0042$, $I^2 = 77.3\%$. The forest plot of the weights assigned for each study is shown in Fig. 4b. Types of anxiety were a significant moderator in the relationship between anxiety symptoms and overt victimisation ($Q = 13.19$, $df = 3$, $p < 0.000$) with the largest effects

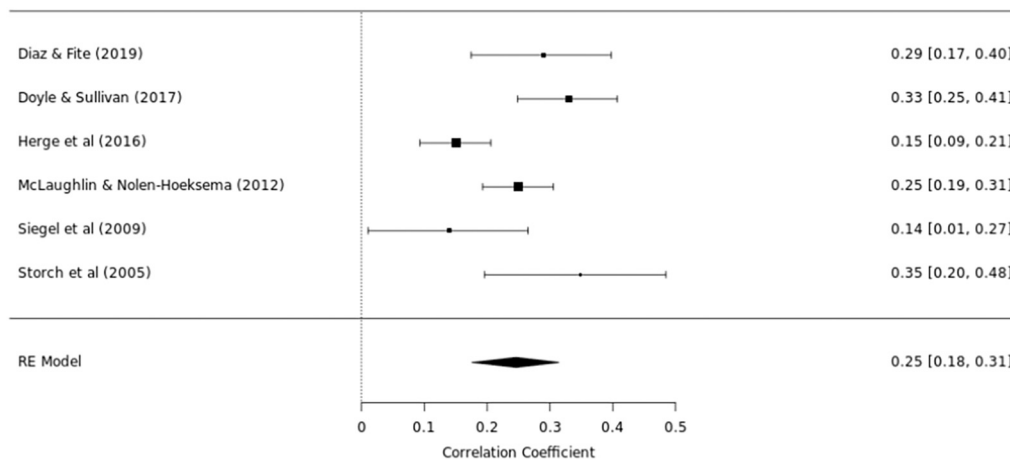


Fig. 4a. Forest plots of overt peer victimisation predicting anxiety over time.

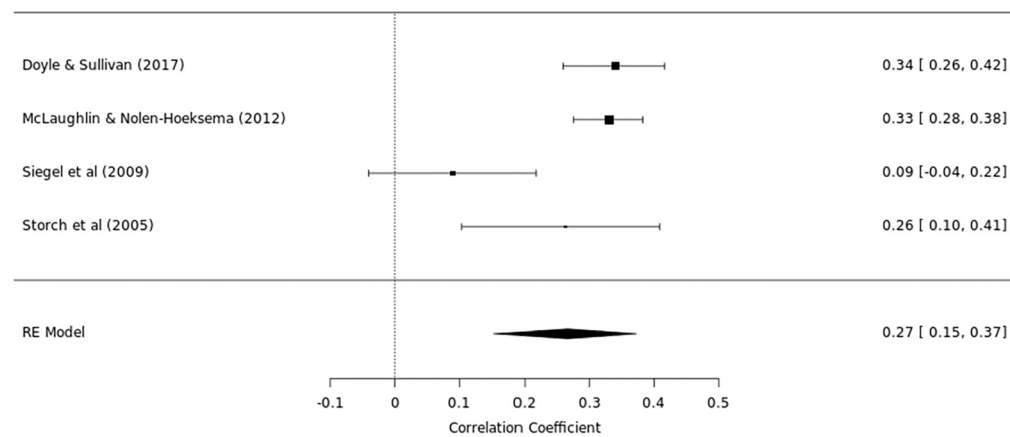


Fig. 4b. Forest plot of anxiety predicting overt peer victimisation over time.

in studies measuring general anxiety ($n = 2, r = 0.33, p < 0.000, z = 1, 95\% \text{ CI } 0.27, 0.39$), followed by studies measuring social anxiety specifically ($n = 2, r = 0.16, z = 1.00, p = 0.0044, 95\% \text{ CI } 0.05, 0.27$). In this relationship, types of anxiety were found to be significantly different from each other ($p = 0.0052$), therefore suggesting that general anxiety had a significantly larger difference than social anxiety on predicting overt victimisation.

3.3.4. Indirect peer victimisation

3.3.4.1. Relational peer victimisation. The meta-analysis ($n = 8$) investigating relational victimisation (T1) as a predictor of anxiety symptoms (T2) showed a significant and moderate correlation effect size, $r = 0.33, p < 0.0001, 95\% \text{ CI } (0.29, 0.35)$. This result suggests higher levels of relational peer victimisation at baseline were associated with higher levels of anxiety at follow-up. Heterogeneity was statistically significant and moderate across studies, $Q = 27.02, p = 0.0003, I^2 = 74.1\%$. The

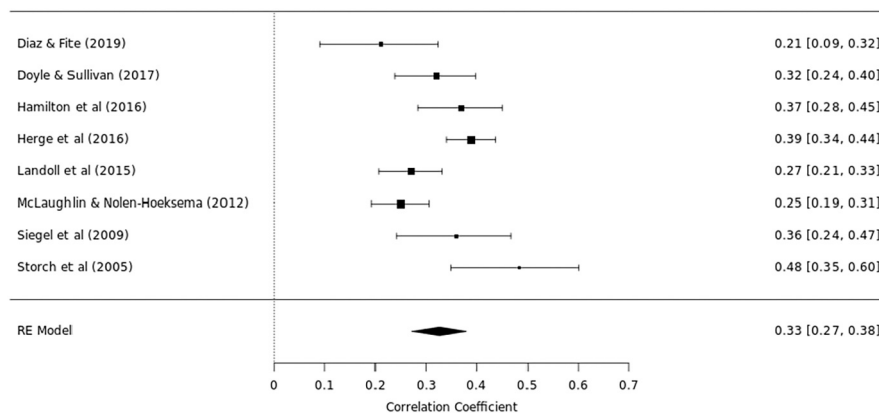


Fig. 5a. Forest plot of relational peer victimisation predicting anxiety over time.

forest plot of the weights assigned for each study is shown in Fig. 5a. Types of anxiety were a significant moderator in the relationship between relational victimisation and anxiety symptoms ($Q = 27.02$, $df = 7$, $p < 0.000$) with the largest effects in studies measuring social anxiety ($n = 5$, $r = 0.36$, $p < 0.000$, $z = 1$, 95 % CI 0.30, 0.42) followed by studies measuring general anxiety ($n = 3$, $r = 0.26$, $z = 1.00$, $p < 0.00$, 95 % CI 0.18, 0.34). The types of anxiety were found to be significantly different from each other ($p = 0.0435$), therefore suggesting that relational peer victimisation predicted social anxiety to a greater, and more significant extent than general anxiety symptoms.

The meta-analysis ($n = 5$) examining anxiety symptoms (T1) as a predictor of relational victimisation (T2) showed a significant and small correlation effect size, $r = 0.27$, $p < 0.0001$, 95 % CI (0.20, 0.34). This result suggests higher levels of anxiety symptoms at baseline were associated with higher levels of relational peer victimisation at follow-up. Heterogeneity was statistically significant and moderate across studies, $Q = 11.16$, $p = 0.0248$, $I^2 = 64.2$ %. The forest plot of the weights assigned for each study is shown in Fig. 5b. Types of anxiety were a significant moderator in the relationship between relational victimisation and anxiety symptoms ($Q = 11.16$, $df = 4$, $p < 0.000$) with the largest effects in studies measuring general anxiety ($n = 2$, $r = 0.31$, $p < 0.000$, $z = 1$, 95 % CI 0.20, 0.40) followed by studies measuring social anxiety specifically ($n = 3$, $r = 0.23$, $z = 1.00$, $p < 0.00$, 95 % CI 0.13, 0.33). Types of anxiety were not found to be significantly different from each other in this relationship ($p = 0.3223$).

3.3.4.2. Reputational peer victimisation. The meta-analysis ($n = 3$) assessing reputational victimisation (T1) as a predictor of anxiety symptoms showed a significant and small correlation effect size, $r = 0.21$, $p < 0.0001$, 95 % CI (0.18, 0.25). This result suggests higher levels of reputational peer victimisation at baseline were associated with higher levels of anxiety at follow-up. Heterogeneity was statistically non-significant across studies, $Q = 1.07$, $p = 0.5844$, $I^2 = 0$ %. The forest plot of the weights assigned for each study is shown in Fig. 5c. Types of anxiety were a significant moderator in the relationship between reputational victimisation and anxiety symptoms ($Q = 1.07$, $df = 2$, $p < 0.000$) with the largest effects in studies measuring general anxiety ($n = 1$, $r = 0.22$, $p < 0.000$, $z = 1$, 95 % CI 0.16, 0.28), followed by studies measuring social anxiety specifically ($n = 2$, $r = 0.21$, $z = 0.99$, $p < 0.00$, 95 % CI 0.16, 0.26). The two types of anxiety were found to not be significantly different from each other ($p = 0.77$).

The meta-analysis ($n = 2$) exploring anxiety symptoms (T1) as a predictor of reputational victimisation (T2) showed a significant and small correlation effect size, $r = 0.16$, $p < 0.0001$, 95 % CI (0.11, 0.21). This result suggests higher levels of anxiety symptoms at baseline were associated with higher levels of reputational peer victimisation at follow-up. Heterogeneity was found to be statistically non-significant across the two studies, $Q = 0.02$, $p = 0.88$, $I^2 = 0$ %. The forest plot of the weights assigned for each study is shown in Fig. 5d. Moderator

analysis of anxiety types within the relationship was not performed due to a small number of studies ($n = 2$).

3.4. Quality ratings

All 14 included studies were deemed to be of fair/acceptable or good quality (National Heart, Lung, & Blood Institute, 2014). This suggests that the methodological quality of the primary research included was primarily high and therefore findings can be interpreted with some certainty.

3.5. Publication bias

Funnel plots were used to detect asymmetry (see Appendix B). There was no indication of asymmetry in the plots consisting of >10 studies, as seen by the non-significant results of the Egger's tests ($p = 0.52$, $p = 0.15$). Thus, there was no conclusive evidence of publication bias within these studies.

Given the limited number of studies included in a majority of the plots ($n < 10$), it is not recommended for funnel plot asymmetry testing as the 'test power' is too low to distinguish chance from real asymmetry (Sterne et al., 2011). Therefore, it was not feasible to reach firm conclusions about publication bias in a majority of the associations.

4. Discussion

This meta-analysis aimed to synthesise findings on the longitudinal associations between types of peer victimisation and anxiety symptomatology. The analysis of 14 studies showed significant effect sizes for all peer victimisation subtypes as predictors of later anxiety symptoms, and that anxiety symptoms were also prospectively associated with later peer victimisations across all subtypes. All associations were classified as small, except for the prospective relationship between relational peer victimisation predicting anxiety symptoms which produced a moderate effect size ($r = 0.33$) according to Cohen's guidelines (Cohen, 1988). These results demonstrated substantial evidence for bidirectional and reciprocal relationships between anxiety symptoms and peer victimisation subtypes. However, it is important to note that not all studies narrowed down to the full-text screening stage were accessible, therefore there is a degree of uncertainty in the robustness of the relationships found.

Although all forms of peer victimisation were associated with anxiety, relational peer victimisation appeared to be a slightly stronger predictor of anxiety symptoms ($r = 0.33$), followed by overt peer victimisation ($r = 0.25$), reputational ($r = 0.21$) and finally by cybervictimisation ($r = 0.14$). Anxiety symptoms appeared to be a slightly stronger predictor of relational and overt peer victimisation ($r = 0.27$ for both), compared with cybervictimisation ($r = 0.17$) and reputational victimisation ($r = 0.16$). This contrasts with previous meta-analyses

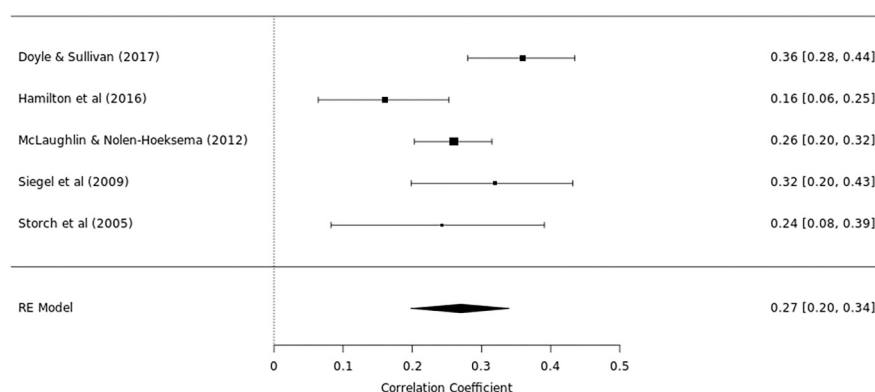


Fig. 5b. Forest plot of anxiety predicting relational peer victimisation over time.

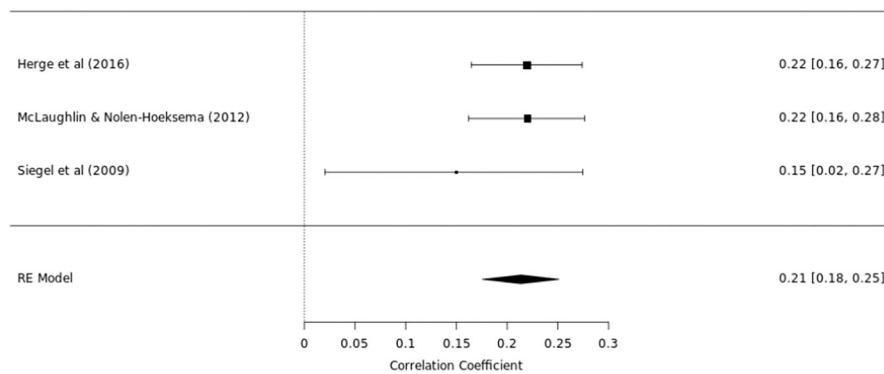


Fig. 5c. Forest plot of reputational peer victimisation predicting anxiety over time.

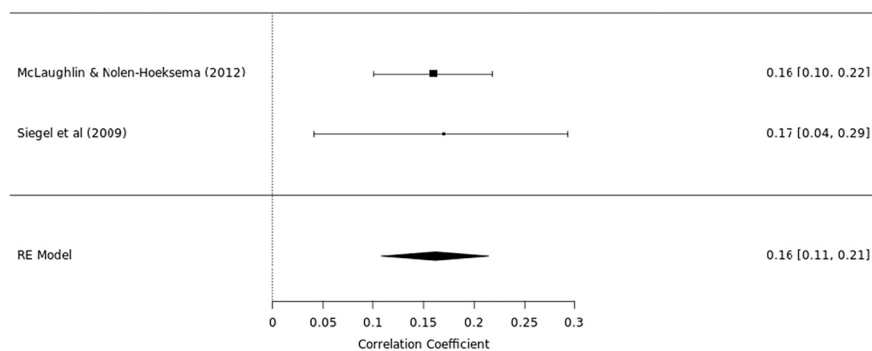


Fig. 5d. Forest plot of anxiety predicting reputational peer victimisation over time.

results that showed cybervictimisation was deemed the strongest predictor of internalising symptoms compared with in-person forms of peer victimisation (Christina et al., 2021). However, this previous review incorporated depression along with anxiety symptoms when evaluating the outcomes. Landoll et al. (2015) found that cybervictimisation predicted depressive symptoms, while controlling for other forms of peer victimisation and anxiety symptoms. The same effect was not found with anxiety symptoms, when depression and other victimisation forms were controlled, therefore highlighting that cybervictimisation may be more closely linked with depressive symptoms compared with anxiety. This finding is also supported by research conducted by Olweus (2012) and Kowalski et al. (2014a, 2014b), who suggest cybervictimisation does not have a unique effect on anxiety levels of children. In addition, Ranta et al. (2009), also found that face-to-face forms of peer victimisation were more related to anxiety than depression. It is also important to consider the overlap between types of victimisations i.e., children who experience physical or relational victimisation are also likely to have experiences of cybervictimisation (Kowalski et al., 2014a, 2014b; Wigderson & Lynch, 2013a, 2013b). It is vital to not neglect the fact that these different victimisations constructs are related and linked, and that the dynamics are far more complex than initially estimated within the present meta-analysis and at times cannot be separated. These factors require further investigation in order to explore the processes driving their associations. Age, in particular, needs to be collected and examined alongside efficacy testing, to determine and add to the understanding behind the developmental trajectories.

On the other hand, it may be that the results found reflect the lower frequency and prevalence rate of cybervictimisation reported in studies compared with other forms of peer victimisation (Christina et al., 2021; Landoll et al., 2015). The current meta-analysis targeted all ages throughout childhood, leading to a calculated mean age of 12.2 years across all the studies included. Research has shown that cybervictimisation studies have typically taken place with adolescent populations

(Kowalski et al., 2019a, 2019b), as technology is commonly accessed by adolescents for social media purposes in order to maintain relationships with their peers, and consequently they may be at a greater risk of experiencing peer cybervictimisation (Lenhart, 2015). This contrasts considerably with younger children who usually utilise technology for video watching or playing games (Lenhart, 2015). This is supported by research into developmental trajectories which has shown that as children become older there is an increase in their development of cognitive capabilities (Batanova & Loukas, 2011a, 2011b), and an increasingly greater emphasis on peer relationships and building a greater social status within their peer group (Casper & Card, 2010; Pronk & Zimmer-Gembeck, 2010a, 2010b). As peer victimisation by definition takes place among similar aged peers, it is therefore understandable that research has also found there to be a developmental trajectory that moves from overt aggression to relational types of aggression as children progress into their adolescent years (Björkqvist et al., 1992a, 1992b), which may also reflect peer victimisation trajectories (Casper & Card, 2016a, 2016b). Therefore, having a sample in this review that captured children across the ages, with a calculated mean age in the lower end of the adolescent range, may not have adequately addressed and captured the differences in developmental stages across the age span, and thus may have impacted findings gathered regarding not only cybervictimisation but the data into the varying victimisations more widely. The small number of studies that met inclusion criteria prevented sub-group analyses for age in the present review. Future research in the area may enable such sub-group analyses to be conducted in future, and individual studies should aim to have a greater restriction on the age criteria to allow for more robust conclusions around childhood development to be drawn.

Moderator analysis of anxiety types in the relationship between anxiety symptoms and peer victimisation showed that there was a non-significant difference between anxiety types (social anxiety and general anxiety symptoms) in a majority of the associations investigated in this

review. In addition, social anxiety and general anxiety were the only two specific anxiety subtypes that have been explored in rigorous research to date which highlights the need for further exploration in future research. However, this review found to be significantly different from each other in two of the prospective relationships investigated. Results suggested that relational peer victimisation predicted social anxiety to a greater, and more significant extent than general anxiety symptoms ($p = 0.0052$), and that general anxiety symptoms had a significantly larger difference than social anxiety on predicting overt peer victimisation ($p = 0.0052$). This is supported by findings by Landoll et al. (2015) who found that relational victimisation was a strong and unique predictor of social anxiety among adolescents when compared with other forms of victimisation. In addition, Chiu et al. (2021) found that peer victimisation had the strongest bidirectional association with social anxiety when compared with other areas of peer functioning (i.e., friendship quality and peer acceptance). This result is also consistent with findings that suggest negative evaluations from peers, which is a core component of relational victimisation, are likely to influence the development and maintenance of social anxiety (Wong & Rapee, 2016). In addition, Casper and Card (2016a, 2016b) found that the association between relational victimisation and anxiety was stronger, as opposed to overt forms of victimisation.

This review also found that general anxiety symptoms were a significantly greater predictor of overt victimisation, in comparison with social anxiety. This is in line with research that has suggested that children who are socially withdrawn and emotionally sensitive, which are notable features of anxiety more generally, are more likely to experience victimisation (Juvonen & Graham, 2014). However the moderator analysis for this relationship had very few studies in each investigation which may be overinflating or underinflating the results. Regardless, we are able to observe a significant difference in these relationships, and thus can determine that some effect may be occurring between the different subtypes. Taking this all into account, these identified patterns between types of anxiety and peer victimisation subtypes have been important to explore as distinct relationships have been found, which may inform future research and clinical interventions.

Generally, these results are consistent with previous meta-analyses addressing similar questions (Chiu et al., 2021; Christina et al., 2021), emphasising the robustness of the effects observed. When evaluating peer victimisation as predictor of anxiety, the effect size in this review was found to be $r = 0.22$, compared with $r = 0.23$ (Chiu et al., 2021). When evaluating anxiety as the predictor, the effect size was found to be $r = 0.21$, as compared with $r = 0.17$ (Chiu et al., 2021). However this previous review only evaluated social anxiety as a predictor and outcome, whereas the current review investigated both general anxiety and social anxiety associations, and the differences between these. Another recent meta-analysis also found significant bidirectional associations, where peer victimisation predicted internalising distress ($r = 0.18$), and internalising distress also predicted peer victimisation ($r = 0.19$; Christina et al., 2021). Interestingly, the results in the current review show a somewhat stronger relationship in both directions when including studies with validated measures exclusively and focusing solely on anxiety symptoms. This may indicate that the effect is larger than initially estimated, which has been enabled to be observed through the use of more reliable and validated measures. The result from the previous review may have also been influenced by the depressive symptoms that had also been measured as part of the internalised distress variable. This suggests that depression may have a weaker relationship with peer victimisation than anxiety among children and adolescents. However, regardless of the small differences of effect sizes, the conclusions among all reviews are broadly consistent.

It is important to note that within this review, reputational victimisation was only captured in a very small number of studies, however a significant effect was still observed in both directions. Supporting this finding, long-term peer exclusion, a core feature of reputational victimisation, has been shown to lead to a negative view of oneself and a

raised expectation of threat, which may increase the risk of developing anxiety (Hankin, 2012; Rapee et al., 2009). In order for more robust and firm conclusions to be drawn, more research is required to investigate the unique relationship between reputational peer victimisation and anxiety.

Furthermore, samples included in this meta-analysis were primarily school based, with only one study carried out in the community. Therefore, the findings are more generalisable to school environments as opposed to the general population in the community or in clinical settings. Having said this, other studies have found that the results from this review are also consistent with clinical (Hunt et al., 2022a, 2022b) and community samples (Jadambaa et al., 2019; van den Eijnden et al., 2014). As well as this, it has been noted that face-to-face peer victimisations among children tends to occur mostly during the school day and are more common than cybervictimisation (Landoll et al., 2015; Mod-ecki et al., 2014). However, research on cybervictimisation has grown exponentially over the last few years, and the research field in this area is still in its forming phase (Strohmeier & Gradinger, 2022). Moreover, measurements for cybervictimisation are a challenge as scales tend to become rapidly outdated due to the consistent technological development (Del Rey et al., 2015). Therefore, the findings of this review may reflect these limitations in the evidence-base, and it may be that the prevalence rate of cybervictimisation among children is greater than initially estimated in the earlier studies identified.

Although the limitations in the evidence base may make it difficult to determine and compare the prevalence rates of the different victimisations and the environments they may be more likely to occur in, the school environment is nevertheless important to explore, especially as programs aiming to prevent peer victimisation tend to take place within schools and the issue is often targeted through whole school approaches (Cross, Monks, et al., 2011; Karna et al., 2011; Ttofi & Farrington, 2011). Studies have consistently reported that negative school environments can increase the frequency of peer victimisations (Hong & Espelage, 2012). Moreover, children with a lower level of school connectedness (i.e., sense of belonging in the school) are more likely to be victimised by their peers and increases their involvement in victimisation (Glew et al., 2005). Other studies have shown that supportive relationships within the school environment (e.g., with peers and teachers) can act as a protective factor against peer victimisation (Thornberg et al., 2022). Overall, there are many components to the school environment that may influence the relationship between anxiety symptoms and peer victimisation, but future research is required to explore associations both within school settings further and in other environments beyond school.

It has been helpful to examine the different types of peer victimisation as separate constructs, as this may provide more targeted information for interventions. However, it is important to note that types of peer victimisation often overlap. Specifically, previous research has found that children who experience physical or relational victimisation are also likely to experience incidents of cybervictimisation (Kowalski et al., 2014a, 2014b; Wigderson & Lynch, 2013a, 2013b). This finding acknowledges that experiences of peer victimisations may not be happening in isolation and may be overlapping with other experiences of victimisation. Additionally, this review focused on those who were exclusively victims, however research has shown that anxious children who are aggressive to other peers are also more likely to be targets of overt forms of victimisation (Hunt et al., 2022a, 2022b). Supporting this, some children who experience peer victimisations tend to also engage with victimisation behaviours (Pellegrini et al., 1999), and are likely to exhibit internalising (Egan & Perry, 1998) and externalising difficulties (Kelly et al., 2015). These findings suggest that there may be several factors at play within this association and illustrates that the issue of peer victimisation is multifaceted. Further research is required to explore the mechanisms that may underpin peer victimisation and its bidirectional relationship with anxiety. It is also important to consider that anxiety can often co-occur with depression (Melton et al., 2016) and it has been extensively shown in previous research to be associated with

peer victimisation (Christina et al., 2021). Therefore, depression may be partially accounted for the bidirectional relationships observed, despite the current review focusing exclusively on anxiety difficulties.

4.1. Conceptual and clinical implications

Current research suggests only half of school-based programs intended to address anxiety difficulties result in a lessening of anxiety (Calear & Christensen, 2010) and only 16 % of anti-bullying programs lead to a reduction of peer victimisation (Gaffney et al., 2019). Additionally, most anti-bullying programmes tend to focus on peer bystanders and perpetrators (Chaux et al., 2016) rather than addressing victimisation directly. However, in the context of school, it has been shown that peer victimisation does not often take place between the bully and victim exclusively (Salmivalli, 2010) and others such as bystanders, defenders or reinforcers are also involved (Zych et al., 2017). Therefore, targeted interventions that encompass all involved (i.e., whole school approaches) may be beneficial and a more effective approach to tackling peer victimisation.

Clinically, the results of this review have demonstrated a bidirectional relationship, and therefore may potentially imply that reducing one variable will have a positive effect on the other. However, other confounding variables not measured may also be influencing these relationships. Nevertheless, these results suggest that future research should aim to maximise these observed bidirectional benefits by designing programmes to manage both experiences simultaneously. This potential programme or intervention can be designed by either including a component that directly targets peer victimisation within anxiety treatment (Berry & Hunt, 2009) or by incorporating anxiety management strategies in school-based peer victimisation programs (Rapee et al., 2020). In addition, there were specific associations found between relational victimisation predicting social anxiety, and general anxiety symptoms predicting overt forms of victimisation. The development of future interventions that specifically focus on these associations may be beneficial due to more targeted support. There is some evidence that school-based intervention programs that target relational victimisation may be helpful in preventing the development of social anxiety (La Greca et al., 2016). Therefore, the development and implementation such interventions could potentially improve peer relationships, as well as improve the management of anxiety, which may simultaneously play an important role in prevention against both. Importantly, any newly developed intervention based on these findings is recommended to be tested for its feasibility and evaluated robustly.

In clinical settings, it has been observed that interventions that target the treatment of anxiety have had a significant impact on the ongoing risk to peer victimisation (Berry & Hunt, 2009; Chu et al., 2015; La Greca et al., 2016). This may be a new direction forward, as research has proposed that addressing anxiety might be a more acceptable pathway to care than targeting peer victimisation (Hunt et al., 2022a, 2022b). Parents or guardians are more likely to be aware of anxiety that their child is experiencing, rather than be cognizant of whether they have been victimised due to low disclosure rates (Rapee et al., 1994; Stavrinides et al., 2015).

4.2. Theoretical implications

The mechanisms that underpin the association between anxiety and peer victimisation are not well understood. The development of anxiety is multi-layered and often involves a complex interaction between biological, contextual, and individual factors (Hambrick et al., 2010). Some studies suggest that peer victimisation leads to a conditioned fear response (Dygdon et al., 2004) that are combined with vulnerabilities (e.g., low self-efficacy in coping), which may contribute to an elevated expectation of potential threats (Barlow, 2000; Mineka & Oehlberg, 2008). These factors have been shown to mediate the relationship between peer victimisation and anxiety in cross-sectional data (Giannotta

et al., 2012; Singh & Bussey, 2011a, 2011b), but further research is needed to investigate their prospective and longitudinal bidirectional association. Having said this, these mechanisms are supported by a cognitive-behavioural perspective. Anxious children with low self-efficacy may hold positive beliefs about their peer group when victimised, and consequently may blame themselves; this reinforces their own negative perceptions of their social capabilities, and thus increases their experience of anxiety (Clark & Beck, 2009; Cohen & Kendall, 2015; Essau & Ollendick, 2013).

When examining specific relationships between types of anxiety and victimisation in this study, it was found that relational peer victimisation predicted social anxiety to a greater and more significant extent than general anxiety symptoms, and that general anxiety symptoms had a significantly larger difference than social anxiety on predicting overt peer victimisation. These associations have been found to be supported in individual studies (Landoll et al., 2015), however an overlap between these two specific types of victimisations has been highlighted in a previous meta-analysis (Casper & Card, 2016a, 2016b). Despite the overlapping nature of these two victimisation types, the effects on psychological factors have been shown to differ, thus supporting the importance of viewing them as separate yet related constructs.

It has been suggested that there is a developmental trajectory that moves from overt types of aggression in younger children to relational types of aggression during adolescence (Björkqvist et al., 1992a, 1992b), which may be similar with peer victimisation trajectories. This may be because as children become adolescents, there is an increase in the development of cognitive abilities (Batanova & Loukas, 2011a, 2011b), where intimacy, secrecy and competitiveness between peers increase as the social status within the peer group becomes more important (Hawley, 1999; Prinstein & Gillessen, 2003). These reasons may lead to engagement with peer victimisation involvement, both as perpetrators and victims (Casper & Card, 2010; Pronk & Zimmer-Gembeck, 2010a, 2010b). In support of these concepts, it was found that as relationally victimised children got older, their anxiety increased over time, however this association became weaker for overt forms of victimisation (Casper & Card, 2016a, 2016b). It is hypothesised that as peer relations become viewed as more important across development, children experience higher levels of internalised distress (i.e., anxiety) from negative relational experiences (Thompson & Leadbeater, 2013). Moreover, externalising symptoms, such as conduct difficulties, and a lack of peer social support are more greatly linked to overt forms of victimisation (Casper & Card, 2016a, 2016b; Hodges et al., 1999). This supports findings found in this meta-analysis, as it may be that these externalising symptoms are similar to symptoms that characterise anxiety, which may lead to children being targets of overt victimisation (Casper & Card, 2016a, 2016b).

Additionally, other forms of victimisations have been observed to overlap, i.e., children who experience physical or relational victimisation are also likely to have experiences of cybervictimisation (Kowalski et al., 2014a, 2014b; Wigderson & Lynch, 2013a, 2013b). As well as this, there is overlap between being a target and perpetrator of peer victimisation; for instance, anxious children who are aggressive to other peers are more likely to be targets of overt forms of victimisation themselves (Hunt et al., 2022a, 2022b). Typically, peer victimisation continues to be viewed as a single construct (Moore et al., 2017a, 2017b), despite clear, unique contributions that can be found by examining these different types separately. It is recommended that focused and targeted interventions relating to different subtypes of victimisation and anxiety symptoms are required to be developed and the effects evaluated. Age, in particular, needs to be collected and examined alongside efficacy testing, to determine and add to the understanding behind the developmental trajectories.

4.3. Limitations and future directions

There are several limitations to discuss. A key limitation of the

eligibility criteria within this review is that all papers included were required to be self-report studies which may inflate or underestimate the relationship as they are subject to response bias and demand characteristics (Hoskin, 2012) and the findings obtained may not be consistent across the sample groups (Austin et al., 1998). In addition, without informant reports (i.e., parents or teachers), it is possible that anxiety does not increase the likelihood of victimisation, but rather the child's perceptual bias leads to a misinterpretation of interactions or situations and the potential to evaluate these excessively negatively (Calleja & Rapee, 2020; Hunt et al., 2022a, 2022b).

Having said this, literature has shown limited agreement between informants across a broad range of areas (De Los Reyes & Kazdin, 2005) and this informant report will be impacted by the low disclosure rate of victimisation to adults where approximately a third to half of victimised school-aged children do not disclose to adults (van der Ploeg et al., 2022). In particular, covert and indirect forms of peer victimisation often remain hidden from adults around the child (Cross et al., 2009). In addition, research has shown that informant reports may be affected by their own personal biases and perspectives (De Los Reyes et al., 2011; Juvonen et al., 2014). To mitigate these limitations, future research should aim to collect a range of perspectives through observations, informant and self-report measures which can help inform a more robust conclusion and consensus of these relationships. Having said this, Christina et al. (2021) who completed a moderator analysis on different informant measures in a similar review, showed that bidirectional relationships were still significant regardless of the reporting measure used (i.e., cross-informant, self-report), which further supports the strength of these associations. Even so, future research would benefit by exploring these associations further with different reporting measures and examining any differences found between them.

In consideration of demographics, gender differences have been observed in the disclosing and reporting of peer victimisation, with some studies showing that females report more relational victimisation and males report more overt victimisation (La Greca & Harrison, 2005; Siegel et al., 2009). In addition, females tend to report more symptoms of mental health difficulties (Essau et al., 2010; Hyde et al., 2008). This therefore suggests that differences in reporting may underrepresent or overrepresent the results found in this review, as well as indicating a query around external validity and poses a limitation on the generalisability of these results. Further research is required to specifically look at these differences among the sexes and explore reasons and mechanisms behind them. Furthermore, this review also captured a diverse population sample spanning across several countries; however, all studies included were required to be in English, which may introduce systematic bias. Despite this, the effect of language restriction in reviews was shown to not impact systematic bias in conventional medicine but highlighted that further research is required in particular areas of health (Morrison et al., 2012). In addition, most studies in the current review were conducted within the United States, therefore further research is required in different population groups and different countries to determine consistency and improve the external validity of the findings.

Despite the intention to explore the school environment and social context as a risk factor to peer victimisation, studies in the evidence-base meeting criteria with varying environments were limited, therefore

conclusions were unable to be drawn and a moderator analysis among these factors could not be conducted. There is evidence that the type of school environment is a risk factor, where classroom size has been shown to be negatively associated with victimisation with popularity of bullies being stronger in smaller classrooms (Garandeanu et al., 2019). In addition, attitudes of teachers (Veenstra et al., 2014; Oldenburg et al., 2014) and peer bystanders (Salmivalli et al., 2011), as well as status in the classroom (Garandeanu et al., 2014), have also been shown to influence peer victimisation prevalence rates. These individual factors within the school environment and their relationship with anxiety symptoms would benefit from further exploration in future research. In addition, future literature should aim to replicate the findings from this review in other sample groups (including, community and clinical settings) to improve external validity and allow for findings to be generalised more widely than just the school environment. This will also provide an opportunity for any differences between environments to be examined and explored.

Finally, studies that measured reputational victimisation were limited in the evidence base. Despite this, a significant association was still found in both directions. Future research is required to explore this construct further and determine a more robust conclusion on its effects.

4.4. Conclusions

The effects found are relational and cannot definitely determine cause, and it is possible that additional variables not included are responsible for changes in both variables. Despite the inability to draw causal conclusions, the results show a clear, significant bidirectional relationship between anxiety and peer victimisation subtypes, which is consistent with previous research and holds relevance to different developmental and cognitive theories. In addition, these findings have implications for informing possible clinical and school-based interventions to support anxious children and adolescents who have been victimised by their peers. Future research is needed to improve the generalisability and validity of the bidirectional associations found.

CRedit authorship contribution statement

Elene Nicola: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. **Kiki Mastroyannopoulou:** Conceptualization, Project administration, Supervision, Writing – review & editing. **Honor Reeves:** Data curation. **Laura Pass:** Conceptualization, Project administration, Supervision, Writing – review & editing.

Declaration of competing interest

None.

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Appendix A. Search terms and syntax for systematic review

MEDLINE EBSCO – 848, PsychINFO – 1098, CINAHL Complete – 611, ERIC – 170 via EBSCOhost

(MH “Bullying+”) OR (MH “Cyberbullying”) OR AB (“bull*” OR “cyberbully*” OR “cyber-bully” OR “bullied” OR “victimisation” OR “victimization”) AND (MM “Child+”) OR (MM “Adolescent”) OR TI (“adolescent*” OR “youth” OR “child*” OR “teenager” OR “young p*”) AND (((MM “Anxiety+”) OR (MM “Anxiety Disorders+”))) OR AB (“anx*” OR “anxiety symptom*” OR “anxiety disorder*” OR “fear” OR “worry” OR “phobia”)

Web of Science, Core Collection – 1033

AB = (“Bullying” OR “Cyberbullying” OR “bull” OR “cyberbully” OR “cyber-bully” OR “bullied” OR “victimisation” OR “victimization”)

AND

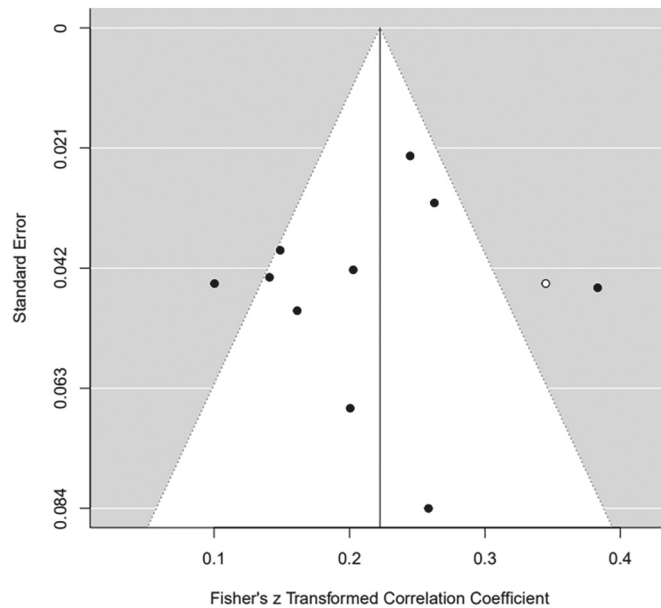
TI = (“Child” or “Adolescent” OR “adolescent*” or “youth” or “child*” or “teenager” or “young p**”)

AND

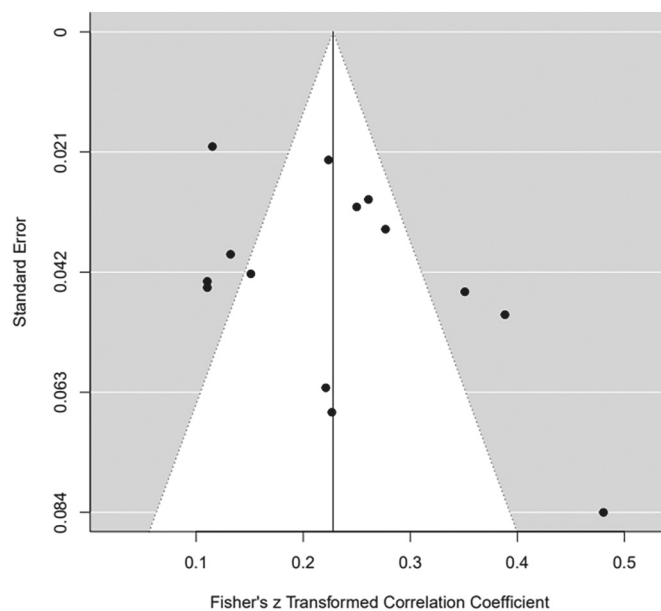
AB = (“Anxiety” OR “Anxiety Disorders” OR “anx*” or “anxiety symptom*” or “anxiety disorder*” or “fear” or “worry” or “phobia”)

Appendix B. Funnel plots of the meta-analysis

(a) Anxiety as a predictor for peer victimisation



(b) Peer victimisation as a predictor for anxiety



Data availability

No data was used for the research described in the article.

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