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The Correlation Between Social Support and Post-Traumatic Stress Disorder in Children and Adolescents: A Meta-analysis

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PII: S0165-0327(21)00707-2  
DOI: <https://doi.org/10.1016/j.jad.2021.07.028>  
Reference: JAD 13556



To appear in: *Journal of Affective Disorders*

Received date: 14 February 2021  
Revised date: 3 July 2021  
Accepted date: 13 July 2021

Please cite this article as: Leila Allen , Chris Jones , Andrew Fox , Alexandre Copello , Natalie Jones , Richard Meiser-Stedman , The Correlation Between Social Support and Post-Traumatic Stress Disorder in Children and Adolescents: A Meta-analysis, *Journal of Affective Disorders* (2021), doi: <https://doi.org/10.1016/j.jad.2021.07.028>

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## Highlights

- We examined the strength of the relationship between social support and PTSD in trauma-exposed children and young people.
- Seventy-two effect sizes from 50 primary studies (N= 27,073) were included, which either reported total social support, or a source of social support subgroup (peer, family and/or teacher) and PTSD.
- Overall, a small effect size was found ( $r=-0.12$ , 95% CI  $-0.16$  to  $-0.07$ ,  $k=41$ ) between social support and PTSD.
- The effect sizes between peer support ( $r=-0.18$ , 95% CI  $-0.10$  to  $-0.25$ ,  $k= 12$ ), family support ( $r=-0.16$ , 95% CI  $-0.09$  to  $-0.24$ ,  $k= 13$ ) and teacher support ( $r=-0.20$ , 95% CI  $-0.15$  to  $-0.24$ ,  $k=5$ ) and PTSD were also small.
- The cross-sectional design of the studies limits the findings and future research using prospective and longitudinal design would help to explain the relationship between social support and PTSD further.

# The Correlation Between Social Support and Post-Traumatic Stress Disorder in Children and Adolescents: A Meta-analysis

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## Abstract

### Background

Risk factors exploring the link between trauma and Post-traumatic Stress Disorder (PTSD) have been extensively explored in adults, however, less is known about child and adolescent populations.

### Methods

The current meta-analysis aimed to systematically evaluate and summarise the child focused literature to estimate the strength of the relationship between social support and PTSD symptoms following traumatic events.

### Results

Fifty primary studies reporting an effect size for the relationship between total social support scale or a source of social support with PTSD were included. A small effect size was found for the relationship between social support and PTSD ( $r=-0.12$ , 95% CI -0.16 to -0.07,  $k=41$ ), with large heterogeneity ( $I^2 = 90.3\%$ ). The effect sizes between peer support ( $r=-0.18$ , 95% CI -0.10 to -0.25,  $k= 12$ ), family support ( $r=-0.16$ , 95% CI -0.09 to -0.24,  $k= 13$ ) and teacher support ( $r=-0.20$ , 95% CI -0.15 to -0.24,  $k=5$ ) and PTSD were also small. Moderator analyses indicated that studies reporting on participants exposed to abuse ( $r=-0.25$ ) and correlations based on univariate data ( $r=-0.14$ ) had higher correlations and medium heterogeneity. The main effect size was robust to publication bias and study quality.

### Limitations

The cross-sectional design of the studies limits the findings and future research using prospective and longitudinal design would help to explain the relationship between social support and PTSD further.

### **Conclusions**

The current review suggests that social support may only play a small role in protecting against PTSD and future research may benefit from exploring the link between post-trauma cognitions and social support.

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Introduction

## Background

There has been an increasing amount of research suggesting that children and young people experience high rates of trauma. In a recent epidemiological study, although only based on one sample, the authors found that 31.1% of 2064 children and young people reported trauma exposure, of which 7.8% fulfilled criteria for Post-Traumatic Stress Disorder (PTSD) by age 18 years (Lewis et al., 2019). The impact of trauma on children and young people can be detrimental, with the potential to negatively impact social, emotional, physical development and well-being (Fairbank & Fairbank, 2009; Pynoos et al., 2009).

Many children and young people do not develop PTSD following trauma and consequently there is a need to explore mechanisms underlying the link between trauma and psychopathology and understanding vulnerability factors. One risk factor which has been extensively explored in the adult

literature is lack of social support (Brewin et al., 2000; Ozer et al., 2003). Social support often refers to the perceived emotional support provided by significant others such as caregivers or peers (Malecki & Demaray, 2002). There are two main explanatory models of the association between social support and PTSD, which include the 'social causation' models, such as the 'stress buffering hypothesis' (Cohen & Wills, 1985), and the 'social erosion' models (Kaniasty & Norris, 2008).

The 'stress buffering hypothesis' postulates that lack of social support may precede and contribute to increased psychological distress following trauma (Cohen & Wills, 1985). It is suggested that emotional support may help with the psychological processing of trauma and may play a role in making sense of the event(s), consequently helping to manage distress and pain caused as a result of the trauma (Lepore, 2001), and buffer the effects of stress (Cohen, 2004). This is linked to the cognitive model of PTSD that suggests that other people's reactions following a traumatic event can impact how victims interpret the event and may lead to further symptoms of PTSD such as social isolation (Ehlers & Clark, 2000). The model suggests that negative responses from significant others can induce negative appraisals, with further research suggesting that this can potentially mediate the association between social support and PTSD (Guay et al., 2006; Joseph et al., 1997).

The 'social erosion' model suggests that an individual's social support reduces due to psychological distress following trauma resulting in interpersonal difficulties and social withdrawal. Whilst research is limited into these models, due to the literature base comprising of largely cross-sectional data, these theoretical models can help to explain the link between PTSD symptoms and social support. Individuals with high levels of social support are likely to have increased opportunities to re-engage with their lives following trauma, which may inhibit patterns of behaviour related to avoidance and withdrawal from previously enjoyed activities (Stice et al., 2004). Individuals may also be supported to safely yet spontaneously be exposed to trauma reminders, potentially leading to fewer re-experiencing symptoms and reduced vigilance (Foa et al., 2007). Finally, social support may

also provide an outlet for individuals to express their concerns and problems, which has been shown to be associated with reduced intrusive thoughts (Cohen et al., 2000; Lepore et al., 1996).

### Current research

Two meta-analyses, based on adult populations, found that social support was one of the largest predictors of PTSD, suggesting that lower levels of social support were associated with increased PTSD symptoms or rates of current PTSD (Brewin et al., 2000; Ozer et al., 2003). In Ozer's meta-analysis a small-to-medium effect size ( $r=-.28$ ) was found between social support and PTSD, and medium effect sizes ( $r=0.30$ ) were also found in Brewin's meta-analysis. This finding was also supported in a recent meta-analysis exploring risk factors of PTSD in children and young people, where social support was found to have a large effect size ( $r=0.33$ , Trickey et al., 2012). However, these meta-analyses have been based on a small number of studies. A larger recent meta-analysis exploring the association between social support and depression in youth found a significant and moderate effect size ( $r=0.26$ ), highlighting the importance of exploring this further within children and adolescent literature (Rueger et al., 2016).

### Moderators of social support

There are a number of moderators that have been identified in the literature which impact the correlation between social support and PTSD and will be important to consider for this current review. These can be categorised into three groups: methodological factors, trauma-related factors and child characteristics.

**Methodological factors.** One of the difficulties with investigating the link between social support and PTSD is the multi-modal construct of social support which means it is assessed using a variety of measures (Guay et al., 2006). In an attempt to overcome this problem, Barrera (1986) categorised social support instruments into three categories: social network (referring to the size and



density of support), enacted support (frequency of support) and perceived support (perception of how much support is available), and these will be used for the current review.

There are a number of validated, widely used measures of social support for use with children and adolescents, such as the Multi-dimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988) and the Child and Adolescent Social Support Scale (CASSS; Malecki et al., 2000). These measures provide an overall global sum of social support scores, whilst also providing sub-scale data on sources of support (i.e. parent, teacher, and friend support). Research has shown mixed findings across sources of support, some studies suggesting that teacher support had the strongest association with well-being (Chu et al. 2010), whilst other finding larger associations for support from family members and peers (Rueger et al., 2010). Therefore, differences amongst sources of social support will be explored in the current review to investigate whether different providers of support impact on PTSD symptomology.

**Trauma-related factors.** It is also important to explore the impact of trauma-related factors on the association between social support and PTSD. It is well documented that the type of trauma, i.e. interpersonal violence (IPV) such as sexual abuse, or non-interpersonal violence (non-IPV) such as natural disasters, has an important role in explaining the development of psychopathology (Alisic et al., 2014). More specifically, IPV has been found to be more likely to result in the development of PTSD and depression in children and young people than in non-IPV samples (Pinto et al., 2017; Vibhakar et al., 2019). It is largely assumed that non-IPV events are typically a one-off event, whereas IPV may be more chronic in nature and have been found to corrode social support (Pinto et al., 2017). Given that childhood sexual abuse has been found to be one of the most significant risk factors for the development of psychopathology, in both adults and children (Hillberg et al., 2011), the current review will explore whether type of trauma impacts the association between social support and PTSD.

**Child characteristics.** There are a number of child characteristics that have been explored throughout the child PTSD-literature, with a particular focus on age and sex as potential moderators. It has been found that girls exposed to interpersonal trauma show the highest rates of PTSD (32.9%, 95% CI 19.8 - 49.3), compared to males exposed to non-interpersonal trauma (8.4%, 95% CI 4.7-14.5; Alisic et al., 2014). With regards to social support, studies have found that women tend to rely more on interdependent relationships for well-being; whereas men are reported to generally seek less social support than women, and experience lower levels of psychological benefit from social support (Caselman et al. 2006; Turner, 1994).

Research has also shown that an individual's need for social support varies during changes in developmental stages, for instance increased age was shown to strengthen the association between social support and well-being indicating older young people may benefit more from social support (Chu et al., 2010). It has been shown that peers become increasingly more important sources of support during early adolescence (Buhrmester, 1996; Rueger et al., 2010), whereas it is argued that support from parents and teachers is maintained throughout adolescence (Colarossi & Eccles, 2003).

The question of whether the outlined potential moderators impact the effect between social support and PTSD was important to address to allow for a thorough evaluation of the methodological robustness within the current review.

### **Purpose of the current review**

The primary aim of this meta-analysis was to systematically evaluate and summarise the existing child research literature to estimate the strength of the relationship between social support and PTSD symptoms following traumatic events, including examining the relationship between different sources of social support (family, peer and teacher) with PTSD symptoms. The secondary aim was to examine the extent to which effect sizes are explained by characteristics of the study or

the sample population. It was hypothesised that lower levels of social support would be related to higher levels of PTSD symptoms. It is hoped that by exploring the association between social support and PTSD it will help to understand whether post-trauma interventions should bolster social support as part of clinical treatments for children and young people.

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## Method

### Search strategy

The review was prospectively registered on the PROSPERO register of systematic reviews (16<sup>th</sup> September 2019, CRD42019145710). An initial systematic search for relevant papers was conducted on 18<sup>th</sup> July 2019 using three electronic databases: MEDLINE, PsycINFO and the Published International Literature on Traumatic Stress (PILOTS). The searches dated from 1980 (the year in which PTSD was first added to the Diagnostic and Statistical Manual of Mental Disorders, 3<sup>rd</sup> Edition (DSM-III); American Psychiatric Association, 1980). The aim of the search was to obtain a comprehensive overview of the literature into the relationship between social support and PTSD in children and young people. Articles were selected where the search terms (post-traumatic stress disorder OR PTSD) AND (child\* OR teen\* OR adolescen\* OR young person OR youth OR young people) AND (social support). To reduce the potential confounding effect of publication bias, searches for unpublished data were also conducted using electronic databases for dissertations/theses: ProQuest and Open Grey. Furthermore, the references of key papers and existing meta-analyses were reviewed to identify any further relevant papers (Furr et al., 2010; Gordon-Hollingsworth et al., 2018; Tol et al., 2010).

### Inclusion criteria

The main criteria for inclusion in the meta-analysis included quantitative studies with children and/or adolescents reporting an effect size (i.e. Pearson  $r$ , Means and Standard Deviations, Odds Ratio, Cohen's  $d$  effect size, F-Test Statistics, Beta coefficients) between measures of social support and PTSD. To summarise, quantitative and observational studies were included where the mean age of the study sample was 18 years old or below. Studies included a group where participants had experienced trauma, as defined by A Criterion for PTSD in either DSM-IV or DSM-V (American Psychiatric Association, 2013). Studies using a self-reported, validated measure of social support were included. Studies using either a validated quantitative questionnaire or diagnostic clinical interview of PTSD, administered at least four weeks after trauma, with adequate reliability and validity with such psychometric properties documented in peer-reviewed journals were included. Due to limited resources, only studies reported in English were included. The full justification of the inclusion and exclusion criteria are available in supplementary material.

### Selection of studies

A PRISMA flow-chart of the search and selection process is shown in Figure 1. Initial searches yielded 1615 articles and 1322 after removing duplicates. Titles and abstracts were screened for suitability, leading to the exclusion of 1093 studies. The main reason for exclusion at this stage was absence of social support and PTSD measures. The full text of 229 studies were reviewed against the inclusion and exclusion criteria, reasons for exclusion are listed in Figure 1. The main reasons for exclusion were absence of social support measure or a measure which was not validated, and the age of participants. Eight studies met the inclusion criteria but did not report effect size data, authors were contacted for raw data and four provided effect size data and the other four were excluded from further analysis. Thus, 50 articles (48 published, two unpublished studies) satisfied criteria for the meta-analysis and reported the effect size between total social support and PTSD ( $k=42$ ), or the

effect size between a source of social support and PTSD; peer (k=12), family (k=13) and or/ teacher (k=5).

### Data extraction

All data was extracted by the first author (LA). Data was extracted related to the effect sizes, methods, participants, type of trauma, outcomes and any data relating to the planned contrasts. If this data could not be extracted, then the authors of the studies were contacted where possible to clarify or obtain relevant information for the analysis.

### Quality assessment and risk of bias

A quality assessment framework was developed to assess the quality and risk of bias within each study (available in supplementary material). The framework was informed by The National Institute for Health and Care Excellence Quality Assessment Checklist for Studies reporting Correlations and Associations (NICE, 2012), the National Heart Lung and Blood Institute Quality Assessment Tool for Observational Cohort and Cross-section Studies (NIH, 2014) and the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement (Von Elm et al., 2007).

The first author completed the quality rating for all studies and a second rater (NJ) used the quality assessment framework to score a randomly selected sub-set of the studies (10%). Percentage agreement for the individual items in the quality assessment was 87%. The weighted Kappa was 0.70 ('substantial agreement') for overall quality rating.

## Meta-analytic method

### Calculating effect sizes

Available data pertaining to the relationship between total social support scale score and PTSD severity was extracted from each primary study. Subscale data related to sources of social support (i.e. peer, family and/or teacher) and PTSD severity was also extracted. If the measure reported all available sub-scale data individually, but not overall total social support scale, it was combined and transformed into an overall correlation for use in the main analysis. If the measure reported peer and classmate subscale data, they were combined together (for example, social support scale for children, Lai et al., 2018).

If zero-order Pearson's  $R$  correlation coefficients were reported, no transformations were necessary, and this coefficient was used. Where two separate  $r$  correlation coefficients were available (e.g. two different ethnicities) correlations were combined for total  $r$ , using the procedures described in Borenstein et al., (2011). Effect sizes were reported as negative when social support is inversely related to PTSD and therefore social support is protective. If the primary study reported a positive correlation but were concluding that social support was a protective factor, or a negative correlation but were concluding that social support was not a protective factor, then the sign of  $r$  was changed accordingly. This was the case for two studies (Al Krenawi et al., 2009; Dorinson, 2012).

If treatment outcomes were reported using non-parametric measures of association (e.g. Spearman's  $Rho$ ), then the Pearson coefficient was approximated using the transformations reported by Rupinski and Dunlap (1996). Alternatively, if other effect size data was reported (i.e. means and standard deviations,  $d$ , or odds ratios) then these were transformed into correlation coefficient  $r$  value using formulas provided by Rosnow & Rosenthal (1991).

Finally, standardised regression coefficients were substituted when zero-order correlations coefficients were not reported. Peterson and Brown (2005) report that using beta coefficients to impute missing correlations generally produces relatively accurate and precise population effect-size estimates with a meta-analysis. The difference between data reported as a raw univariate statistic and data that had to be derived from a transformation was explored.

#### Data Analysis Strategy

The omnibus test was calculated using the random effects model due to likelihood of uncontrolled factors such as methodological heterogeneity across the studies. The random effects model was calculated using the DerSimonian and Laird method, which is the most commonly used method for calculating the between studies variation ( $\tau$ ) in meta-analysis and is used for effects that are considered to be normally distributed in the population (DerSimonian & Laird, 1986). R values were transformed into a Fisher's Z score for use in the analysis and then back-transformed to r for interpretation.

#### Handling problematic variance

Estimates of heterogeneity which can result from methodological variation in the studies were calculating using the Q statistic and  $I^2$  statistic. The degree of heterogeneity was classified as 'low' (25%), 'medium' (50%) or 'large' (75%; Higgins et al., 2003).

To examine whether any particular primary studies were exerting a disproportionate influential effect on the meta-analytic synthesis, a leave-one-out analysis was conducted to identify primary studies displaying problematic heterogeneity. If omitting a study influences the overall meta-analytic effect by greater than 10% of the original estimate, it was considered as disproportionately influential and examined for risk of bias and removed from the omnibus test.

#### The quality effects model

The quality effects model (Doi & Thalib, 2008) was used to explore variation due to methodological factors; it can be interpreted as the meta-analytic effect that would have been



obtained had all of the studies been of the same methodological quality as the highest quality in the review. The quality effects model weights study precision by consideration of sample size and heterogeneity (as does the random effects model) and also an explicit rating of methodological quality.

#### Planned Contrasts

Sub-group analysis was conducted on the following categorical moderators which were identified a priori:

1. Methodological moderator variables – measure of PTSD (self-report or interview), time PTSD measure taken after trauma, type of social support measure (perceived – perception of how much social support they have received, enacted support – frequency of support and social network – size and density of support, (see Chu et al., 2010 for further discussion), type of analysis (raw data or derived).
2. Population moderator variables – age of sample (categorised as up to 13 years old when the mean or 80% of the sample fell below 13, and 14 years old and above when the mean or 80% of the sample were over 14), gender (categorised as ‘female’ when 75% of sample or more was female, ‘male’ when 75% of the sample were male or ‘combined’)
3. Trauma moderator variables – trauma type (interpersonal violence trauma such as sexual abuse, community violence, or non-interpersonal violence such as natural disasters), and frequency of trauma (single event, multiple events or mixed trauma).

Summary effects and associated heterogeneity measures was calculated for each of the sub-groups. The significance of the difference between the sub-groups was evaluated by comparison of their 95% confidence intervals.

## Results

### Study characteristics

The effect sizes reported in the primary studies are described in Table 1. There were 72 effect sizes from 50 primary studies reporting an effect size of the correlation between either total social support scale, or a source of social support subgroup (peer, family and/or teacher) and Post-traumatic Stress Disorder (PTSD). The total number of participants included in the meta-analysis was 27,073, ranging from 6-23 years old and approximately 54% of the overall sample were female (not reported in three studies).

The participants were recruited from schools (62%), specialist centres (e.g. child protection clinics, government agencies; 22%), hospitals (8%), and from community samples (8%). Participants had mixed trauma experiences, which included interpersonal trauma (e.g. sexual abuse, community violence) and non-interpersonal trauma (e.g. natural disasters, war trauma). Half of the sample originated from either USA (18 studies) or China (7 studies). Based on 32 studies, the PTSD measure was administered approximately 20.5 months after trauma.

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## Omnibus test

The effect size data reported in the primary studies for correlation between social support and PTSD are presented in Figure 2. Forty-two studies (comprising 24,001 participants) were included in the main analysis calculated from effect size data based on total social support scale data and PTSD. Effect sizes ranged from  $r=-0.74$  (Freh, 2016) to  $r=0.24$  (Paxton et al., 2004). The pooled effect size was  $r=-0.14$  (95% CI -0.19 to -0.09;  $z = -5.21$ ,  $p < 0.01$ ), i.e. a small effect. This pooled effect size was characterised by a large degree of heterogeneity ( $Q=579.10$ ,  $df=41$ ,  $p<0.001$ ;  $I^2=92.9\%$ ).

As can be seen on the Forest Plot there is one particular study (Freh, 2016) with a very large effect size ( $r=-0.74$ ). Further analysis of the studies was conducted to assess problematic heterogeneity and to explore the impact of any influential studies on the overall effect size.

## Impact of influential studies

A “leave-one-out” procedure, in which the random effects model is calculated with each of the primary studies in omitted in turn, was conducted (see Supplementary material). When omitting Freh (2016) study from the analysis, the overall effect size changed by 14% of the original estimate and therefore this primary study is reporting an effect size that is markedly inconsistent with the other literature. The meta-analysis was conducted again without the Freh (2016) study. When this study was omitted from subsequent analysis the weighted average correlation reduced to  $r=-0.12$  (95% CI -0.16 to -0.07,  $z=5.12$ ,  $p<0.001$ ), see Figure 3. Estimates of heterogeneity showed that there continued to be substantial variance across the studies ( $Q=410.42$ ,  $df=40$ ,  $p<0.001$ ;  $I^2=90.3\%$ ). Subsequent analysis was conducted with the Freh (2016) study omitted.

According to Rosenthal’s (1984) formula for binomial effect sizes, a correlation of  $r=-0.12$  between social support and PTSD indicates that 30% of children and young people benefit from social support following trauma.

## Attenuation due to study quality and risk of bias

### Summary of quality bias

Overall, there was a mixed level of bias across the studies included in the meta-analysis. Four studies did not show any high risk of bias in any of the quality criteria. The most problematic area of risk across the studies was generalisability, where half of the studies were rated as high risk, which is related to the cross-sectional design of the studies.

The quality effect model reported a synthesis of  $r = -0.13$  (95% CI -0.17 to -0.07). The quality effects model evidences an approximately 0.07% increase relative to the random effects estimate. Accordingly, when the synthesis includes information about the methodological quality of the studies there was no important change in the effect of the study and overall the effect size remained small.

### Attenuation due to other factors

To further explore the impact of uncontrolled covariates upon the correlation of social support and PTSD, a series of subgroup analysis were conducted and are shown in Table 2. Analyses of subgroups showed that studies where the effect size was extracted from raw data (i.e. univariate correlations) showed a significantly larger effect size ( $r=-0.14$ ) than those where the analysis was derived or transformed, i.e. from beta coefficients or odds ratios, ( $r=0.012$ ). This suggests the reporting of multivariate measures of association or conversion from other effect sizes may be contributing to heterogeneity. However, effect size data based on reported univariate correlations still found a small effect size between social support and PTSD with a large amount of heterogeneity.

With regards to trauma-related moderators, no significant subgroup differences were found between IPV vs non IPV, or single vs mixed or multiple trauma. However, post-hoc analyses on specific type of trauma (abuse vs community violence) found that abuse yielded significantly higher

correlations ( $r=-0.25$ ) with medium heterogeneity (56.8%), than community violence ( $r=-0.02$ ) with medium heterogeneity (73.3%),  $p = 0.01$ .

No significant subgroup differences were observed for the following methodological moderators: type of PTSD measure (self-report or interview), time elapsed between trauma and PTSD measure (1-6 months, 6 months – 3 years, 3 years and over), or type of social support measure (perceived, enacted, social network). In addition, no significant subgroup differences in child characteristics (younger or older children/adolescents or gender) were found, although less heterogeneity was identified in the female only group (58%).

#### Subgroup Analysis of sources of social support

A subgroup analysis was undertaken to explore the effect size between PTSD and three different sources of social support, peers, family and teachers. The average effects and 95% Confidence Intervals (CI) for each of these sources of social support are shown in Figure 4. The correlation between peer social support and PTSD was small ( $r=-0.18$ , 95% CI, -0.10 to -0.25,  $k=12$ ), and with significant heterogeneity ( $Q=84.86$ ,  $df=11$ ,  $p < 0.001$ ,  $I^2 = 87\%$ ). The correlation between family social support and PTSD was also small ( $r=-0.16$ , 95% CI, -0.09 to 0.24,  $k=13$ ), with significant heterogeneity ( $Q=90.62$ ,  $df=12$ ,  $p < 0.001$ ,  $I^2 = 87\%$ ). The correlation between teacher social support and PTSD was the largest effect size but would still be considered small ( $r=-0.20$ , 95% CI, -0.15 to -0.24,  $k=5$ ), with low heterogeneity ( $Q=4.57$ ,  $df= 4$ ,  $p= 0.33$ ,  $I^2 = 12\%$ ). There was no significant difference between the three sources of social support.

### Publication bias

Publication bias was explored through inspection of funnel plots and the use of a trim and fill procedure which estimates the number of missing studies due to publication bias and calculates an adjusted effect size for the analysis. The funnel plot of the correlation between standard error by Fisher's Z for overall effect size (all studies included except Freh, 2016) is presented in Figure 5. Using the Duval & Tweedie's 'Trim and Fill' method no imputed studies were added. The uncorrected estimate of the effect size is -0.12 (95% CI -0.16, -0.07). Overall, with regards to publication bias the effect size value can be seen to be relatively robust and there is little evidence of publication bias.

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## Discussion

### Summary of findings

This meta-analysis sought to explore the correlation between measures of social support and Post-traumatic Stress Disorder (PTSD) in children and young people. Fifty primary studies reported an effect size of the correlation between total social support scale, or a source of social support (i.e. peer, family and/or teacher) and PTSD, providing 72 effect size estimates. The results of the 41 primary studies reporting total social support scale, after omitting one paper reporting inconsistent findings (Freh, 2014), demonstrated a small effect size ( $r=-0.12$ ), with high heterogeneity (90.3%).

The different types of sources of support (i.e., peer, family and teacher) also demonstrated small effect sizes ( $r=-0.18$ ,  $r=-0.16$  and  $r=-0.20$  respectively). Each of these meta-analyses, except sources of support from teacher, were characterised by a large degree of heterogeneity.

### Comparisons to other reviews

Previous literature has consistently found that levels of social support are associated with mental health outcomes for children and adolescents following traumatic events (Pine & Cohen, 2002). The small effect size between social support and PTSD in children and young people found in this meta-analysis may be surprisingly low given previous meta-analyses suggesting small-to-medium effect sizes (Brewin et al., 2000; Ozer et al, 2003; Trickey et al., 2012). However, interestingly the effect size between social support and PTSD in the non-combat, non-interpersonal violence population was  $r=-0.11$  (Brewin et al., 2000) which is in-line with the results found in this meta-analysis. Also, these studies exploring a number of risk factors for PTSD were based on a small



amount of studies, for example Trickey et al (2012) found four studies adequately addressed social support as a construct of which only two had used validated measures of social support.

Although this is the first meta-analysis to focus on exploration of the correlation between social support and PTSD in children and young people, two meta-analyses exploring the correlation between social support and well-being and depression (Chu et al., 2010; Rueger et al., 2016) found results in line with the current review ( $r = -0.17$  and  $-0.26$ , respectively). Inconsistent with previous meta-analyses, age nor gender significantly impacted the association between social support and PTSD.

#### Moderator analyses

Analyses of moderators revealed two significant differences in the association between social support and PTSD. Firstly, studies reporting multivariate data showed significantly weaker associations between social support and PTSD, which may be due to standardised regression coefficients and transformed data taking into account additional covariates (for example, gender) resulting in dissimilarity with the other reported effects. However, despite previous meta-analyses excluding multivariate data, the total correlation between social support and PTSD was still small in magnitude in studies that reported univariate data only.

Secondly, although type of trauma (i.e. IPV or non-IPV trauma) was not found to be a significant moderator in this meta-analysis, it was observed that the IPV study class comprised of a broad range of trauma types. For example, the IPV group included five studies based on community violence exposed populations where there were varying degrees of exposure to trauma. It has been well documented that sexually assaulted populations, compared to non-sexual assaults, have been found to have higher levels of PTSD (Valentiner et al, 1996), and therefore further post-hoc analyses of trauma type were conducted. Post-hoc analyses found significantly stronger correlations between social support and PTSD where participants had been exposed to abuse, albeit the effect size would still be considered small. Interestingly, there was no correlation between social support and PTSD in

populations exposed to community violence. It could be hypothesised that social support is not a protective factor in samples where community violence is high, and research has shown that social support can actually be detrimental in these populations as peer support has been found to be associated with increased levels of PTSD severity (Ullman et al., 2007). It may also be hypothesised that in communities with high levels of violence, racial tensions and family and peer conflict, the provision of social support may be more difficult to develop and maintain (Stansfeld et al., 2017).

#### Sources of social support

Whilst based on a smaller number of studies, the effect size for social support provided by teachers was higher than the other two forms, although still only producing a small effect size. In a meta-analysis by Chu et al (2010), teacher and school personal support was significantly stronger than other sources of social support for well-being in children and adolescents. Whilst this finding needs to be treated with caution and requires further exploration with a larger number of studies, it may provide some indication that school might be an important setting to promote mental health of students. This is supported by emerging research suggesting that teacher-mediated interventions help to improve mental health symptoms in children and adolescents following natural disasters (Berger & Gelkopf, 2009; Wolmer et al., 2005).

#### Theoretical implications

The key finding of this current review is that social support may only have a small impact on buffering against the development of PTSD. A large number of the included studies were based on populations exposed to natural disasters, war zones and terrorist acts, and as a result the perceived low levels of social support (i.e. disrupted social networks) may have been caused by the traumatic event itself (Banks & Weems, 2014). It may be perhaps that social support has a limited impact on PTSD as support providers are also victims themselves and are therefore unable to provide further social support to others (Lee et al., 2004). However, due to the cross-sectional design of all included

studies, no firm conclusions can be made until further research explores the impact of pre-disaster levels of social support on psychological sequelae.

Interestingly, emerging research is suggesting that perceived social support is associated with maintenance of PTSD symptom severity through their association with negative post-trauma cognitions (Hitchcock et al., 2015; Robinaugh et al., 2011). Post-trauma cognitions are a well-documented risk factor for development and maintenance of PTSD in children and adolescents (Gómez de La Cuesta et al., 2019), however, perceived social support is seemingly playing a role in mediating this relationship. In line with the cognitive models of PTSD, supportive interaction may help traumatised children and young people challenge and reframe their negative beliefs about themselves and the world (Munzer, 2017). Furthermore, when individuals are dominated by extreme negative cognition, social support appears to have little impact on the development of PTSD (Ma et al., 2011).

### Strengths and Limitations of current review

This is the first meta-analysis to focus on synthesizing correlational data between social support and PTSD in children and young people, with consideration to the source of social support and exploration of methodological and theoretical moderators. A strength of the study includes the exhaustive search of both published and unpublished data and attempts to contact authors to obtain missing data.

There are a number of limitations in this study that are important to note. The cross-sectional design of the studies included in the meta-analysis limits the conclusions that can be drawn as causality is limited. It would have strengthened the study to include prospective and longitudinal studies, however only four studies used these designs and therefore data was not extracted (La Greca, 2010; Lai et al., 2018; Meiser-Stedman et al., 2019; Rosario et al., 2008). Secondly, measures

of social support and PTSD were self-reported, and parent reported data was excluded, whilst some argue that self-report is preferable when assessing personal experience (Whitcomb & Merrell, 2013), it can also be viewed as subject to self-reporting bias. This is particularly important to consider as measures of social support were predominantly based on perceived levels of support which might be influenced by participant's affect and personality (Pinto et al., 2017).

Further limitations include the large amount of heterogeneity identified in the literature. As discussed in Ozer et al (2003) it is likely that substantial heterogeneity in each construct (e.g. interpersonal violence vs non interpersonal violence) exists, and whilst effort was made to explore methodological and theoretical factors moderating the correlation between social support and PTSD, it is likely that there are additional unexplained factors. A further limitation of this review is the methodological quality of the included studies. There were many studies rated as high risk of generalisability bias and this may have influenced the overall effect size. Similarly, those studies with high risk of reporting bias, in particular those studies reporting multivariate analysis, were associated with lower correlations. Lastly, although the quality of a subset of the studies were checked by a second rater, due to time constraints it was not possible for a subset of the included studies to be double coded.

### **Future research and clinical implications**

With the findings of the current study and following consideration of the limitations, a number of recommendations for future research are outlined. Firstly, to assist in future meta-analytic reviews it would be helpful if authors report zero-order correlations for all constructs measured in the study, and if available provide subscale data such as source of social support correlations. Secondly, to help determine the causal links between social support and PTSD future studies should make attempts to obtain pre-trauma assessment of social support and follow up post-

trauma assessment at a number of intervals to examine the association of social support and PTSD over time.

With regards to clinical implications, the negative correlation between social support and PTSD provides support that clinical treatments may benefit from efforts to increase social support (King et al., 2006), and it is documented that treatments aiming to equip people with the skills to access social support are beneficial to those with PTSD (Cloitre et al., 2002). In particular, mental health clinicians may want to focus on working collaboratively with teachers in order to increase their skills and confidence to provide social support to children and adolescents following trauma. However, the effect size noted in this current review suggests that social support may only play a small role in protecting against PTSD and future research may benefit from exploring the link between post-trauma cognitions and social support further.

## Conclusions

The current review found a small correlation between social support and PTSD in children and young people following trauma, with the strongest effect size for social support provided by teachers. Stronger associations were found for studies reporting univariate data and studies reporting on populations who had experienced abuse.

## Author statement

We confirm that this work is original and has not been published elsewhere, nor is it currently under consideration for publication elsewhere.

## Acknowledgements

The research presented here was originally submitted as part of Leila Allen's doctoral thesis at the University of Birmingham. We have no other acknowledgements to make.

## Funding

None

## Contributors

**Leila Allen:** Conceptualisation, Methodology, Data Curation, Formal analysis, writing – original draft and review. **Christopher Jones:** Methodology and review of methodology. **Andrew Fox:** Supervision, writing – reviewing and editing. **Alexandre Copello:** Supervision, writing – reviewing and editing. **Natalie Jones:** Data Quality review. **Richard Meiser-Stedman:** Conceptualisation, writing – reviewing and editing.

## Conflict of interest

We have no conflicts of interest to disclose. The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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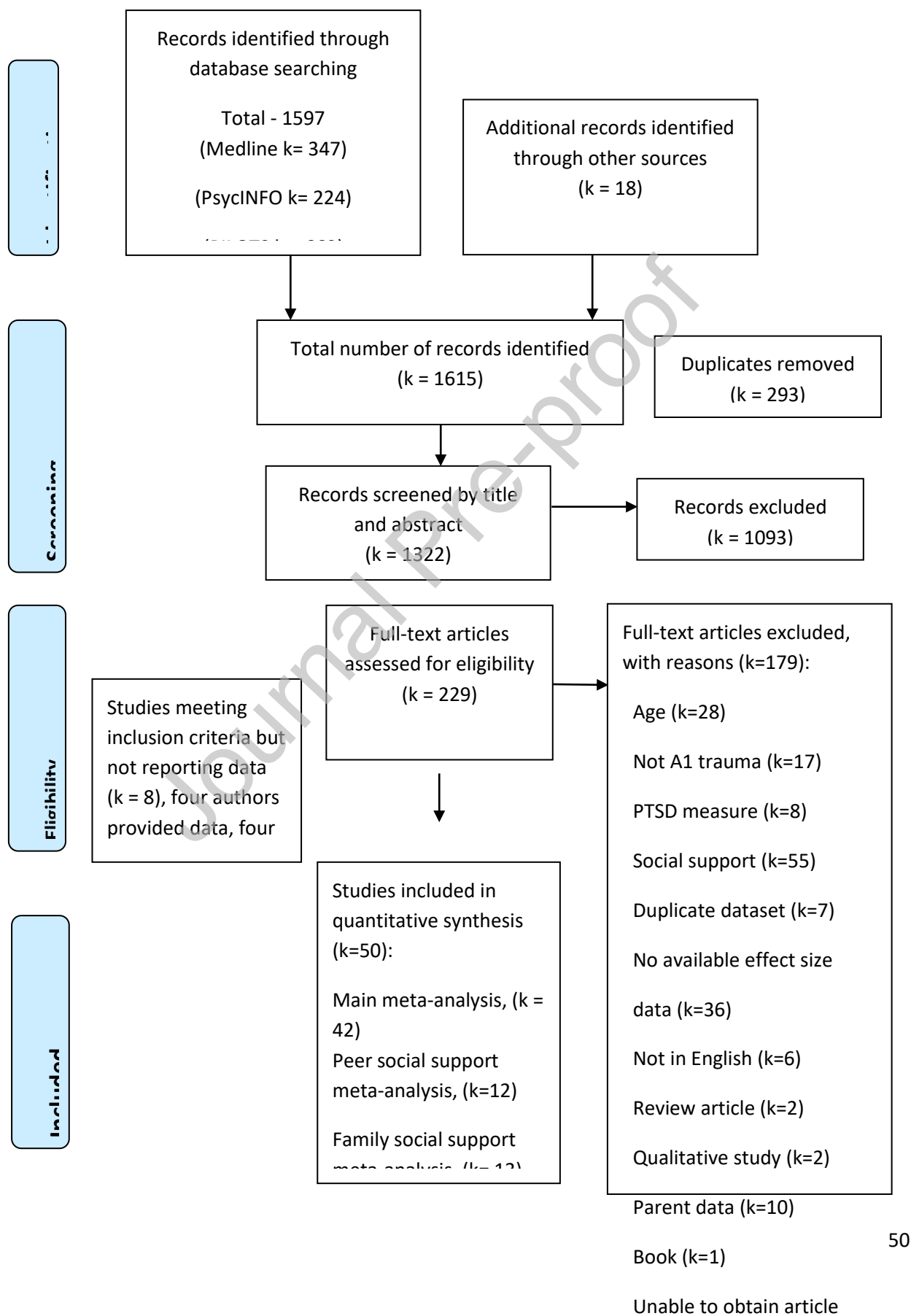
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## Figures

Figure 1

PRISMA Flow Diagram outlining results from the study selection process



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Figure 2

Forest Plot of the Omnibus Test for the correlation between social support and PTSD

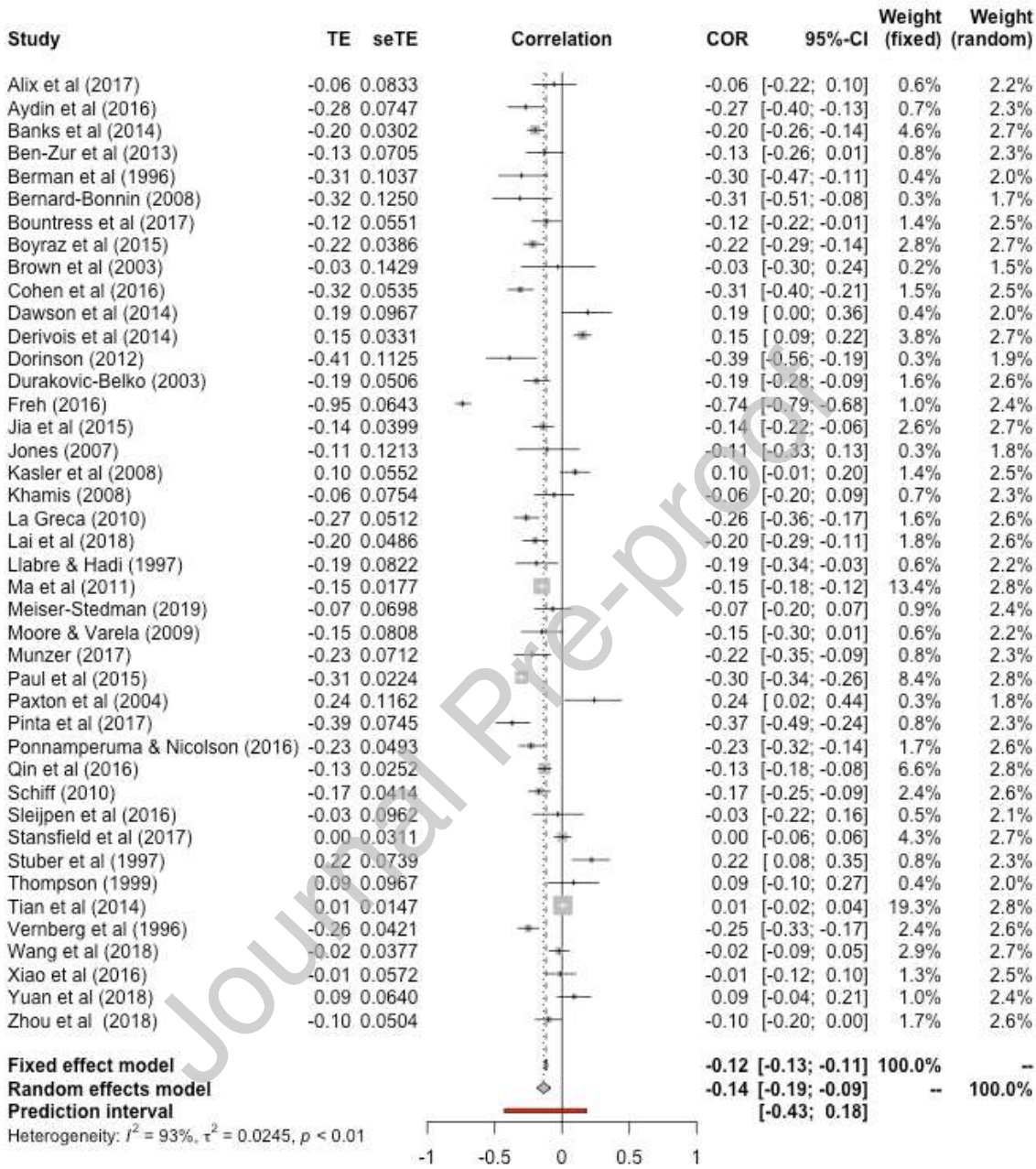
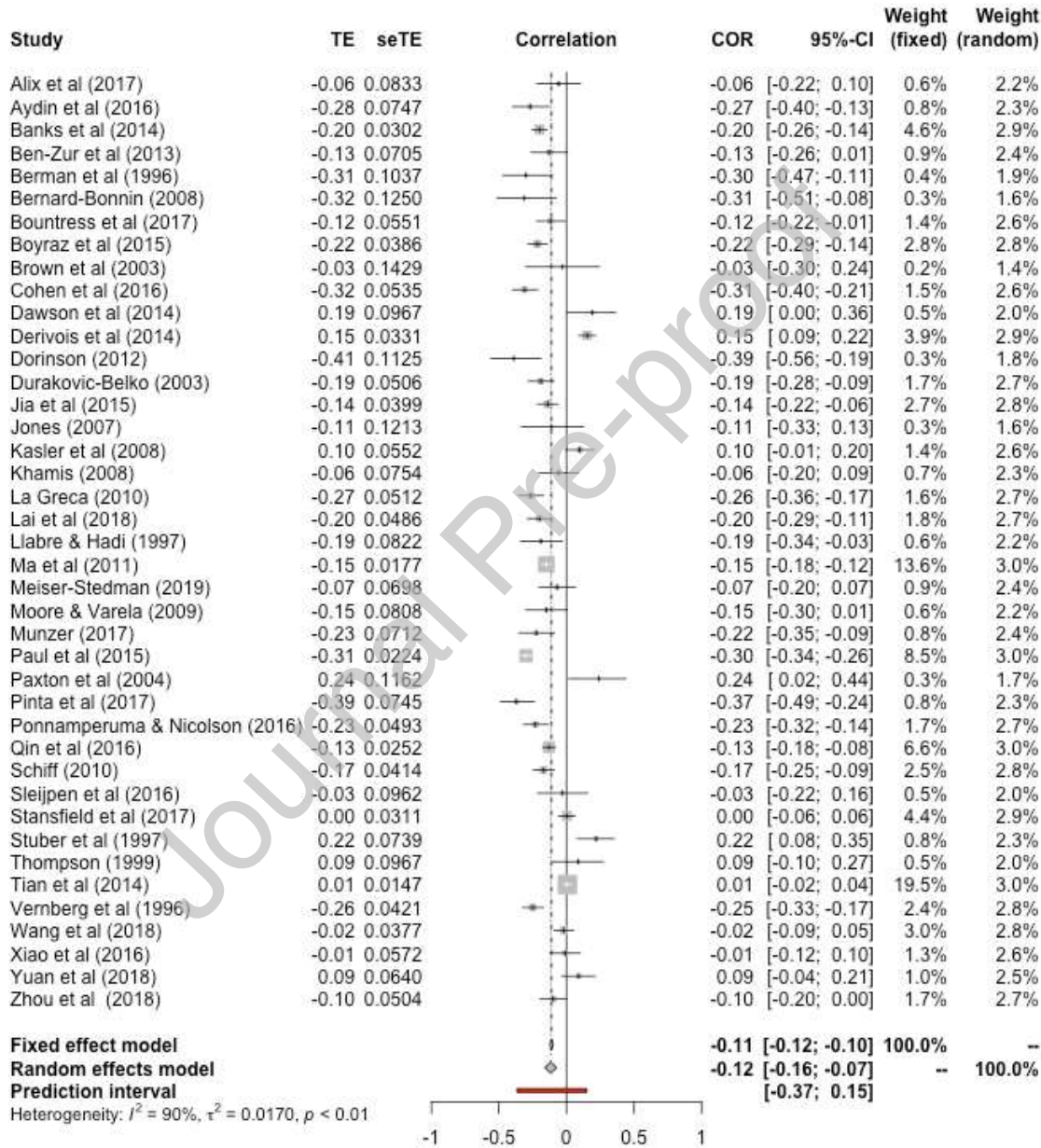


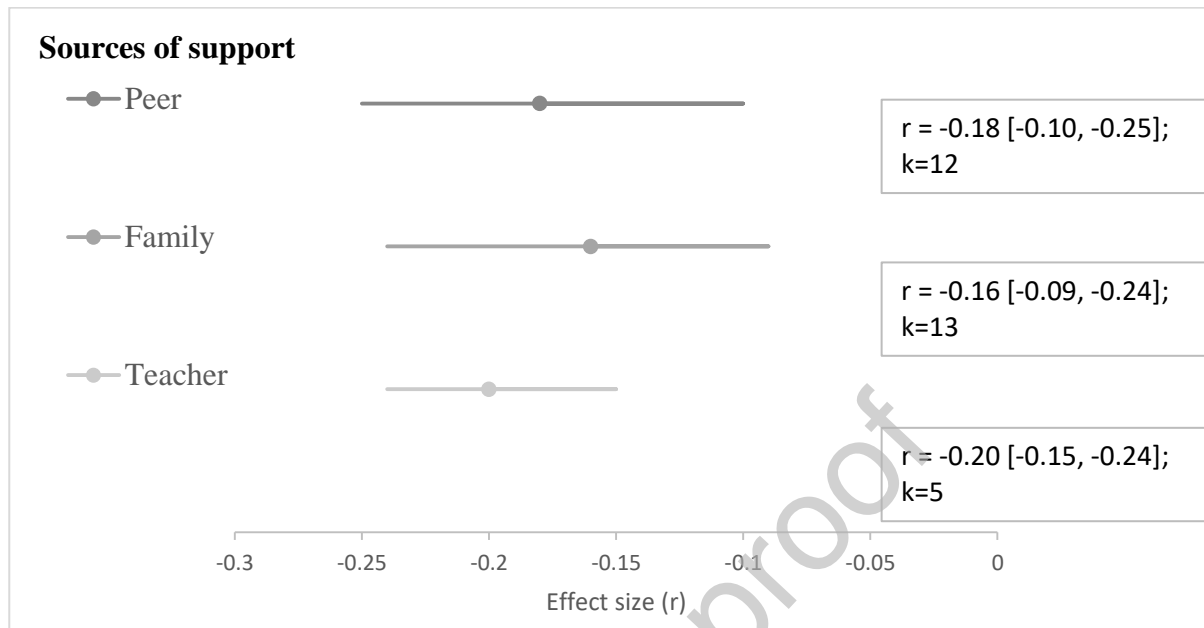
Figure 3

Omnibus test with Freh (2016) study omitted from analysis



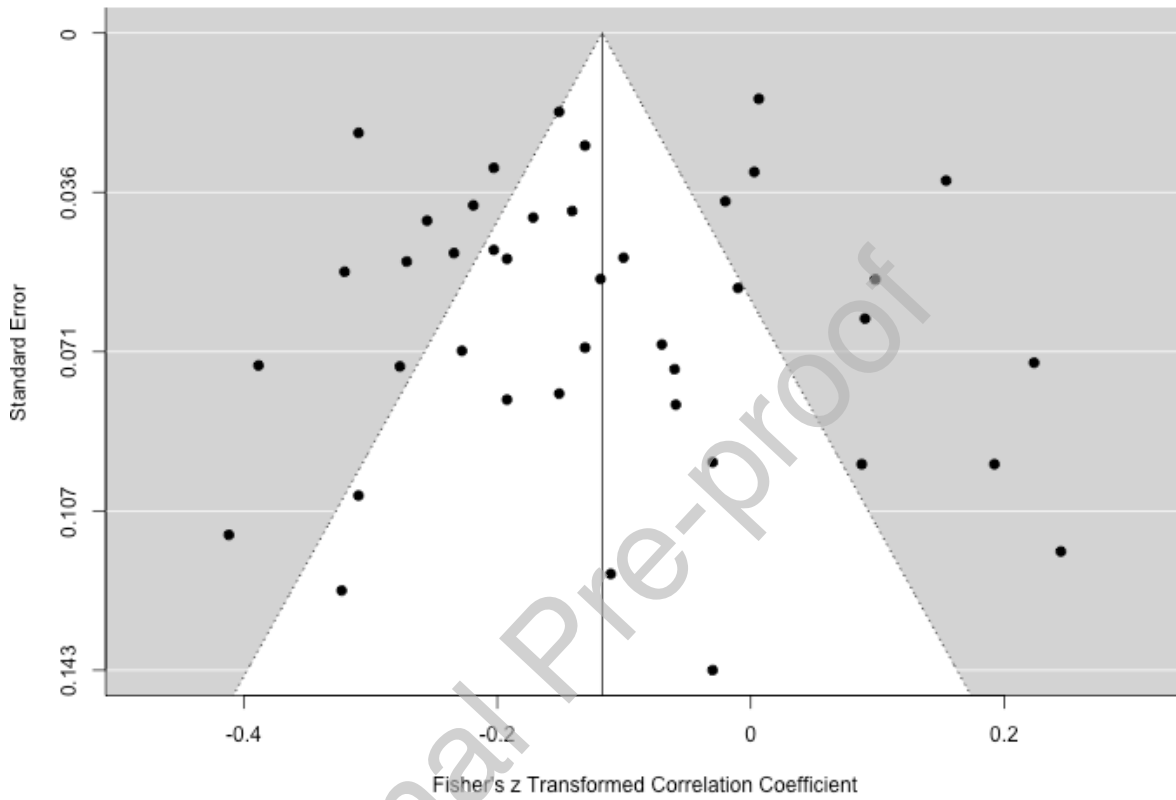
**Figure 4**

Forest plot showing the effect size between PTSD and three sources of social support: peer, family and teacher



**Figure 5**

*Funnel plot showing the standard error by Fisher's Z for overall effect size showing the symmetry of the data in relation to publication bias*





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## Tables

**Table 1**

*Overview of included studies*

Authors	N	Age range	Gender (%Female)	Country of origin	Trauma type	Single or multiple trauma	IPV, non IPV, mixed	PTSD measure	Time PTSD measure taken after trauma	Social
Al-Krenawi et al (2009)	892	14-18years old	NR	Israel and Palestine	War	Unknown	Mixed	PSS (Foa et al., 1993)	NR	Index 1982)
Alix et al (2017)	147	14-18years old	100%	Canada	Abuse	Mixed	IPV	Children's Impact of Traumatic Events Scale II (Wolfe, 2002)	NR	Ways subsc
Aydin et al (2016)	182	6-18 years old	87.40%	Turkey	Abuse	Mixed	IPV	Child Post-traumatic Stress Reaction Index (PTSD-RI, Pynoos et al)	9.5 months	Perce Revisi
Banks et al (2014)	1098	7-18 years old	53%	USA	Hurricane	Single	Non IPV	PTSD-RI (Frederick, Pynoos & Nadar, 1992)	36-65 months	SOCS:
Ben-Zur et al (2013)	204	13-19	59%	Israel	War	Unknown	Non IPV	PSS-SR (Foa et al, 1993)	NR	MSPS 1991)
Berman et al (1996)	96	14-18	42%	USA	Community violence	Unknown	IPV	PTSD-RI (Frederick, 1985)	NR	ASSIS 1987)

Authors	N	Age range	Gender (%Female)	Country of origin	Trauma type	Single or multiple trauma	IPV, non IPV, mixed	PTSD measure	Time PTSD measure taken after trauma	Social
Bernard-Bonnin (2008)	67	7-12 years old	100%	Canada	Sexual abuse	Mixed	IPV	CRIES-R (Wolfe, 1996)	3 months	Social
Bokszczanin (2008)	503	NR	60%	Poland	Flood	Single	Non IPV	Revised Version Mississippi PTSD Scale (Norris & Perilla, 1996)	28 months	Parer (1998)
Bountress et al (2017)	332	12-17 years old	51%	USA	Tornado	Single	Non IPV	PTSD Module - National Survey on Adolescents (NSA-R, Kilpatrick et al, 2000)	1 year	SOCS
Boyras et al (2015)	673	Not reported		USA	Mixed	Mixed	Mixed	PTSD Checklist (PCL-C, Weathers et al, 1993)	NR	Social & Rus
Brown et al (2003)	52	12-23 years old	55.70%	USA	Cancer	Single	Non IPV	PTSD-RI (Pynoos et al., 1987)	1 year +	Perce (Proci
Cohen et al (2016)	352	12-17 years old	55.40%	USA	Tornado	Single	Non IPV	NSA-R (Resnick et al., 1993)	8 months	Social (SSAS
Dawson et al (2014)	110	7-13 years old	59.00%	Indonesia	Tsunami	Single	Non IPV	CRIES-13 (Smith 2003)	5 years	Social (SSSC
Derivois et al (2014)	917	10-23 years old	58.23%	Caribbean	Earthquake	Multiple	Non IPV	PCL-C (Weathers et al., 1993)	12 months	Social 6, Sar

Authors	N	Age range	Gender (%Female)	Country of origin	Trauma type	Single or multiple trauma	IPV, non IPV, mixed	PTSD measure	Time PTSD measure taken after trauma	Social
Dorinson (2012)	82	17-19 years old	62.65%	USA	Terrorist attack	Single	Non IPV	PSS-SR (Foa et al, 1993)	4 years	Social Weiss
Durakovic-Belko et al (2003)	393	Not reported	48.60%	Bosnia	War	Unknown	Mixed	PTSRQ (Kuterovac et al., 1993)	1 year	SOCS:
Freh (2016)	245	12-23 years old	46.40%	Iraq	War	Unknown	Mixed	PSS (Foa, 1995)	NR	Crisis & Bro
Guerra et al (2018)	106	12-17 years old	100.00%	Chile	Sexual abuse	Mixed	IPV	PSS (Foa et al., 2001)	Mixed	MSPS
Jia et al (2015)	631	Not reported	61.80%	China	Hurricane	Single	Non IPV	CPSS (Foa et al, 2001)	NR	SS Ba Relati Burrn
Jones (2007)	71	9-11 years old	56%	USA	Community violence	Multiple	IPV	Angie/Andy Cartoon Trauma Scales (Praver, 1996)	NR	Kinsh (Taylc
Kasler et al (2008)	331	9-11 years old	51%	Israel	War	Unknown	Non IPV	PTSD-RI (Nader, 1997)	7 months	MSPS
Khamis (2008)	179	12-18 years old	0%	Palestine	War	Single	Non IPV	Clinical interview	1-27 months	Parer 2000)
La Greca (2010)	384	7-10 years old	54%	USA	Hurricane	Single	Non IPV	PTSD-RI (Pynoos et al., 1998)	9 months	Surve (SOCS

Authors	N	Age range	Gender (%Female)	Country of origin	Trauma type	Single or multiple trauma	IPV, non IPV, mixed	PTSD measure	Time PTSD measure taken after trauma	Social
Lai et al (2018)	426	8-16 years olds	55%	USA	Hurricane	Single	Non IPV	PTSD-RI (Pynoos et al., 1998)	3-7 months	Social (SSSC)
Llabre & Hadi (1997)	151	9-13 years old	NR	Israel	War	Unknown	IPV	PTSDI (Davidson et al., 1990)	2 years	Social study
Ma et al (2011)	3208	12-18 years old	52.10%	China	Earthquake	Single	Non IPV	CRIES-13 (Smith 2003)	6 months	Social
McQuaid (2005)	79	8-18 years old	43%	USA	Terrorist attack	Single	Non IPV	CPSS-PTSD (Foa et al., 2001)	6 months	Surve (SOC)
Meiser-Stedman (2019)	208	8-17 years old	42.50%	UK	Mixed	Single	Mixed	CPSS-PTSD (Foa et al., 2001)	2 months	MSPS
Moore & Varela (2009)	156	9-14 years old	47%	USA	Hurricane	Single	Non IPV	PTSD-RI	32-33 months	Social (SSSC)
Morley & Kohrt (2013)	142	11 - 18 years old	52.80%	Nepal	War	Multiple	Mixed	CPSS-1 (Foa et al., 1997)	NR	Reint (Kohr)
Munzer (2017)	200	8-17 years old	44.50%	German	Abuse	Mixed	IPV	PTSD-RI (Pynoos et al., 1988)	NR	MSPS
Paul et al (2015)	2000	Not reported	50.90%	USA	Tornado	Single	Non IPV	NSA (Kilpatrick et al., 2003)	8 months	Social (SSAS)
Paxton et al	77	13-16 years	0%	USA	Community	Unknown	IPV	Checklist of Post-Traumatic Stress	NR	Social

Authors	N	Age range	Gender (%Female)	Country of origin	Trauma type	Single or multiple trauma	IPV, non IPV, mixed	PTSD measure	Time PTSD measure taken after trauma	Social
(2004)		old			violence			Symptoms (Richters & Martinez, 1990)		1982]
Pinto et al (2017)	183	13-17 years old	51.40%	Portugal	Abuse	Unknown	IPV	Child PTSD Symptom Scale (CPSS-V, Gillihan et al., 2012)	NR	Scale Suppt (ESSS)
Ponnamperuma & Nicolson (2016)	414	12-16 years	54.30%	Sri Lanka	Tsunami	Mixed	Non IPV	UCLA PTSD-RI (Steinberg et al., 2004)	3 years	MSPS
Qin et al (2016)	1573	7th-10th grade	54.20%	China	Earthquake	Single	Non IPV	PTSD-SS (Liu et al., 1988)	6 months	Social 1994)
Rosario et al (2008)	667	11-14 years old	49.70%	USA	Community violence	Unknown	IPV	Interview - DICA-R	NR	Inven Attac 1987)
Schiff (2010)	587	Not reported	37.90%	Israel	Terrorism	Unknown	IPV	UCLA PTSD-RI (Rodriguez, Pynoos & Steinberg, 1999)	4 years	MSPS
Sleijpen et al (2016)	111	12-17years old	51%	Netherlands	Forced flight	Mixed	Mixed	CRIES-13 (Smith 2003)	3 years	MSPS
Stansfeld et al	1034	13-19 years	53.90%	South Africa	Violence	Unknown	IPV	Harvard Trauma Questionnaire	NR	MSPS

Authors	N	Age range	Gender (%Female)	Country of origin	Trauma type	Single or multiple trauma	IPV, non IPV, mixed	PTSD measure	Time PTSD measure taken after trauma	Social
(2017)		old						(Ward et al., 2004)		
Stuber et al (1997)	186	8-20years old	50%	USA	Cancer	Single	Non IPV	PTSD-RI (Pynoos et al., 1987)	5.5 years	Social (1982)
Tang et al (2010)	271	12-18 years old	54.60%	Taiwan	Typhoon	Single	Non IPV	Mini-KIDS	3 months	Famil
Thabet et al (2009)	412	12-16 years	51.50%	Israel	War	Mixed	Mixed	Interview - SCID	NR	PPSS
Thompson (1999)	110	11-13 years old	52.70%	USA	Violence	Unknown	IPV	PTSD-RI (Pynoos et al., 1987)	NR	SOCS:
Tian et al (2014)	4604	12-19 years old	43.20%	China	Earthquake	Single	Non IPV	PTSD Checklist (Weathers, 2013)	3 years	SS-A (
Vernberg et al (1996)	568	8-11 years old	55%	USA	Hurricane	Single	Non IPV	PTSD-RI (Frederick, Pynoos & Nadar, 1992)	3 months	Social (SSSC
Wang et al (2018)	706	11-18 years old	53.80%	China	Earthquake	Single	Non IPV	PTSD Checklist (Weathers, 2013)	3.5 years	Social (1999)

Authors	N	Age range	Gender (%Female)	Country of origin	Trauma type	Single or multiple trauma	IPV, non IPV, mixed	PTSD measure	Time PTSD measure taken after trauma	Social
Xiao et al (2016)	309	12-18 years old	53%	China	Earthquake	Single	Non IPV	Child PTSD Symptom Scale (CPSS-V, Foa et al., 2001)	6 months	Social
Yuan et al (2018)	247	Not reported	59.50%	China	Tornado	Single	Non IPV	Child PTSD Symptom Scale (CPSS-V, Foa et al., 2001)	3 months	Netw
Zhou et al (2018)	397	13-20years old	61%	China	Earthquake	Single	Non IPV	PTSD Checklist (Weathers, 2013)	2.5 years	Social

Key: **IPV** Interpersonal Violence, **Non IPV** Non Interpersonal Violence, **NR** Not Reported



Table 2

*Subgroup analysis for total social support scale only*

Covariate	Number of Studies	r	Lower confidence level	Upper confidence level	Q	Heterogeneity	P
<b>Age Group</b>							
Up to 13 years old	15	-0.12	-0.19	-0.05	0.06	83.9%	0.80
14 years old and over	26	-0.11	-0.17	-0.06		91.9%	
<b>Gender</b>							
All female sample	3	-0.20	-0.36	-0.04	2.89	59.0%	0.23
All male sample	2	0.07	-0.21	0.36		79.3%	
Combined sample	36	-0.12	-0.16	-0.07		91.1%	
<b>Number of traumatic events</b>							
Single event	22	-0.12	-0.17	-0.06	0.10	91.7%	0.75
Mixed or multiple	17	-0.09	-0.12	-0.06		88.5%	
<b>Type of trauma</b>							
IPV	12	-0.15	-0.24	-0.05	0.61	81.2%	0.4356
Non IPV	25	-0.10	-0.16	-0.04		92.9%	
<b>Specific trauma type</b>							
Abuse	5	-0.25	-0.35	-0.14	7.51	56.8%	0.01
Community Violence	5	-0.02	-0.16	0.13		73.3%	
<b>Type of PTSD measure</b>							
Interview	2	-0.19	-0.41	0.05	0.43	90.1%	0.51
Self-report	39	-0.11	-0.15	-0.07		88.3%	
<b>Time trauma symptoms measured</b>							
1-6 months	4	-0.13	-0.31	0.06	0.83	87.3%	0.6613
6 months – 3 years	14	-0.13	-0.21	-0.06		92.9%	
3 years and over	10	-0.08	-0.17	0.01		90.6%	
<b>Type of analysis</b>							
Reported (raw data)	35	-0.14	-0.19	-0.10	9.99	87.4%	0.0016
Derived (transformed)	6	0.012	-0.07	0.09		83.9%	
<b>Type of social support measure</b>							
Perceived	31	-0.12	-0.18	-0.06	0.03	90.6%	0.8526
Social Network/Enacted	4	-0.11	-0.26	0.05		78.5%	