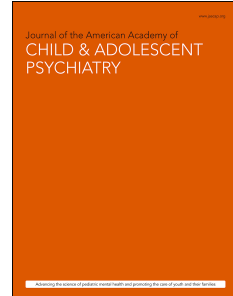


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Meta-analytic Review: Group-Based Interventions for Treating Posttraumatic Stress Symptoms in Children and Adolescent

Rebecca S. Davis, DEdPsy, Richard Meiser-Stedman, PhD, DClinPsy, Nimrah Afzal, MSc, John Devaney, PhD, MSW, Sarah L. Halligan, DPhil, Katie Lofthouse, BA, Patrick Smith, PhD, Paul Stallard, PhD, Siyan Ye, MSc, Rachel M. Hiller, PhD

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Meta-analytic Review: Group-Based Interventions for Treating Posttraumatic Stress
Symptoms in Children and Adolescent
RH = Meta-analysis of Group Tx for Child PTSD

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Supplemental Material
Editorial

Accepted March 13, 2023

Dr. Davis, Mss. Afzal and Ye, and Profs. Halligan and Stallard are with the University of Bath, United Kingdom. Prof. Halligan is also with the University of Cape Town, South Africa. Prof. Meiser-Stedman and Ms. Lofthouse are with University of East Anglia, Norwich, United Kingdom. Prof. Devaney is with the School of Social and Political Science, University of Edinburgh, United Kingdom. Dr. Smith is with the Institute of Psychiatry, Psychology & Neuroscience, King's College London, United Kingdom. Dr. Hiller is with the Division of Psychology and Language Sciences, University College London, United Kingdom, and Anna Freud National Centre for Children & Families, United Kingdom.

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This work has been prospectively registered:
https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=187214.

Prof. Meiser-Stedman served as the statistical expert for this research.

Author Contributions

RSD, RMH, RMS, SLH, JD, PSm, and PSt conceived and designed the study. RSD, NA, and SY conducted the systematic search and article screening and extracted the data. RSD and KL accessed and verified the underlying data reported in the manuscript. RMS analysed the data. RSD and RMH wrote the first draft of the manuscript. All authors contributed to critical revisions of the manuscript. All authors had full access to all the data in the study. RSD and RMS take responsibility for the integrity and accuracy of data analysis and RSD and RMH were responsible for the final decision to submit for publication.

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ABSTRACT

Objective: Trauma exposure in childhood is common and can lead to a range of negative mental health outcomes, including posttraumatic stress disorder (PTSD). In many settings, resources to address this distress are scarce. Group-based interventions require minimal resources and training, can be delivered by non-mental health specialists, and target larger numbers of young people. Our meta-analysis sought to establish whether such an approach is an effective method for targeting PTSD symptoms, and to identify potential moderators of effectiveness.

Method: We searched PubMed, PsycNET and PTSDPubs for randomised controlled trials (RCTs) which used a group-based PTSD intervention, with children aged 6-18 years. Data were extracted for PTSD symptoms and depression symptoms. We conducted a random effects meta-analysis to obtain between group pooled effect size estimates. This study was registered on PROSPERO (CRD42020187214).

Results: The initial search identified 9,650 studies, of which 42 were eligible for inclusion (N=5,998). Children randomised to a group-based intervention had significantly lower PTSD symptoms post-treatment compared to control, with a medium pooled effect ($g=-0.55$, CI -0.76, -0.35). Group interventions were superior when compared to either active or passive controls; at follow-up; and for depression symptoms. There was a large amount of heterogeneity, but no evidence that this was explained by whether the intervention was delivered in a low-to-middle income or high-income country, included caregivers, or was universal or targeted.

Conclusion: Group PTSD interventions, particularly CBT-based, are effective at targeting children's post-trauma distress. There was evidence of effectiveness when delivered in highly complex and resource-scarce settings and to a range of trauma-exposed groups, including those exposed to war/conflict, natural disasters, and abuse.

Key words: PTSD; trauma; children; treatment; group.

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INTRODUCTION

Epidemiological studies have shown that trauma exposure is common in childhood, with prevalence estimates ranging from 30-70%.^{1,2} Trauma exposure spans a wide range of experiences, including accidental injury (e.g., motor vehicle accidents), witnessing violence, assault or maltreatment, natural disasters, and war or conflict. There is robust evidence demonstrating the detrimental effect that childhood trauma exposure can have on psychosocial outcomes across the lifespan.³⁻⁵ One such outcome is posttraumatic stress disorder (PTSD) - a trauma-specific mental health condition. Symptoms include re-experiencing (e.g., flashbacks, nightmares), avoidance (avoiding thoughts, places, people, or things that might remind the person of their trauma), changes in arousal (e.g., difficulty concentrating or sleeping), and altered mood or cognition (a symptom requirement in the Diagnostic and Statistical Manual of Mental Disorders 5th ed.; DSM-5).⁶ Meta-analytic reviews estimate that one in six trauma-exposed children, and up to one in four children exposed to interpersonal trauma, will go on to develop PTSD.⁷ If left unaddressed, both PTSD and partial or subthreshold PTSD are associated with a range of negative outcomes, including the development of comorbid mental health difficulties,¹ substance abuse,⁸ and self-harm.⁹

The best-evidenced treatment for PTSD is individual trauma-focused cognitive behavioural therapy (tf-CBT).^{10,11} These treatment programmes typically last between 10 and 20 sessions but may be longer in complex cases.¹² However, when considering the large proportion of children worldwide exposed to trauma and that corresponding rates of PTSD are particularly high for children in low-resources settings,¹³ there has been increased attention on how effective treatments can be delivered at scale. One way to do this is through group treatments, which by definition allow the intervention to be simultaneously delivered to a larger number of children. This mode of delivery is seen as particularly useful in the

aftermath of large-scale traumas, such as natural disasters or war/conflict, and in lower- and middle-income countries where resources can be particularly limited.¹⁴⁻¹⁶ Yet, even in the context of high-income countries, mental health services are often not resourced to meet the needs of the large numbers of children who may require mental health support post-trauma.¹⁷ Besides enabling a larger number of children to access support, when compared to individual evidence-based interventions (e.g., tf-CBT), group treatments often require less training for facilitators (or on the job training through the role of co-facilitator), and can be delivered by non-mental health professionals.¹⁸

However, the effectiveness of group interventions in reducing child PTSD symptoms is not clear. In 2016, Gutermann et al.¹⁹ completed a comprehensive review of treatments for PTSD in children, adolescents, and young adults, which included 66 studies of group programmes. While they found a medium effect size for reductions in pre- to post-intervention PTSD symptoms for group interventions, many studies were uncontrolled, or controlled but without randomisation. Given natural recovery is common following trauma exposure,²⁰ randomised controlled trials (RCTs), particularly those which include a passive comparison group, provide necessary evidence for the specific effectiveness of the intervention. Other reviews and meta-analyses have also provided initial evidence that group interventions may be effective, but also include uncontrolled or non-randomised designs, focus solely on particular traumas,^{21,22,23} or only focus on specific settings (e.g., school-based²⁴), limiting the generalisability of findings. In the adult literature, meta-analytic reviews show that group psychotherapy for PTSD is efficacious when compared to passive controls, but that there is no significant difference in outcomes when compared to active controls.^{25,26}

To address these issues, we conducted a meta-analytic review focused exclusively on group-based PTSD-focused interventions for trauma-exposed children and teens. The review

focuses solely on RCTs, to establish the efficacy of group treatments when compared to passive and active control conditions. While our primary focus was on between-group differences in PTSD symptoms, we also explored differences in depression symptoms (as the most common comorbidity with PTSD^{1,27}), as well as evidence of whether between group differences were maintained at longer-term follow-ups. Alongside this, we explored several potential moderators aimed at delineating whether efficacy differed depending on study characteristics. This included type of comparison condition (passive versus active), trauma type (interpersonal vs. non interpersonal), whether the intervention was universal or targeted (i.e., included all trauma-exposed young people or targeted only those with elevated PTSD symptoms), caregiver involvement and whether the study was carried out in a low-middle income country.

METHOD

This meta-analysis was pre-registered on PROSPERO (CRD42020187214) and follows PRISMA reporting guidelines.

Search Strategy

Relevant studies were identified through systematic searches of three electronic databases: PubMed, PsycNET and PTSDPubs. The final search was carried out on 28th June 2021. The search strategy combined free text and controlled terms relating to PTSD, group-based treatment and children, and adolescents (see Table S1, available online, for the full search terms for each database). The search was restricted to studies published in the English language. To ensure a comprehensive review, we also scanned reference lists of recent reviews and papers identified in the search. See Figure 1 for PRISMA diagram (and Table S2, available online, for PRSIMA checklist). Initially, at the scoping stage we planned to include uncontrolled studies. However, because of the large number of studies available, a

decision was made to focus the review only on those groups tested via RCTs. The revised focus has more clinical utility, given natural recovery in PTSD symptoms following trauma exposure.²⁰

[FIGURE APPROXIMATELY HERE]

Figure 1: PRISMA flow chart outlining the study selection process.

Selection Criteria

Inclusion criteria were as follows.

Population: Mean participant age between 6 and 18 years old and majority of sample ($\geq 50\%$) exposed to a Criterion A trauma (as per DSM-5 PTSD criteria). Studies were included if the sample spanned up to 19 years old, but mean participant age was between 6 and 18 years.

Intervention: Utilised a group-based psychological intervention, which targeted a reduction in PTSD symptoms. “Group” meant the intervention was delivered to two or more participants concurrently (excluding where the group were all family members). Where interventions also had an individual delivery component, this had to be $\leq 50\%$ of the overall treatment time.

Comparison: Randomised controlled trial design, with any type of comparison condition (active or passive).

Outcome: A pre- and post-treatment measure of PTSD symptoms, using a validated PTSD measure.

Screening Process

Titles and abstracts were imported into Covidence, and duplicate papers were removed (see Figure 1). The first author (RSD) screened all titles and abstracts with a second reviewer (NA) independently screening a random 10%, with 97% agreement. Full texts were then imported, and all were reviewed independently by two reviewers (RSD and NA),

resulting in 84% agreement. Disagreements were discussed at a consensus meeting with co-authors (SH and RH). For a complete list of all studies excluded at full text screening see Table S3, available online.

Data Extraction

Two authors (RSD and SY) independently extracted descriptive and quantitative data using a customised data extraction template within Covidence. A third reviewer (KL) conducted final quality checks on all data in the final dataset. Data were extracted regarding population, intervention, comparison condition, and outcomes. Where necessary descriptive or quantitative data could not be obtained from the paper (i.e., means and standard deviations), authors were contacted directly. If no reply was received after one month, studies were excluded from the review ($k = 2$).

Symptom measures: Information was extracted regarding the PTSD measure used, informant, type of measure (e.g., interview, symptom checklist), and timepoints at which symptoms were measured. Based on what was consistently available across all studies, PTSD symptoms were extracted from child-report symptom checklists (or combined carer- child-report). A small number of papers also provided carer-report of child PTSD symptoms, but these data were less consistently available and not used here. Using child report also reflects guidance on best practice when assessing internal processes and symptoms, such as PTSD.²⁸ Means and standard deviations (SDs) were extracted for all available timepoints, along with between-group effect sizes, where reported. If follow-up data were reported for more than one timepoint, the last timepoint was used. If more than one PTSD measure was used, data from the identified primary outcome were collected. Where assessed and reported, means and SDs from validated child-report depression symptom measures were also extracted.

Descriptives: Descriptive information for included studies is reported in Table 1). This includes the country the study was conducted (categorised as high income or low-middle

income for moderator analysis); the setting the intervention occurred (e.g., school, community, mental health service); and the type of intervention (e.g., CBT-based, psychoeducation only, creative-based).

Moderators: Based on the information available in papers, we planned to explore the following moderators: (i) trauma type, (ii) universal vs targeted intervention, (iii) low- or middle-income vs high income country; (iv) active vs passive control; (v) whether a caregiver was involved in the intervention; and (vi) CBT-based vs other. The latter was not explored, as the vast majority (90.5%) of groups were CBT-based.

Trauma type was coded based on the categorisation used in the Alisic et al.⁷ meta-analysis. Examples of interpersonal trauma were assault, maltreatment, and war, and examples of non-interpersonal trauma were bereavement and natural disasters.

Interventions were coded as universal if they did not require all children to score above a certain threshold for PTSD severity (i.e., the intervention was delivered on the basis of the trauma-exposure), while targeted interventions were those delivered to children experiencing distress based on their PTSD symptom score.

Caregiver involvement was coded as yes or no, with yes indicating they had some level of involvement in the intervention (see Table 1).

Comparison condition was coded as either active or passive. Passive included waitlist or no treatment conditions, and active included treatment-as-usual (TAU) and specific comparison interventions. Where a study compared two different group-based trauma-focused interventions ($k=1$), the CBT-based intervention was coded as the intervention group, given the superior evidence for trauma-focused CBT interventions (see Table 1). If a study included both a passive and active comparison ($k=1$), data were extracted for the passive comparison condition only (see Table 1). When coding the active comparison conditions,

there were four studies that compared the group intervention to an individual trauma-focused intervention. As we would not expect a group treatment to out-perform an individual trauma-focused intervention,¹⁹ these four studies were grouped separately (active-individual; discussed further in Statistical Analysis section).

Risk of Bias Assessment

Risk of bias for the primary outcome measure was assessed by the lead author (RSD) using the Cochrane Risk-of-Bias tool (RoB 2).²⁹ A second reviewer (KL) independently assessed 30% of included studies (selected at random), with an agreement of 94%. Again, consensus was reached through discussion between the two reviewers.

Statistical Analysis

Analyses were performed using the metafor package,³⁰ in R 4.1.0.³¹ Random effects models were used for each meta-analysis. A Hedges' g statistic was derived for each study. Where means and SDs were not reported by included studies, Cohen's d statistics were extracted and used in the analysis or were derived from other reported statistics. Estimates of heterogeneity were calculated using the Q statistic and the I^2 statistic; for I^2 , statistics greater than 25% indicate "low" heterogeneity, greater than 50% indicate "moderate" heterogeneity, and greater than 75% indicate "high" heterogeneity.³² More negative Hedges' g statistics indicate an effect favouring the experimental condition (i.e., the group-based intervention was superior to the control condition).

For clarity, the between-group differences in PTSD severity are reported by comparison condition (although the overall pooled effect is also reported). This shows the pooled effect for whether a group treatment is better than nothing (i.e., passive comparison; particularly relevant in resource poor contexts and when considering risk of harm); better than another intervention (active comparison); and comparison against an individual trauma-focused intervention. For moderator analysis, we decided prior to analysis to exclude the four

papers that compared a group intervention to an individual trauma-focused intervention, as this reflects a non-inferiority type study. However, for transparency, the moderator analysis using the full sample is provided in Table S4, available online. There were no differences in the pattern of results.

We identified four manualised treatment approaches that had been tested in multiple studies: gold standard manualised trauma-focused CBT (tf-CBT, e.g., Trauma-Focused CBT, Cognitive Processing Therapy), Teaching Recovery Techniques (TRT), Cognitive Behavioural Intervention for Trauma in Schools (CBITS), and Classroom, Community, Culture Based Intervention (CBI). As a secondary analysis, we explore the pooled effectiveness of each, when compared to a passive control (as was most common).

Potential publication bias for the primary outcome measure was assessed through visual inspection of the funnel plot and testing for funnel plot asymmetry. The trim and fill method³³ was used as a further estimate of publication bias. Leave-one-out models were also used as a sensitivity test.

[TABLE APPROXIMATELY HERE]

Table 1: Characteristics of included studies.

RESULTS

Characteristics of Included Studies

The systematic search resulted in 7,962 studies (after duplicates were removed), of which 42 met our pre-defined eligibility criteria and were included in the meta-analysis (see Figure 1). Full study characteristics are presented in Table 1. The 42 studies included a total of 5,998 children and young people. The mean age of participants was 12.4 years (range 6-19

years), and 52.9% were female. Most studies were carried out within schools (k=25), followed by community settings (k=9), mental health services (k=4), social care (k=3), and youth offending settings (k=1). The majority of studies included participants who had been exposed to interpersonal trauma (k=32; 76.2%), of which war was most commonly reported (k=14). Of the nine studies involving participants exposed to non-interpersonal trauma, natural disaster was the most frequently reported (k=7). One study^[34] did not report on trauma type. Most studies implemented a targeted (k=32), rather than universal (k=10) approach.

CBT-based interventions were the most commonly used treatment approach (k=37), two studies used predominately creative approaches^{44,54}, two used psychoeducation only^{41,72}, and one utilised a mind-body skills intervention⁴⁷. Interventions were largely delivered by either mental health professionals (k=14), school staff (k=11), social care professionals (k=7) or adults from the local community (k=4).

The majority of studies compared group treatment with a passive waitlist control group (k=24), with one study using a non-treatment control. Of the 17 studies using an active control, six were TAU, six were a different group intervention, four were individual trauma-focused interventions, and one was a different trauma-focused group intervention.

Most studies used a child, or combined parent-child, report PTSD symptom checklist (k=39), with the remaining three studies using a diagnostic interview (although symptom scores were still reported). All studies had pre- and post- intervention measures, and 12 reported follow-up assessments. Follow-up duration ranged from one month to two years. Twenty-six studies (62%) also investigated the impact of treatment on depression outcomes, using a validated child-report or combined parent-child report depression screening tool.

Risk of Bias

The majority of included studies were assessed as being overall, at some risk of bias (63%), with the rest at high risk. Of the five risk of bias domains, only four studies were at high risk of bias regarding randomisation processes, which largely related to either, investigators not being blind to the forthcoming group allocation or, significant baseline differences between the intervention and control groups. Eight studies were at high risk of bias due to the number of participants excluded from their analyses (e.g., only analysing those who completed the intervention), and nine studies were assessed as high risk due to the amount of missing data which could be related to the outcome variable (i.e. potentially linked to PTSD symptoms). Only one study was judged to be high risk of bias regarding outcome measurements. Full risk of bias assessments are detailed in Table S5, available online.

We investigated risk of bias as a potential moderator and found no differences between studies assessed to be at high or some risk ($Q=0.30$, $df=1$, $p=0.86$).

[FIGURE APPROXIMATELY HERE]

Figure 2: Forest plot of effect sizes comparing group treatment with active and passive control conditions at post-treatment.

Treatment Outcomes – PTSD symptoms

Thirty-eight studies were included in the meta-analysis (with the four studies which utilised an individual psychological intervention as a comparator excluded). Overall, pooled effect sizes showed that children in the group condition had lower PTSD symptoms at post-treatment than those in the comparison condition, with a pooled medium effect size ($g=-0.55$, $CI -0.76, -0.35$) (see Figure 2). Effect sizes ranged from medium to large when the intervention was compared to a passive control ($g=-0.71$, $CI -0.97, -0.45$), and small to

medium when compared to an active control ($g=-0.25$, CI -0.47, -0.03). The heterogeneity for all studies was high ($I^2 = 92\%$), indicating considerable variability between study outcomes.

The pooled effect for the four studies that compared to an individual intervention confirmed that at post-treatment individual psychological treatment leads to lower PTSD symptoms than group therapy ($g=0.69$, CI 0.17, 1.22) (see Figure S1, available online, for forest plot).

Excluding the four studies that compared to individual treatment, 13 of the 38 studies reported follow-up PTSD symptom scores. At follow-up there remained evidence of an overall small effect favouring group treatment over the comparison condition ($g=-0.28$, CI -0.43, -0.12) (see Figure S2, available online, for forest plot). This was comparable for whether the control was passive ($g=-0.31$, CI -0.56, -0.06) or active ($g=-0.27$, CI -0.48, -0.06). There was moderate heterogeneity between studies ($I^2 = 65\%$). Given the variability in follow up duration (ranging from one to twelve months post-treatment), we also looked at whether there was an effect of follow up length on symptom reduction. The effect size, favouring the group treatment, was greater for studies which followed-up after six months or more ($g=-0.33$, CI -0.51, -0.15), compared to those following up after less than five months ($g=-0.20$, CI -0.46, -0.07). However, this is potentially driven by the large difference in sample sizes between the two groups (≥ 6 mo, $n=1808$ vs < 5 mo, $n=797$).

Moderator Analysis

The type of comparison condition (passive versus active) significantly moderated the between group effect on symptom reduction ($Q=4.55$, $df=1$, $p=0.03$). As expected, the effect size was greater for studies which utilised a passive control ($g=-0.71$, CI -0.97, -0.45) over an active control ($g=-0.25$, CI -0.47, -0.03). No significant differences were found for any other moderator, including whether studies were carried out in low or middle-income countries versus high-income countries ($Q=0.22$, $df = 1$, $p=0.64$), whether the intervention was

universal or targeted ($Q=1.18$, $df=1$, $p=0.27$), the type of trauma exposure (interpersonal vs non-interpersonal) ($Q=0.29$, $df=1$, $p=0.59$), or whether caregivers were involved ($Q=0.39$, $df=1$, $p=0.53$) (see Table 2).

We also conducted an additional subgroup analysis in order to further explore type of trauma exposure, by separating the interpersonal trauma group into war-related trauma and non-war related interpersonal trauma (e.g., maltreatment, family violence). No significant difference was found between the three trauma exposure groups (war v maltreatment v non-interpersonal) and treatment outcome. Thus, the overall effect size for interpersonal trauma and the lack of difference between different trauma types, does not seem to be driven by the grouping of interpersonal traumas. Analyses are reported in Table S6, available online.

[TABLE APPROXIMATELY HERE]

Table 2: Pooled effect sizes and moderator analyses for reduction in PTSD symptoms at post-treatment.

Secondary Analysis of Treatment Manuals

When compared to a passive control group, gold standard manualised tf-CBT (e.g., Trauma-Focused CBT, Cognitive Processing Therapy) ($k=3$), TRT ($k=7$) and CBITS ($k=2$) all led to significantly reduced PTSD symptoms post-treatment. There was no significant difference in the pooled effect size for CBI ($k=5$). Data are reported in supplementary materials, along with a brief description of each intervention, see Table S7, available online.

Treatment Outcomes – Depression symptoms

Twenty-six studies also reported on post-treatment depression symptom outcomes (with two using an individual psychological intervention as a comparison group). Pooled effect sizes of the twenty-four studies included in the meta-analysis showed that children in

the group condition had lower depression symptoms at post-treatment than those in the comparison group, with a small effect size ($g=-0.30$, CI -0.48, -0.12) (see Figures S3 and S4, available online, for forest plots). Effect sizes were larger when compared with a passive ($g=-0.35$, CI -0.59, -0.11) versus active ($g=-0.17$, CI -0.45, 0.11) control. The heterogeneity for all studies was large ($I^2= 82\%$).

At follow up ($k=11$), there was no pooled effect of group treatment ($g=-0.11$, CI -0.25, -0.02) on depression symptoms when compared with all comparison conditions (see Figure S5, available online, for forest plot).

Publication Bias/ Sensitivity Analysis

Visual inspection of the funnel plot for post-treatment PTSD outcomes (Figure 3) provided some evidence of asymmetry, although there was no evidence of a significant publication bias on further testing ($p=0.062$). Additional leave-one-out sensitivity analysis indicated that no one study was driving the overall effect size when compared with other studies. Furthermore, trim and fill analysis did not impute any added studies.

[FIGURE APPROXIMATELY HERE]

Figure 3: Funnel plot for group-based treatment versus control at post-treatment.

DISCUSSION

This meta-analysis sought to delineate the effectiveness of group-based treatments for child PTSD symptoms. Given the large proportion of young people exposed to trauma before their 18th birthday, and that young people in low-resource contexts (whether family, community, or country-level) are at particularly high risk of cumulative trauma exposure, group treatment provides a potential avenue for addressing trauma-related mental health on a larger scale. Our meta-analysis, focused exclusively on RCTs, found good evidence for the

effectiveness of group trauma-focused interventions for improving mental health outcomes for trauma-exposed young people.

Whilst we confirmed findings that individual trauma-focused interventions are superior to a group format,^{10,11,73} in contexts where this is not feasible or available, group programmes may offer a valuable alternative for treating PTSD symptoms, with further potential gains for depression symptoms. The pooled post-treatment between group effect of the group interventions, compared with passive controls, was similar to that found in meta-analyses of the adult literature.^{25,26} Additionally, and in contrast with the adult literature, we also found a statistically significant if small effect size when group intervention was compared with an active control. We also found that the superiority of the group intervention was maintained at follow-up. Although the effect size was small at follow-up, this did capture follow-ups ranging from one-month post-treatment to 2-years post-treatment. Beyond PTSD symptoms, we also found small post-treatment effects for depression.

The vast majority of interventions included in this meta-analysis were CBT-based, the recommended treatment for PTSD.^{11,74} A manualised trauma-focused CBT delivered in a group (~12 sessions, including some individual sessions), TRT (~5 sessions), and CBITS (~10 sessions, including some individual sessions) were all found to be effective compared to passive controls, in our sub-analysis on specific manualised treatments. In many cases, these interventions were being delivered in highly complex settings, in sectors including schools, mental health services, and NGOs, and with young people who had experienced multiple complex traumas (e.g., former child soldiers, incarcerated youth, war exposure, sexual abuse). They were also often delivered by non-clinical professionals with limited training and using translated versions of the manual. That these interventions were effective in such contexts, provides further support for the real-world scalability of group delivered

programmes. Of note, at the time of the systematic search we found no eligible studies that used EMDR, so are unable to draw conclusions on this particular approach in a group format.

As is common in meta-analyses of psychological treatments, there was substantial heterogeneity between studies. Our moderator analysis largely failed to identify reasons for this and further work is needed to understand exactly what factors help or hinder the delivery of group treatments to trauma-exposed young people. We found no differences in effectiveness for children exposed to non-interpersonal (e.g., natural disasters) and interpersonal (e.g., war) traumas, which is in line with findings reported by other meta-analyses.¹⁹ Similarly, there was no significant difference in effectiveness when delivered in high income countries versus low- or middle-income countries, a moderator which has been largely unexplored in the literature to date. The finding that group-based interventions are no less effective across different countries with considerably different therapeutic resources has important clinical implications, including being readily able to implement and requiring only limited specialist mental health training and resources.

There was also no difference in effectiveness if the intervention was delivered universally (based on trauma-exposure) or targeted (based on presence of symptoms). Similarly, other meta-analyses have reported that treatment effects are not moderated by percentage of children with a PTSD diagnosis pre-intervention,⁷³ or whether children have a full diagnosis versus subthreshold PTSD.¹⁹ In many contexts, screening for diagnosis or symptom severity may not be practical or possible. In such cases, where there is expected high rates of community distress, it is likely that delivery of a manualised CBT-based group intervention to all the exposed population would support greater psychological recovery.

Lastly, we found no evidence that caregiver involvement in the intervention moderated treatment effects. This finding adds to the mixed picture from previous treatment focused meta-analyses in which many report improved outcomes when caregivers are

involved,^{19, 21} whilst others report little difference in outcomes.⁷³ Here, it may be that the group context, where peer support is an inherent part, means the involvement of a caregiver is less essential. It may also be that the caregiver component is less necessary for universal interventions or where PTSD symptoms are subsyndromal. Further research is needed to understand the mechanisms of change in these group interventions, and what role caregivers may play in supporting children through interventions.

The primary limitations of this review relate to the limitations of the included studies. As reflected in the risk of bias assessments, the majority of studies were either at some or high risk of bias. Despite finding no impact of increased risk of bias on PTSD outcomes in our moderator analysis, it is important to recognise that the increased levels of bias across all studies may have impacted them similarly. Some studies had very small sample sizes, as shown in Table 1. Relatedly, while there was no evidence of significant publication bias, plot inspection showed some asymmetry, which visual inspection showed may be driven by studies with smaller samples generally having greater effect sizes. Further, even with randomisation, a minority of studies had significantly different levels of PTSD symptoms between groups at baseline.^{16,38} This can make it challenging to draw conclusions from the post-treatment between group effect. That said, this issue was rare and a focus on pre- to post-treatment change would have been less robust, given the potential for natural recovery in trauma-exposed samples. Follow-up data were also only provided in a third of included studies with large variance in the length of follow up time. Overall, the field would benefit from further larger-scale RCT evaluations, particularly with longer-term follow-ups, although this type of work can be challenging in the highly complex settings where many of these studies were conducted.

It is also important to highlight that for some of our moderator analyses, the distribution of studies was skewed in the direction of one alternative (e.g., trauma type and

universal vs targeted intervention). It cannot be ruled out that the lack of significant difference between the two groups is due to sample size differences, rather than a true effect of the intervention. A further potential methodological limitation is that inter-rater agreement was only established on 10% of abstracts in the very first step of screening. That said, this was a first step highly conservative screen to exclude papers that clearly were not relevant (e.g., papers on adults) and agreement was 97%. Lastly, consistent with the wider psychotherapy literature, we chose to categorise our control groups as either passive or active, i.e., the participants received no other treatment (usually a waitlist condition), or they received TAU or another intervention. Whilst we recognise there is some debate regarding the use of waitlist control groups and suggestion that they might inflate effect sizes,^{75,76} we chose to include this type of control as understanding whether an intervention is better than no treatment, particularly a low-intensity intervention, was felt to have the most clinical and translatable value. This is particularly the case within the context of poor mental health resourcing. It is also important to note that we included TAU within our active comparator group, however, studies' descriptions of this condition reflect considerable diversity in the amount or type of intervention received and consequently it is likely this contributed to heterogeneity across studies.

Overall, findings from this meta-analysis provide support for the use of group (particularly CBT-based) interventions for treating PTSD symptoms in trauma-exposed children and young people, with potential for related reductions in depression symptoms. This has important implications for contexts in which group programmes may be the most or only viable option, including communities exposed to conflict or natural disaster, through to poorly resourced services. While individual tf-CBT remains the best-evidenced treatment for child PTSD, our meta-analysis demonstrates that group programmes are also a valuable therapeutic resource.

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Table 1: Characteristics of Included Studies

Study	Location	Setting	Sample size	Age range in years (mean)	% Female	Ethnicity (%)	Trauma type	Type of intervention	Control	Follow up period	PTSD symptom measure	Depression symptom measure
Ahmadi et al. (2020) ³⁴	USA	Mental health service	11	10-15 (11)	55	NR	NR	Tf-CBT (12 sessions) 4 caregiver sessions (joint)	RFPP (12 group sessions, 75 mins, 12 individual sessions, 10 mins) 4 caregiver sessions (joint)	12-mo ^a	CAPS-CA (self-report, interview)	-
Ahrens and Rexford (2002) ³⁵	USA	Youth offending	38	15-18 (16.4)	0	African American (26.3), Caucasian (60.5), Hispanic (5.3), Native American (5.3), Other (2.6)	Various (including violence)	CPT (8 sessions, 60 mins)	WL	-	PSS-SR (self-report), IES (self-report)	BDI (self-report)
Auslander et al. (2017) ³⁶	USA	Outpatient mental health service	27	12-18 (14.7)	100	White (22), Black (46), Other/Mixed Ethnicity (33)	Maltreatment	GAIN (adapted-CBITS) (10 sessions, 90 mins, 2 individual sessions, 90 mins) 2 caregiver sessions.	TAU (in-home therapy, outpatient mental health services, school counselling)	6-mo	CPSS (self-report)	CDI (self-report)
Auslander et al. (2020) ³⁷	USA	Community mental health service	249	12-19 (14.9)	100	African American (69.5), Hispanic (1.6), Asian (0.4), American Indian (1.6) Other (non-White) (1.6) White, non-Hispanic (25.3)	Maltreatment	CBITS (10 sessions, 90 mins, 2 individual sessions)	TAU (mental health outpatient service, in-home therapy, school counselling and residential treatment)	6-mo	CPSS (self-report)	CDI (self-report)
Barron et al. (2013) ³⁸	Palestine	School	140	11-14 (11.08)	42.9	Palestinian (100)	War	TRT (5 sessions, 90 mins)	WL	-	CRIES13 (self-report)	DSRC (self-report)
Barron et al. (2016) ¹⁴	Palestine	School	154	11-15 (13.5)	59.7	NR	War	TRT (5 sessions)	WL	-	CRIES13 (self-report)	DSRC (self-report)

Barron et al. (2017) ³⁹	UK	Secure accommodation	20	14-18 (15.05)	64.7	Caucasian (100)	NR	TRT (14 sessions, 40 mins)	TAU (social education)	-	CRIES13 (self-report)	MFQ (self-report)
Barron et al. (2020) ⁴⁰	Brazil	NGO	30	8-13 (10.1)	46.7	Caucasian (26.7)	Community violence	TRT (5 sessions, 90 mins)	WL	-	CRIES13 (self-report)	MFQ (self-report)
Basu et al. (2009) ⁴¹	USA	Community	10	8-12 (NR)	NR	NR	Domestic violence	Psychoeducation (10 sessions, 60 mins) 10 caregiver sessions	WL	3-mo, 6-mo	TSCC-A-PTS (self-report)	TSCC-A-DEP (self-report)
Berger et al. (2007) ⁴²	Israel	School	142	NR	45.8	NR	Terrorism	OTT (8 sessions, 90 mins) 2 caregiver sessions	WL	-	UCLA PTSD RI (self-report)	-
Berger and Gelkopf (2009) ¹⁵	Sri Lanka	School	166	9-15 (NR)	47.6	NR	Natural disaster	ERASE Stress – Sri Lanka (12 sessions, 90 mins)	WL	-	UCLA PTSD RI (self-report)	BDI-brief (self-report)
Berger et al. (2012) ⁴³	Israel	School	154	11-13 (12.8)	53.9	NR	War	ERASE Stress (16 sessions, 90 mins) 1 caregiver session	WL	-	UCLA PTSD RI (self-report)	-
Chemtob et al. (2002) ⁴⁴	Hawaii, USA	School	248	6-12 (8.2)	61.4	Hawaiian and Part-Hawaiian (30.1), White (24.9), Filipino (19.7), Japanese (9.2)	Natural disaster	Psychosocial intervention (4 sessions)	Psychosocial intervention (individual)	10-12-mo	KRI (self-report)	-
Chen et al. (2014) ⁴⁵	China	School	40	NR (14.5)	68	Chinese (100)	Traumatic bereavement	TRT-adapted (6 sessions, 60 mins)	No treatment	3-mo	CRIES13 (self-report)	CES-D (self-report)
Dorsey et al. (2020) ⁴⁶	Kenya and Tanzania	Community	640	7-13 (10.6)	50	NR	Bereavement	Tf-CBT (12 sessions, 3-4 individual sessions) 12 caregiver sessions (7 individual, 5 joint)	TAU (educational support and mental health care)	6-mo ^a , 12-mo	CPSS (guardian and self-report)	-
Gordon et al. (2008) ⁴⁷	Kosovo	School	82	14-18 (16.3)	75.6	NR	War	Mind-body skills (12 sessions, 2 hours)	WL	-	HTQ (self-report)	-

Jaycox et al. (2009) ⁴⁸	USA	School	76	NR (11.5)	51.3	Hispanic/ White (88), Hispanic/ African American (8), non-Hispanic/ African American (3), non-Hispanic/ White (1)	Community violence	SSET (adapted-CBITS) (10 sessions, 45 mins)	WL	6-mo ^b	CPSS (self-report)	CDI (self-report)
Jaycox et al. (2010) ⁴⁹	USA	School	118	NR (11.6)	55.9	Non-Hispanic White (48), African American (46), Hispanic (5), and other racial/ethnic backgrounds (2).	Natural disaster	CBITS (10 sessions, 1-3 individual sessions)	TF-CBT (individual, 12 sessions) 12 caregiver sessions (joint)	-	CPSS (self-report)	CDI (self-report)
Jordans et al. (2010) ⁵⁰	Nepal	School	325	11-14 (12.7)	48.6	Brahmin/ Chhetri/ Thakuri (45.2), Tharu (24.6) Terai caste (15.7), Dalit (7.7), Other Janajati (6.8)	War	CBI (15 sessions, 60 mins)	WL	-	CPSS (self-report)	DSRS (self-report)
Khamis et al. (2004) ⁵¹	Palestine	School	840	6-16 (11.3)	49.6	NR	War	CBI (15 sessions, 60 mins)	WL	-	IES (self-report)	-
Langley et al. (2015) ⁵²	USA	School	74	NR (7.7)	50	Latino (49), Caucasian (27), African American (18), biracial (5), Asian (1).	Various (including violence)	Bounce Back (10 sessions, 50-60 mins, 2-3 individual sessions, 30-50 mins) 1-3 caregiver sessions	WL	6-mo ^b	UCLA PTSD RI (child and parent report)	CDI (child and parent report)
Layne et al. (2008) ⁵³	Bosnia	School	159	13-19 (16)	64.5	Ethnic Muslim (100)	War	TGCT (17-20 sessions, 60-90 mins)	TAU (classroom skill-based psychoeducation)	4-mo	UCLA PTSD RI (self-report)	DSRS (self-report)
Lyshak-Stelzer et al. (2007) ⁵⁴	USA	Inpatient mental health service	77	13 – 17 (15.1)	44.8	African American (40.1), Latino/a (35.2), White (18.3), Caribbean American (0.7), mixed ethnicity	Various (including violence)	Trauma-focused art therapy (16 sessions)	TAU (arts and crafts activity group)	-	UCLA PTSD RI (self-report)	-

						(4.9), Bangladeshi (0.7).							
Mahmoudi-Gharaei et al. (2009) ⁵⁵	Iran	Community	85	11-18 (14.6)	74.1	NR	Natural disaster	CBT (4 sessions)	WL	-	PSS (self-report)	-	
McMullen et al. (2013) ⁵⁶	DR Congo	NGO	50	13-17 (15.8)	0	NR	Child soldiers	Tf-CBT (15 sessions, 2-4 individual sessions) 3 caregiver sessions	WL	3-mo ^b	UCLA PTSD RI (self-report)	-	
O'Callaghan et al. (2013) ⁵⁷	DR Congo	NGO	52	12-17 (16.02)	100	NR	Sexual abuse	Tf-CBT (12 sessions, 2 hours, 3 individual sessions) 3 caregiver sessions	WL	3-mo ^a	UCLA PTSD RI (self-report)	-	
O'Callaghan et al. (2015) ⁵⁸	DR Congo	NGO	50	14-17 (14.9)	42	NR	War	Tf-CBT (9 sessions, 90 mins) 2 caregiver sessions	CFS (9 group sessions, 90 mins) 2 caregiver sessions	-	UCLA PTSD RI (self-report)	-	
Ooi et al. (2016) ⁵⁹	Australia	School	82	10-17 (12.6)	35.4	African (56), Asian (22), Middle Eastern (17)	War	TRT (8 sessions, 60 mins)	WL	3-mo ^b	CRIES13 (self-report)	DSRS (self-report)	
Overbeek et al. (2013) ⁶⁰	Netherlands	Community	164	6-12 (9.2)	44.5	Dutch (43.2), Turkish/Moroccan (18.7), Antilles/Suriname (20), Other countries (18.1)	Interpersonal violence	It's my turn now (9 sessions, 90 mins) 9 caregiver sessions	You belong (9 group sessions, 90 mins) 9 caregiver sessions	6-mo	TSCC (self-report), TSCYC (parent-report)	CDI (self-report), CBCL (parent-report)	
Pfeiffer et al. (2018) ⁶¹	Germany	Children's social care	99	13-21 (17)	7.1	Afghanistan (45.5), Syria (11.1), Gambia (10.1), Somalia (7.1) Iran (7.1), Eritrea (3), Senegal (2), Iraq Ethiopia (2), Pakistan (2), Angola (2), Nigeria or Ivory	War	Mein Weg (6 sessions, 90 mins)	TAU (social care support)	-	CATS-S (self-report), CATS-C (carer report)	PHQ8 (self-report)	

						Costa (2), Ghana, Guinea, Guinea-Bissau or Kurdistan (4)						
Pityaratstian et al. (2015) ⁶²	Thailand	School	36	10-15 (12.3)	72.2	NR	Natural disaster	TRT-adapted (3 sessions, 2 hours)	WL	1-mo	UCLA PTSD RI (self-report), Thai CRIES (self-report)	-
Qouta et al. (2012) ¹⁶	Palestine	School	482	10-13 (11.3)	49.4	Palestinian	War	TRT (8 sessions, 2 hours)	WL	6-mo	CRIES13 (self-report)	DSRS (self-report)
Ronan and Johnston (1999) ⁶³	New Zealand	School	113	7-13 (10.5)	54	Caucasian (European descent) (61.9), Māori (10.6), Asian (5.3), Māori/European (18.6), Asian/Māori/Pacific Islander (1.8), Asian/Pacific Islander (0.9).	Natural disaster	CBT (1 session, 60 mins)	Exposure and normalising intervention (1 session, 60 mins)	4-mo ^b	UCLA PTSD RI (self-report)	YSR (self-report)
Runyon et al. (2010) ⁶⁴	USA	Children's social care	60	7-13 (9.9)	46.7	African American (41.7)	Physical abuse	CPC-CBT (16 sessions, 2 hours) 16 caregiver sessions (~12 hours joint)	Parent only CBT and games and art group for children	3-mo ^a	K-SADS-PL (combined child and parent report, interview)	-
Salloum and Overstreet (2008) ⁶⁵	USA	School	56	7-12 (NR)	37.5	African American (89), Caucasian (4), Hispanic (2), African American/Native American (4)	Natural disaster	LAST intervention (10 sessions, 60 mins, 1 individual session) 1 caregiver session	LAST intervention (individual) 1 caregiver session	3-wk	UCLA PTSD RI (self-report)	MFQ (self-report)
Salloum and Overstreet (2012) ⁶⁶	USA	School	72	6-12 (9.6)	44.3	African American (97.2)	Various (including violence)	GTI (10 sessions, 50-60 mins, 1 individual session, 50-60 mins)	GTI (without trauma narrative) (10 group sessions, 50-60)	3-mo, 12-mo	UCLA PTSD RI (self-report)	MFQ (self-report)

								1 caregiver session	mins, 1 individual session, 50-60 mins) 1 caregiver session			
Santiago et al. (2018) ⁶⁷	USA	School	52	NR (7.8)	36.5	African American/Black (3.8), White/Caucasian (5.9), Latino (55.8), Latino/Caucasian (23.1), Latino/Native American (5.9), Missing (5.9)	Various (including violence)	Bounce Back (10 sessions, 3 individual sessions) 3 caregiver sessions	WL	6-mo ^b	UCLA PTSD RI (child and parent report)	CDI (child and parent report)
Stein et al. (2003) ⁶⁸	USA	School	126	NR (11)	56.1	NR	Various (including violence)	CBITS (10 sessions, 1 individual session)	WL	6-mo ^b	CPSS (self-report)	CDI (self-report)
Tol et al. (2008) ⁶⁹	Indonesia	School	403	7 - 15 (9.9)	48.6	NR	War	CBI (15 sessions)	WL	6-mo	CPSS (self-report)	DSRS (self-report)
Tol et al. (2012) ⁷⁰	Sri Lanka	School	399	9-12 (11)	38.6	Hindu (81)	War	CBI (15 sessions)	WL	3-mo	CPSS (self-report)	DSRS (self-report)
Tol et al. (2014) ⁷¹	Burundi	School	329	8-17 (12.3)	48	NR	War	CBI (15 sessions)	WL	3-mo	CPSS (self-report)	DSRS (self-report)
Trowell et al. (2002) ⁷²	UK	Mental health service	71	6-14 (10)	100	White (63), Black Caribbean (11), mixed parentage (10), Chinese (7), Mediterranean origin (6), Unknown (3)	Sexual abuse	Psychoeducation (18 sessions) 13 caregiver sessions	Psychotherapy (individual) (up to 30 sessions, 50 mins) Caregiver support	24-mo	Orvaschel PTSD scale (self-report, interview)	K-SADS (self-report, interview)

Note. BDI = Beck Depression Inventory, CAPS-CA = Clinical Administered PTSD Scale for Children and Adolescents, CATS-C = Child and Adolescent Trauma Screen – Caregiver Report, CATS-S = Child and Adolescent Trauma Screen – Self Report, CBCL = Child Behaviour Checklist for Children, CBI = Classroom, Community, Culture Based Intervention, CBITS = Cognitive Behavioural Intervention for Trauma in Schools, CBT = Cognitive Behavioural Therapy, CDI = Child Depression Inventory, CES-D = The Centre for Epidemiological Studies – Depression CFS = Child Friendly Space, CPSS = Child PTSD Symptom Scale, CPT = Cognitive Processing Therapy, CRIES13 = Child Revised Impact of Events Scale 13, DSRC = Depression Self-rating Scale for Children, ERASE Stress = Enhancing

Resiliency Amongst Students Experiencing Stress, GAINS = Girls Aspiring Towards Independence, GTI = Grief and Trauma Intervention, HTQ = Harvard Trauma Questionnaire, IES = Impact of Events Scale, KRI = Kauai Recovery Inventory, K-SADS = Kiddie Schedule for Affective Disorders and Schizophrenia, LAST = Loss and Survival Team, MFQ = Mood and Feelings Questionnaire, NGO = Non-Governmental Organisation, OTT = Overshadowing the Threat of Terrorism, PHQ8 = Patient Health Questionnaire 8, PSS-SR = PTSD Symptom Scale-Self Report, RFPP = Reminder Focused Positive Psychiatry, SSET = Support for Students Exposed to Trauma, TAU = Treatment as Usual, TF-CBT = Trauma-Focused Cognitive Behavioural Therapy, TGCT = Trauma and Grief Component Therapy for Adolescents, TRT = Teaching Recovery Techniques, TSCC = Trauma Symptom Checklist for Children, TSCC-A-DEP = Trauma Symptom Checklist for Children – Depression subscale, TSCC-A-PTS = Trauma Symptom Checklist for Children – Posttraumatic Stress subscale, TSCYC = Trauma Symptom Checklist for Young Children, UCLA PTSD RI = UCLA PTSD Reaction Index, WL = Waitlist, YSR = Youth Self Report.

^a – follow up assessments but full data not reported in paper.

^b - not included in analysis as waitlist control had received intervention at follow up assessment.

Table 2: Pooled Effect Sizes and Moderator Analyses for Reduction in Posttraumatic Stress Disorder (PTSD) Symptoms at Post-

Treatment

Analysis: moderator/subgroup	k	n	Hedge's g	95% CI	Q statistic	I ² (%)	Q statistic	p
<i>All studies – post-treatment</i>	38	5575	-0.55	-0.76, -0.35	Q(37)=282.87***	92	-	-
<i>All studies – follow-up</i>	13	2809	-0.28	-0.43, -0.12	Q(12)=38.23***	65	-	-
<i>LMIC vs HIC</i>							0.22	0.64
LMICs	19	4141	-0.62	-0.95, -0.28	Q(18)=202.32***	96	-	-
HICs	19	1434	-0.50	-0.74, -0.26	Q(18)=71.53***	77	-	-
<i>Universal vs targeted</i>	-	-	-	-	-	-	1.18	0.27
Universal	10	1871	-0.78	-1.36, -0.20	Q(9)=155.59***	97	-	-
Targeted	28	3704	-0.48	-0.65, -0.30	Q(27)=124.40***	83	-	-
<i>Control condition</i>	-	-	-	-	-	-	4.55	0.03*
Active	13	1493	-0.25	-0.47, -0.03	Q(12)=31.54**	67	-	-
Passive	25	4082	-0.71	-0.97, -0.45	Q(24)=250.34***	93	-	-
<i>Risk of bias</i>	-	-	-	-	-	-	0.10	0.75

High	14	2122	-0.50	-0.77, -0.22	Q(13)=95.13***	86	-	-
Some	24	3453	-0.59	-0.87, -0.30	Q(23)=183.17***	93	-	-
<i>Trauma type</i>	-	-	-	-	-	-	0.29	0.59
Interpersonal	31	4566	-0.60	-0.83, -0.37	Q(30)=247.12***	93	-	-
Non-interpersonal	6	1001	-0.45	-0.85, -0.06	Q(5)=27.31***	82	-	-
<i>Caregiver involvement</i>	-	-	-	-	-	-	0.39	0.53
Yes	15	1691	-0.64	-1.05, -0.24	Q(14)=95.33***	92	-	-
No	23	3884	-0.49	-0.72, -0.27	Q(22)=176.38***	90	-	-

Note. All analyses were run excluding the four studies with an individual psychotherapy control condition.

*p<.05; **p<.01; ***p<.001.

Figure titles

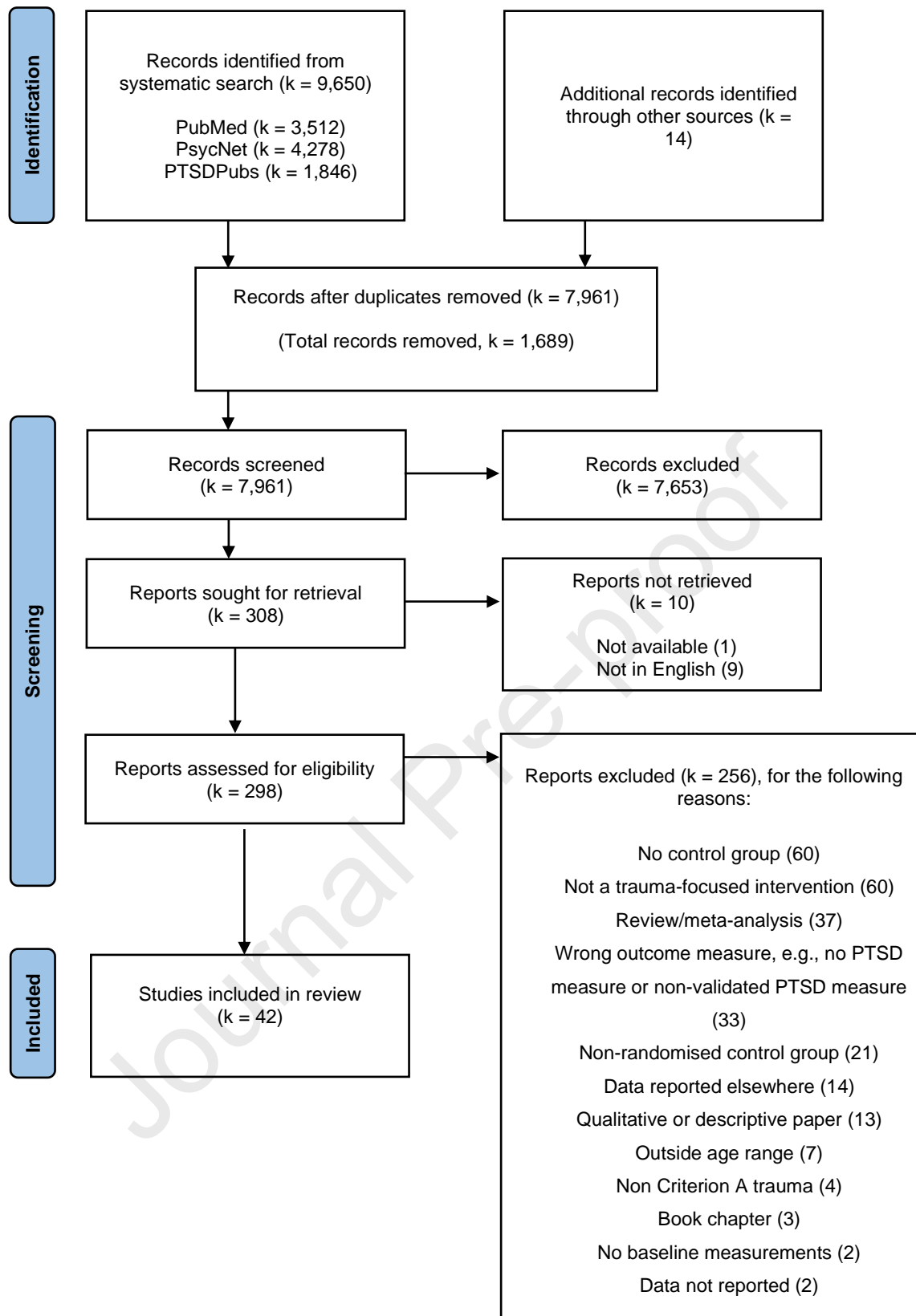
Figure 1: PRISMA Flow Chart Outlining the Study Selection Process

Figure 2: Forest Plot of Effect Sizes Comparing Group Treatment With Active and Passive Control Conditions at Posttreatment

Note: RE = random effect; SMD = standardized mean difference.

Figure 3: Funnel Plot for Group-Based Treatment versus Control at Posttreatment

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Passive control condition

Ahrens et al. (2002) ³⁵		-1.20 [-1.89, -0.51]
Barron et al. (2013) ³⁸		-0.76 [-1.12, -0.39]
Barron et al. (2016) ¹⁴		-0.66 [-1.00, -0.31]
Barron et al. (2020) ⁴⁰		-2.07 [-2.96, -1.18]
Basu et al. (2009) ⁴¹		-0.98 [-1.91, -0.05]
Berger et al. (2007) ⁴²		-1.05 [-1.40, -0.70]
Berger et al. (2009) ¹⁵		-1.27 [-1.60, -0.94]
Berger et al. (2012) ⁴³		-0.48 [-0.83, -0.14]
Chen et al. (2014) ⁴⁵		-0.47 [-1.32, 0.39]
Gordon et al. (2008) ⁴⁷		-1.12 [-1.59, -0.64]
Jaycox et al. (2009) ⁴⁸		-0.46 [-0.91, -0.00]
Jordans et al. (2010) ⁵⁰		-0.18 [-0.40, 0.04]
Khamis et al. (2004) ⁵¹		0.14 [-0.01, 0.30]
Langley et al. (2015) ⁵²		-1.01 [-1.51, -0.52]
Mahmoudi-Gharaei et al. (2009) ⁵⁵		-0.25 [-0.73, 0.23]
McMullen et al. (2013) ⁵⁶		-2.71 [-3.49, -1.92]
O'Callaghan et al. (2013) ⁵⁷		-1.96 [-2.62, -1.30]
Ooi et al. (2016) ⁵⁹		0.02 [-0.41, 0.46]
Pityaratstian et al. (2015) ⁶²		-0.06 [-0.72, 0.59]
Qouta et al. (2012) ¹⁶		-0.13 [-0.31, 0.05]
Santiago et al. (2018) ⁶⁷		-0.62 [-1.17, -0.06]
Stein et al. (2003) ⁶⁸		-1.07 [-1.46, -0.68]
Tol et al. (2008) ⁶⁹		-0.67 [-0.88, -0.47]
Tol et al. (2012) ⁷⁰		0.05 [-0.15, 0.24]
Tol et al. (2014) ⁷¹		0.02 [-0.21, 0.26]

RE Model for Subgroup

-0.71 [-0.97, -0.45]

Active control condition

Ahmadi et al. (2020) ³⁴		0.84 [-0.60, 2.29]
Auslander et al. (2017) ³⁶		-0.75 [-1.57, 0.08]
Auslander et al. (2020) ³⁷		-0.25 [-0.51, 0.02]
Barron et al. (2017) ³⁹		0.36 [-0.61, 1.33]
Dorsey et al. (2020) ⁴⁶		-0.40 [-0.56, -0.24]
Layne et al. (2008) ⁵³		-0.22 [-0.57, 0.13]
Lyshak-Stelzer et al. (2007) ⁵⁴		-1.64 [-2.48, -0.80]
O'Callaghan et al. (2015) ⁵⁸		0.05 [-0.51, 0.60]
Overbeek et al. (2013) ⁶⁰		0.21 [-0.23, 0.65]
Pfeiffer et al. (2018) ⁶¹		-0.54 [-0.94, -0.14]
Ronan et al. (1999) ⁶³		-0.11 [-0.58, 0.37]
Runyon et al. (2010) ⁶⁴		-0.61 [-1.17, -0.05]
Salloum et al. (2012) ⁶⁶		0.23 [-0.26, 0.71]

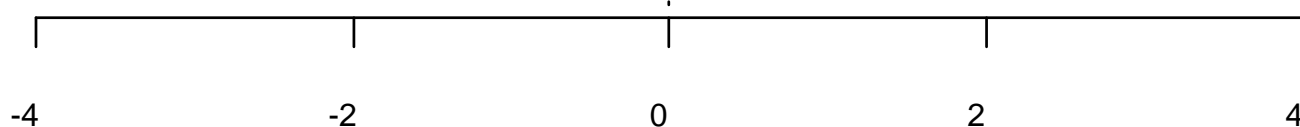
RE Model for Subgroup

-0.25 [-0.47, -0.03]

RE Model for All Studies



-0.55 [-0.76, -0.35]



Standardized Mean Difference

