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Meta-analysis of psychological treatments for posttraumatic stress disorder in adult survivors of childhood abuse

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HIGHLIGHTS

- Treatment of PTSD is efficacious in survivors of child abuse.
- Trauma-focused treatments show higher effect sizes than non-trauma-focused ones.
- Individual treatments show higher effect sizes than pure group treatments.
- More research is needed using rigorous methodology.

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ABSTRACT

Posttraumatic stress disorder (PTSD) is highly prevalent in adult survivors of childhood sexual and/or physical abuse. However, intervention studies focusing on this group of patients are underrepresented in earlier meta-analyses on the efficacy of PTSD treatments. The current meta-analysis exclusively focused on studies evaluating the efficacy of psychological interventions for PTSD in adult survivors of childhood abuse. Sixteen randomized controlled trials meeting inclusion criteria could be identified that were subdivided into trauma-focused cognitive behavior therapy (CBT), non-trauma-focused CBT, eye movement desensitization and reprocessing, and other treatments (interpersonal, emotion-focused). Results showed that psychological interventions are efficacious for PTSD in adult survivors of childhood abuse, with an aggregated uncontrolled effect size of $g = 1.24$ (pre- vs. post-treatment), and aggregated controlled effect sizes of $g = 0.72$ (post-treatment, comparison to waitlist control conditions) and $g = 0.50$ (post-treatment, comparison with TAU/placebo control conditions), respectively. Effect sizes remained stable at follow-up. As the heterogeneity between studies was large, we examined the influence of two a priori specified moderator variables on treatment efficacy. Results showed that trauma-focused treatments were more efficacious than non-trauma-focused interventions, and that treatments including individual sessions yielded larger effect sizes than pure group treatments. As a whole, the findings are in line with earlier meta-analyses showing that the best effects can be achieved with individual trauma-focused treatments.

Contents

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1. Introduction

1.1. Treatment of PTSD in adult survivors of childhood abuse

Posttraumatic stress disorder (PTSD) is highly prevalent in adult survivors of childhood physical and/or sexual abuse[1] (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Ullman & Brecklin, 2002). In addition, individuals with PTSD following childhood abuse are a large subgroup of patients attending mental health services in general as well as specialist services for PTSD (Farley & Patsalides, 2001; Zayfert et al., 2005). The question how PTSD can best be treated in this specific group of trauma survivors is therefore of great clinical interest.

However, a definite answer to this question is complicated by the fact that individuals suffering from PTSD following childhood abuse have traditionally been underrepresented in PTSD treatment outcome research (Spinazzola, Blaustein, & van der Kolk, 2005). Consequently, existing meta-analyses on the efficacy of treatments for PTSD are mainly based on studies including survivors of adult-onset trauma. For example, in a frequently cited meta-analysis by Bisson et al. (2007), 27 (71%) out of 38 randomized controlled trials (RCTs) included exclusively focused on survivors of adult-onset trauma, whereby only three studies (8%) focused on adult survivors of childhood-onset trauma (mixed adult/childhood onset: $n = 5$, 13%; unclear: $n = 3$, 8%). There is currently no consensus in the literature whether evidence-based interventions originally developed for PTSD following adult-onset trauma are also applicable to adult survivors of child-onset trauma, or whether interventions specifically tailored for this group are necessary (Cloitre et al., 2011; van Minnen, Harned, Zoellner, & Mills, 2012). The current study therefore aimed to conduct the first meta-analysis focusing specifically on the efficacy of PTSD treatments in adult survivors of childhood sexual and/or physical abuse.

Results of a recent meta-analysis showed that PTSD symptom severity was successfully reduced by psychological interventions offered to adult survivors of childhood sexual abuse (uncontrolled pre vs. post effect size: $g = 0.72$; controlled effect size: $g = 0.77$) (Taylor & Harvey, 2010). However, in this earlier study results were collapsed across highly heterogeneous samples that were mostly not selected based on PTSD symptomatology. In addition, the findings were collapsed across very different types of treatments, the majority of which did not have PTSD as their main treatment focus. Although this earlier meta-analysis therefore provides indirect evidence showing that PTSD symptomatology in adult survivors of childhood trauma can in principle be modified by psychological treatment, it does not provide valid estimates of the magnitude of treatment effects for PTSD in this group in general nor does it examine the relative efficacy of different types of PTSD treatments. The current meta-analysis directly addresses these two key issues.

1.2. Is PTSD following childhood abuse special?

Investigating the efficacy of PTSD treatments in a particular group of trauma survivors, in this case adult survivors of childhood abuse, only appears warranted if this particular population differs from other PTSD sufferers in important aspects. There is extensive evidence that survivors of childhood abuse tend to show high levels of symptom complexity beyond PTSD, including emotion regulation difficulties, interpersonal problems, impulsive and/or self-destructive behavior, high levels of dissociation, substance-related problems, or somatic symptoms (Briere, Kaltman, & Green, 2008; Cloitre et al., 2009; Cloitre, Garvert, Brewin, Bryant, & Maercker, 2013). Although most researchers agree on this basic finding, the jury is still out on the question whether this symptom complexity also requires a different treatment approach (Cloitre et al., 2011; van Minnen et al., 2012). In the literature, a key controversy concerns the question whether trauma-focused treatments are appropriate for PTSD sufferers with high levels of symptom complexity.

1.3. Are trauma-focused treatments appropriate for adult survivors of childhood abuse?

According to recent meta-analyses on the efficacy of treatments for PTSD in general, the best evidence currently exists for trauma-focused

[1] In the remainder of this article, the term *childhood abuse* will be used to indicate physical and/or sexual abuse in childhood.

cognitive behavior therapy (TF-CBT) (Bisson et al., 2007; Bradley, Greene, Russ, Dutra, & Westen, 2005; Watts et al., 2013). Eye movement desensitization and reprocessing (EMDR) has also been shown to be efficacious, although there are still less studies investigating this treatment approach than for TF-CBT. Current treatment guidelines agree on recommending TF-CBT as first-line treatment for PTSD, whereas recommendations for EMDR are somewhat more mixed (Forbes et al., 2010).

TF-CBT and EMDR can both be classified as trauma-focused treatments, i.e. interventions that are mainly focused on processing the memory of the trauma and/or its meaning. There is consistent evidence showing that trauma-focused treatments lead to significantly larger effects than non-trauma-focused interventions, including supportive interventions, strategies aiming at anxiety management and/or problem solving, or psychodynamically oriented interventions (Bisson et al., 2007). The finding that interventions directly targeting the trauma memory show the largest effect sizes is in line with current theoretical models of PTSD that emphasize the role of memory processes in the development and maintenance of the disorder (for a review, see Ehlers, Ehring, & Kleim, 2012).

However, as described earlier individuals with PTSD following childhood abuse are underrepresented in existing meta-analyses. It therefore remains unclear whether the superiority of trauma-focused treatments over non-trauma-focused interventions also holds for this particular group of patients. In the current research literature, three main positions on this issue can be distinguished. First, a number of authors propose that trauma-focused treatments originally developed for survivors of adult-onset trauma can also be offered to the childhood abuse survivor group without any major modifications (e.g., Cook, Schnurr, & Foa, 2004; Resick, Nishith, & Griffin, 2003; van Minnen et al., 2012). Examples for trauma-focused interventions that have been offered to childhood abuse survivors are *prolonged exposure treatment* (Powers, Halpern, Ferenschak, Gillihan, & Foa, 2010), *trauma-focused cognitive-behavior therapy* (TF-CBT) involving exposure interventions plus cognitive restructuring (McDonagh et al., 2005), *cognitive processing therapy* (Chard, 2005), or *EMDR* (van der Kolk et al., 2007).

A second group of authors suggest that in line with the general evidence on the efficacy of PTSD treatments, interventions for childhood abuse survivors with PTSD should be trauma-focused, but adapted for the specific needs of this group. For example, in a recent expert clinician survey organized by the International Society for Traumatic Stress Studies (ISTSS), a large group of experts recommended phase-based treatments for PTSD in cases of high symptom complexity, whereby a first non-trauma-focused phase (e.g., skills training) is followed by trauma-focused treatment (Cloitre et al., 2011). Examples of phase-based interventions that have been developed for the specific needs of childhood abuse survivors with PTSD are the STAIR/MPE program (Cloitre, Koenen, Cohen, & Han, 2002) or DBT-PTSD (Bohus et al., 2013).

Finally, some authors have argued that trauma-focused treatments may not be suitable for patients with PTSD following childhood abuse as emotion regulation difficulties or other aspects of symptom complexity often found in this group may lead to symptom exacerbation when patients are systematically exposed to aspects of the trauma memory (e.g., Dorrepaal et al., 2010; Ford, Courtois, Steele, van der Hart, & Nijenhuis, 2005). Following this view, a number of non-trauma-focused treatments have been developed focusing exclusively on safety, coping, anxiety management or related issues. This group of interventions is very heterogeneous and includes treatments based on principles of cognitive behavior therapy (e.g., Zlotnick et al., 1997) or interpersonal treatments (e.g., Krupnick et al., 2008).

One of the main aims of the current meta-analysis was to investigate whether the general findings from the PTSD treatment literature showing a superiority of trauma-focused treatments over non-trauma-focused interventions can be replicated for the specific group of childhood abuse survivors with PTSD.

1.4. Individual vs. group treatments

Some authors have suggested that group interventions may be particularly useful for patients suffering from PTSD following childhood abuse as this may help normalizing the symptoms experienced by patients, foster social support, and enable observational learning (Dorrepaal et al., 2010; Zlotnick et al., 1997). In contrast to this view, evidence from the general PTSD treatment literature (Bisson et al., 2007) as well as Taylor and Harvey's (2010) meta-analysis suggest that individual treatments are more efficacious than group interventions. However, as data on this issue is still lacking for the treatment of PTSD in adult survivors of child abuse the type of delivery of the intervention was included as a potential moderator variable in the current meta-analysis.

1.5. Methodological considerations

Randomized controlled trials (RCTs) comparing at least one active treatment to at least one control condition are regarded as the gold standard in treatment outcome research. Meta-analyses therefore typically only include RCTs in order to guarantee that conclusions are based on studies with good internal validity. However, in a developing research field with a large number of uncontrolled studies and relatively few RCTs it may be useful to conduct additional analyses including studies with less rigorous methodology in order to test the robustness of the findings from controlled research. For the current meta-analysis, we decided to focus on RCTs only for our main analyses. However, treatment studies using uncontrolled and/or nonrandomized designs but meeting all other inclusion criteria were also identified in a systematic literature search. Following the main analyses, we conducted additional tests investigating whether the main findings from the RCTs could be replicated using evidence from all studies.

1.6. Aims and hypotheses

The aims of this meta-analysis were threefold. First, we wanted to assess the efficacy of psychological interventions for PTSD in adult survivors of childhood abuse by integrating the best evidence currently available. We expected that psychological treatments show medium to large effect sizes in this group for PTSD symptom severity but also comorbid symptomatology (e.g., depression, anxiety, dissociation). In addition, we expected treatment effects to be stable to follow-up.

Second, we aimed to investigate whether trauma-focused treatments differed from non-trauma-focused interventions regarding the relative efficacy. In line with current theoretical models of PTSD and findings from the general PTSD treatment literature, we expected a higher efficacy for trauma-focused treatments than for non-trauma-focused ones.

Finally, we compared the relative efficacy of individual vs. group treatments. Based on earlier findings with other populations (Bisson et al., 2007; Taylor & Harvey, 2010), we hypothesized that individual treatments show higher effect sizes than group interventions.

2. Method

2.1. Inclusion criteria

The criteria for including studies into the current meta-analysis were: (1) randomized trial comparing at least one active psychological treatment to at least one control condition or another active treatment condition; (2) PTSD symptoms are the main treatment target; (3) study participants are at least 18 years of age; (4) at least 90% of the study sample have experienced repeated sexual and/or physical abuse before the age of 18; if less than 90% of the sample have experienced this type of trauma, separate data for the childhood abuse subgroup must be reported in the article; (5) outcome measures include

PTSD symptom severity, assessed with a validated instrument (self-report or structured clinical interview) at least pre- and post-treatment or at pre-treatment and at least one follow-up assessment; (6) at least 10 participants per condition; and (7) published in a peer-reviewed journal (no language restrictions were made).

As we expected that the number of randomized trials meeting the inclusion criteria would be limited, uncontrolled and non-randomized controlled studies meeting all other inclusion criteria (Criteria 2 to 7) were also identified during literature search. As described in more detail below, the main analyses focused on randomized trials only, i.e. studies meeting all eight inclusion criteria described above. However, additional analyses including all studies regardless of design were conducted in order to test whether results could be replicated.

2.2. Identification and selection of studies

Suitable studies were identified in two ways. First, a systematic literature search was conducted using a number of electronic databases (PsycINFO, Medline, PILOTS, Cochrane Central Register of Controlled Trials) up to the first week of November 2013. The comprehensive search combined terms indicative of PTSD or childhood trauma (e.g., PTSD; child abuse) and terms indicative of psychological treatment (e.g., treatment; therapy).[2] Second, the reference lists of earlier meta-analyses and systematic reviews were screened for additional studies (Bisson et al., 2007; Bradley et al., 2005; Cloitre, 2009; Kessler, White, & Nelson, 2003; Martsolf & Draucker, 2005; Price, Hilsenroth, Petretic-Jackson, & Bonge, 2001; Taylor & Harvey, 2010).

The literature search resulted in 21,301 hits. Studies to be included in the meta-analysis were selected in a number of steps (see Fig. 1 for a flow chart). First, the titles and/or abstracts of all hits were examined, leading to the exclusion of 21,181 articles. In a second step, two independent raters closely analyzed whether the remaining 120 potentially relevant studies met inclusion criteria. Inconsistencies were discussed and solved by consensus. The second step resulted in a further exclusion of 83 studies (see Fig. 1 and Appendix A [supplementary material published online] for reasons), leaving 37 studies meeting inclusion criteria 2–7 (including all study designs). Two studies were based on the same dataset but described different follow-up intervals (Edmond & Rubin, 2004; Edmond, Rubin, & Wambach, 1999). For the purpose of the meta-analysis, they were therefore counted as one study; data regarding pre–post-effects and 3 months follow-up were taken from the first article and only data including the 18-months follow-up were taken from the second study. Twenty studies were excluded from the main analyses as they did not use a randomized controlled design. The final sample of studies included in the main analyses therefore was $k = 16$, including 22 active treatment conditions and 15 control conditions. Thirteen studies used a randomized controlled design comparing at least one active treatment to at least one control condition. Three further studies used a randomized design comparing at least two active conditions, but did not include a control group.

2.3. Coding

Two independent raters coded each study included in this meta-analysis using a standardized coding form. Variables included sample characteristics, treatment characteristics, and methodological quality of the study. Inconsistencies between the two raters were solved by consensus.

[2] The exact search terms were: (PTSD OR child* abuse OR child* trauma OR incest OR interpersonal trauma OR sexual abuse OR physical abuse) AND (intervention OR treatment OR therapy OR CBT OR exposure OR stress inoculation OR anxiety management OR behav* therapy OR eye movement desensitization and reprocessing OR EMDR OR psychotherapy OR cognitive processing therapy).

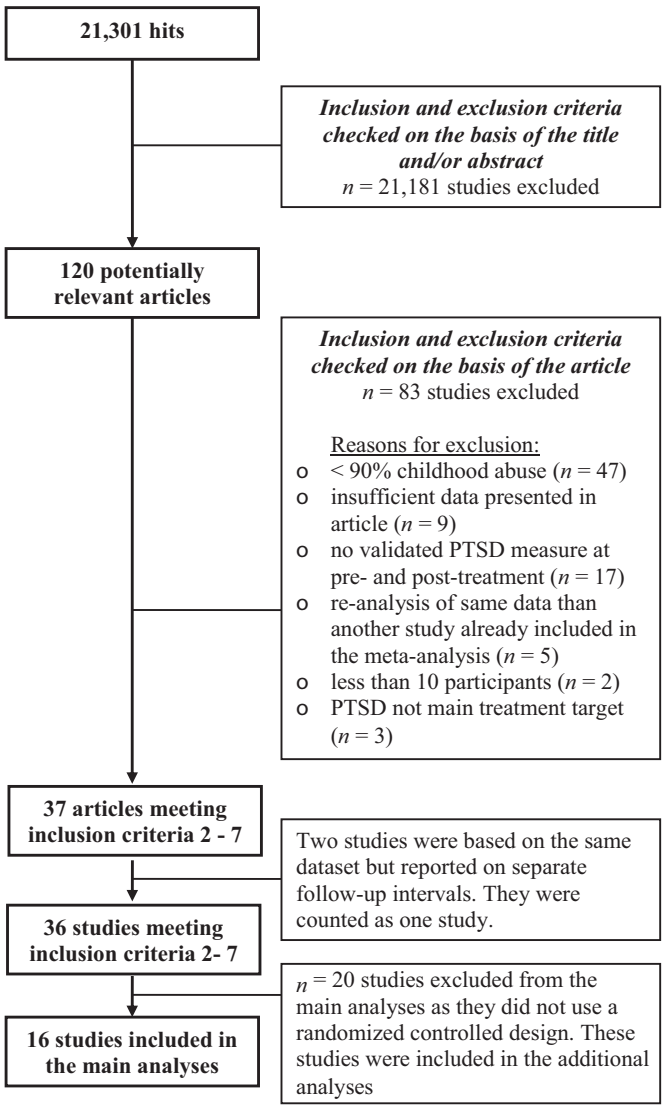

Fig. 1. Flow chart: identification and selection of studies.

2.3.1. Coding of treatment characteristics

Treatment characteristics were scored on four key variables. First, all conditions were coded as either *active treatment* or *control group*. Second, treatment and control conditions were further specified according to their orientation and content. Active treatments were subdivided into *trauma-focused cognitive-behavior therapy* (*TF-CBT*) (CBT treatments focusing on the memory of the trauma and/or its meaning; see also Bisson et al., 2007), *non-trauma-focused cognitive behavior therapy* (*N-TF-CBT*) (CBT treatments not focusing on the trauma memory and/or its meaning, but typically focusing on anxiety management and coping, see also Bisson et al., 2007), *EMDR* (treatments following the manual by Shapiro, 2001), and other treatments (including e.g., inter-personal therapies and emotion-focused treatments). Control conditions were divided into two categories, namely (1) *wait list* or *no contact control groups* and (2) *treatment as usual* (*TAU*) or *placebo*.

Third, active treatments were divided into trauma-focused (a substantial part of the treatment was focused on the memory of the trauma and/or its meaning) or non-trauma-focused (absence of a focus on the memory of the trauma and/or its meaning), irrespective of their general orientation.

Finally, all active treatments were divided based on whether they were delivered as individual treatment, group treatment, or a combination of individual and group sessions.

2.3.2. Coding of the methodological quality of studies

The following methodological aspects were coded for each study: structured clinical interview used to diagnose PTSD (yes/no), treatment outcome was established by blind assessors (yes/no), treatment was manualized (yes/no), data on treatment integrity reported (yes/no), intent-to-treat analyses reported (yes/no), and outcome was assessed at follow-up in addition to post-treatment (yes/no) (see Table 2).

2.4. Effect size calculation

Two types of effect sizes were computed. First, uncontrolled effect sizes (e.g. change from pre- to post-treatment; change from pre-treatment to follow-up) were computed for each active treatment condition as well as each control condition. Second, controlled effect sizes were computed for all RCTs comparing active treatments to waitlist/no contact or TAU/placebo control conditions. No controlled effect sizes were computed for randomized studies comparing two or more bona fide treatments for PTSD without a control condition. Uncontrolled and controlled effect sizes were computed using Hedges's *g*. This was obtained by first subtracting the post-treatment mean from the pre-treatment mean (uncontrolled effect size) or the control group mean from the treatment group mean at post-treatment (controlled effect size) respectively and dividing the outcome by the pooled standard deviation. The outcome was then multiplied by a sample size correction factor $J = 1 - (3 / (4df - 1))$ to obtain the effect size Hedges's *g* (see Lipsey & Wilson, 2001). Effect sizes *g* can conservatively be interpreted using conventions suggested by Cohen (1988), with 0.2 indicating a small, 0.5 a medium and 0.8 a large effect. Effect sizes were computed using the computer program Comprehensive Meta-Analysis (CMA; version 2.2.064). When means or standard deviations were not reported in the original articles, effect sizes were calculated from other data provided by the study authors using the procedures implemented in the CMA software. In studies reporting clinician-rated and self-reported symptom severities, the clinician ratings were included in the analyses.

2.5. Heterogeneity

In order to assess heterogeneity among studies, the *Q*-statistic was computed and tested for significance. Higgins' I^2 was used to express the amount of heterogeneity. When comparing subgroups or studies, we used the *Q* test for moderation (Q_m).

2.6. Meta-analysis

Mean effect sizes were estimated using random-effect meta-analysis as substantial heterogeneity was expected among the studies. In order to test the influence of categorical moderator variables, the random-effect subgroup procedure implemented in CMA was used.

2.7. Publication bias

Publication bias (Bakker, van Dijk, & Wicherts, 2012) was tested by inspecting the funnel plot on primary outcomes measures, and using the Egger's test of the intercept to test whether the bias was significant. In addition, the random-effects version of the Duval and Tweedie's trim and fill procedure (Duval & Tweedie, 2000) as implemented in CMA was used to estimate a corrected effect size when publication bias is taken into account.

3. Results

3.1. Study characteristics

A total of 16 studies were included in the main analyses, reporting results for 22 active treatment conditions and 15 control conditions (see Table 1 for an overview of all included studies). There were in total 16 CBT treatment arms, whereby 10 were classified as *Trauma-Focused* and the other 6 conditions as *Non-Trauma-Focused CBT*. *EMDR* was investigated in three treatment arms each. Three treatment arms were classified in the category *Other treatments*, whereby one arm studied *Inter-personal Therapy* and two arms were on *Emotion-focused Therapy*.

Methodological aspects of the studies included are summarized in Table 2. Most studies used a treatment manual ($k = 13$; 81%), and used a structured clinical interview to diagnose PTSD ($k = 13$; 81%). Fewer studies included follow-up assessments ($k = 11$; 69%), reported data on treatment integrity ($k = 10$; 63%), reported intent-to-treat analyses ($k = 10$; 63%), or ensured that assessors were blinded ($k = 9$; 56%). Only five studies met all six methodological quality criteria assessed in this meta-analysis (Chard, 2005; Cloitre et al., 2010; McDonagh et al., 2005; Resick et al., 2008; van der Kolk et al., 2007).

3.2. Treatment effects on PTSD symptomatology

3.2.1. Uncontrolled effect sizes

We first computed effect sizes for the impact of treatment on the change of PTSD symptomatology from pre- to post-treatment. Data from all 16 studies were included in the analyses. Across all treatments ($k = 22$), a large pre–post effect size was found, $g = 1.24$; 95% CI = [1.03; 1.44] (see also Fig. 2 for a forest plot including all studies). The average pre–post effect size for control conditions ($k = 15$) was $g = 0.38$, 95% CI = [0.21; 0.56]. Results of subgroup analyses showed that active treatments led to significantly higher pre–post effect sizes than both wait list/no contact control conditions, $Q_m(1) = 61.99$, $p < .001$, and active control conditions (e.g., treatment-as-usual, placebo), $Q_m(1) = 14.19$, $df = 1$, $p < .001$.

In a second step, uncontrolled effect sizes for changes in PTSD symptomatology from pre-treatment to follow-up were computed. All follow-up assessments taking place within the first 5 m post-treatment were included in the first analysis (FU1), and follow-ups with a longer time interval (≥6 m) were included in a second analysis (FU2). Results showed large pre-FU-effect sizes across active treatments, FU1: $g = 1.59$, 95% CI = [1.28; 1.91], $k = 11$ and FU2: $g = 1.56$, 95% CI = [1.35; 1.78], $k = 16$. The average pre-FU-effect sizes for active treatments were significantly larger than those in the waitlist/no contact control conditions, FU1: $g = 0.57$, 95% CI =[−0.27; 1.41], $k = 2$, $Q_m(1) = 4.93$, $p = .03$ and FU2: $g = 0.11$, 95% CI = [−0.21; 0.42], $k = 1$, $Q_m(1) = 55.41$, $p < .001$, as well as the active control conditions (e.g., treatment-as-usual, placebo), FU1: $g = 0.77$, 95% CI = [0.25; 1.29], $k = 2$, $Q_m(1) = 6.94$, $p = .008$ and FU2: $g = 0.66$, 95% CI = [0.27; 1.05], $k = 1$, $Q_m(1) = 16.03$, $p < .001$.

3.2.2. Controlled effect sizes

Only RCTs comparing at least one active treatment condition to at least one control group were used to compute controlled (i.e. between-group) effect sizes at post-treatment. The average between-group effect size comparing active treatments versus waitlist/no contact control conditions at post-treatment ($k = 9$) was medium to large, $g = 0.72$; 95% CI = [0.33; 1.11], whereas the average between-group effect size comparing active treatments versus TAU/placebo control conditions at post-treatment ($k = 7$) was of medium size and non-significant, $g = 0.50$; 95% CI = [−0.11; 1.12] (see also Fig. 3 for a forest plot). No controlled effect sizes were computed for follow-up assessments as only few studies ($k = 4$) providing enough information for this type of analysis could be identified.

3.2.3. Heterogeneity

Heterogeneity was large for within-group effect sizes ($I^2 = 79.48$; $Q = 102.32$, $df = 21$, $p < .001$) as well as between-group effect sizes (comparison with waitlist/no contact control conditions: $I^2 = 72.02$; $Q = 28.59$, $df = 8$, $p < .001$; comparison with TAU/placebo control

Table 1
Overview of studies included in the main analyses.

Study and type of treatment	PTSD instrument	Follow-up	Additional outcome variables	N included in study	N used in pre-/post-analysis	% female participants	Age *M* (*SD*)	Type of treatment	Trauma-focused	Modality	Number of sessions
Bohus et al. (2013)	CAPS	4.5 m; 6 m	Dep, Diss			100%	35.14 (10.60)				
DBT-PTSD				43	29			TF-CBT	Yes	Combined	25
TAU				39	29			Control 2	–	–	–
Bradley & Follingstad (2003)	TSI	None				100%	36.67 (8.27)				
Supportive group therapy				24	13			TF-CBT	Yes	Group	18
No contact control				25	18			Control 1	–	–	–
Chard (2005)	CAPS	3 m; 1 y	Dep, Diss			100%	32.77 (8.87)				
CPT				36	28			TF-CBT	Yes	Combined	17
Minimal Attention Control				35	27			Control 2	–	–	–
Cloitre et al. (2002)	CAPS	3 m; 9 m	Dep, Anx, Diss			100%	34 (7.22)				
STAIR/exposure				22	22			TF-CBT	Yes	Individual	16
Waitlist control				24	24			Control 1	–	–	–
Cloitre et al. (2010)	CAPS	3 m; 6 m	Dep, Anx			100%	37.1 (no SD reported)				
STAIR/exposure				33	33			TF-CBT	Yes	Individual	16
STAIR/support				38	38			N-TF-CBT	No	Individual	16
Support/exposure				33	33			TF-CBT	Yes	Individual	16
Dorrepaal et al. (2012)	DTS	None	Diss[a]			100%	40.3 (10.7)				
Stabilizing group treatment				38	31			N-TF-CBT	No	Group	20
TAU				33	29			Control 2	–	–	–
Edmond et al. (1999) & Edmond and Rubin (2004)[b]	IES	3 m; 18 m				100%	31 (no SD reported)				
EMDR				20	20			EMDR	Yes	Individual	6
Routine individual therapy				20	20			Control 2	–	Individual	–
Waitlist control				19	19			Control 1	–	–	–
Krupnick et al. (2008)	CAPS	4 m				100%	32 (10.2)				
Group interpersonal psychotherapy				32	24			Other	No	Group	16
Waitlist control				16	16			Control 1	–	–	–
McDonagh et al. (2005)	CAPS	3 m; 6 m	Dep, Anx, Diss			100%	39.8 (9.9)				
CBT				29	17			TF-CBT	Yes	Individual	14
Present-centered therapy				22	20			N-TF-CBT	No	Individual	14
Waitlist				23	20			Control 1	–	–	–
Paivio, Jarry, Chagigiorgis, Hall, and Ralston (2010)	PSSI	6 m	Dep, Anx			53.4%	45.62 (12.99)				
Emotion-focused therapy with imaginal confrontation				20	14			Other	Yes	Individual	18
Emotion-focused therapy with empathic exploration				25	23			Other	No	Individual	18
Resick et al. (2008)	CAPS	6 m	Dep, Anx			100%	35.4 (12.4)				
CPT				56	56			TF-CBT	Yes	Individual	12
Written Accounts (WA)				55	55			TF-CBT	Yes	Individual	12
Cognitive Therapy (CPT-C)				51	51			TF-CBT	Yes	Individual	12
Scheck, Schaeffer, and Gillette (1998)	IES	None[c]	Dep, Anx			100%	20.93 (no SD reported)				
EMDR				32	28			EMDR	Yes	Individual	20
Active listening control				32	29			Control 2	–	Individual	20
Sikkema et al. (2007)	IES	None				54%	42.5 (6.9)				
Coping group intervention				96	73			N-TF-CBT	No	Group	15
Support group intervention				101	77			Control 2	–	Group	15
Waitlist control				56	48			Control 1	–	–	
van der Kolk et al. (2007)[d]	CAPS	6 m				83%	36.1 (13.4)				
EMDR				n/r	11			EMDR	Yes	Individual	8
Pill placebo				n/r	14			Control 2	–	–	–
Zlotnick et al. (1997)	DTS	None	Diss			100%	39 (9.59)				
Affect-management group treatment				24	16			N-TF-CBT	No	Group	15
Waitlist control				24	17			Control 1	–	–	–
Zlotnick et al. (2009)	CAPS	3 m; 6 m				100%	34.6 (7.4)				
Seeking safety				27	27			N-TF-CBT	No	Group	24
Treatment as usual				22	22			Control 2	–	–	–

TSI = Trauma Symptom Inventory; CAPS = Clinician Administered PTSD Scale; DTS = Davidson Trauma Scale; IES = Impact of Event Scale; PSSI = Posttraumatic Stress Scale – Interview; Dep = Depression; Anx = Anxiety; Diss = Dissociation; TF-CBT = trauma-focused cognitive behavior therapy; N-TF-CBT = non-trauma-focused cognitive behavior therapy; EMDR = Eye Movement Desensitization and Reprocessing; Control 1 = wait list or no contact control group; Control 2 = treatment as usual/placebo; DBT-PTSD = Dialectic Behavior Therapy for PTSD; CPT = Cognitive Processing Therapy; STAIR = Skills Training in Affect and Interpersonal Regulation; TAU = treatment-as-usual; BPD = Borderline personality disorder; 6 w = 6 weeks follow-up; 3 m = 3 months follow-up; 6 m = 6 months follow-up; 9 m = 9 months follow-up; 1y = 1 year follow-up; n/r = not reported in article.

[a] The article did not provide enough data to compute effect sizes for dissociation as the outcome measure.

[b] The article by Edmond and Rubin (2004) describes follow-up data for the sample originally reported by Edmond et al. (1999). The two articles are therefore coded as one study.

[c] These studies report some results at follow-up. However, the articles do not provide enough data to compute effect sizes.

[d] This study additionally included a condition, in which participants received medication treatment.

Table 2
Methodological quality of studies included in the main analyses.

Study	Structured clinical interview for PTSD	Blind assessment of outcome	Manualized treatment	Data on treatment integrity	ITT analysis	Follow-up
Bohus et al. (2013)	Yes	Yes	Yes	No	Yes	Yes
Bradley & Follingstad (2003)	No	No	Yes	No	No	No
Chard (2005)	Yes	Yes	Yes	Yes	Yes	Yes
Cloitre et al. (2002)	Yes	Yes	Yes	Yes	No	Yes
Cloitre et al. (2010)	Yes	Yes	Yes	Yes	Yes	Yes
Dorrepaal et al. (2012)	Yes	Yes	Yes	No	Yes	No
Edmond et al. (1999) & Edmond and Rubin (2004)	No	No	Unclear	Yes	Yes	Yes
Krupnick et al. (2008)	Yes	No	Yes	No	Yes	Yes
McDonagh et al. (2005)	Yes	Yes	Yes	Yes	Yes	Yes
Paivio et al. (2010)	Yes	No	Yes	Yes	Yes	Yes
Resick et al. (2008)	Yes	Yes	Yes	Yes	Yes	Yes
Scheck et al. (1998)	Yes	Yes	Yes	No	No	No
Sikkema et al. (2007)	No	No	No	Yes	No	No
van der Kolk et al. (2007)	Yes	Yes	Yes	Yes	Yes	Yes
Zlotnick et al. (1997)	Yes	No	Yes	No	No	No
Zlotnick et al. (2009)	Yes	No	No	Yes	No	Yes

ITT = intent-to-treat.

conditions: $I^2 = 90.11$; $Q = 60.68$, $df = 6$, $p < .001$), indicating substantial heterogeneity in effect sizes between studies. Tables 3 and 4 show the average effect sizes for the different groups of treatment included. However, given the relatively small number of studies in most categories, the power was judged to be inadequate to directly compare the different groups of treatments. Instead, moderator analyses testing a priori hypotheses regarding variables that may underlie the heterogeneity observed were conducted.

3.3. Comparing trauma-focused vs. non-trauma-focused treatments

All active treatments were divided into trauma-focused treatments and non-trauma-focused treatments (see Table 1). Looking at uncontrolled effect sizes, results of a subgroup analysis showed that trauma-focused treatments performed significantly better than non-trauma-focused ones from pre- to post-treatment but also from pre-treatment to follow-up (for detailed results, see Table 5).

This finding was replicated when looking at controlled effect sizes post treatment (see Table 5). However, when specifying the type of control group, the difference between trauma-focused and non-trauma-focused treatments was only significant for controlled effect sizes comparing active treatments with TAU/placebo control groups, but not for those comparing active treatments to waitlist/no contact control conditions.

3.4. Individual versus group treatments

Some active treatments comprised group sessions only, whereas other treatments were provided as individual treatments only or a combination of individual and group sessions (see Table 1). Mean effect sizes for individual treatments (with or without additional group sessions) versus pure group treatments are shown in Table 6. As there was only one study with group sessions reporting effect sizes at follow-up, our analyses exclusively focused on effects at post-treatment. Treatments comprising individual treatment sessions showed significantly larger uncontrolled as well as controlled effect sizes than pure group treatments. When specifying the type of control group, the difference between individual/combined and group treatments was only significant for controlled effect sizes comparing active treatments with TAU/placebo control groups, but not for those comparing active treatments to waitlist/no contact control conditions.

3.5. Effect of treatments on associated symptomatology

Treatment effects on associated symptomatology are summarized in Table 7. All active treatments taken together showed large uncontrolled ($0.76 < g < 1.10$) as well as moderate to large controlled effect sizes ($0.66 < g < 1.29$) on symptom levels of depression, anxiety, and dissociation.

The comparison of trauma-focused vs. non-trauma-focused treatments could only be carried out for uncontrolled effect sizes as there was not enough variation on this variable when looking at controlled effect sizes. There was a trend for trauma-focused treatments showing larger effect sizes than non-trauma-focused interventions on symptom levels of depression and dissociation, but not anxiety. Due to low variation on this variable, individual/combined vs. group treatments could be compared regarding the effects on associated symptomatology.

3.6. Dropout

Very different definitions of dropout were used in the original studies. For the purpose of this meta-analysis, the dropout rate was defined as the percentage of participants not completing the whole course of treatment after having at least attended one treatment session, i.e. individuals dropping out after randomization/inclusion but never attending a sessions were not counted as dropouts. Four studies did not provide enough information to compute dropout rates defined in this way and were therefore not included in the analysis (Krupnick et al., 2008; van der Kolk et al., 2007; Zlotnick et al., 1997; Zlotnick, Johnson, & Najavits, 2009).

The average dropout rate across studies was 22.29%, 95% CI = [17.35%; 28.16%]. Dropout rates neither differed between trauma-focused (23.92%, 95% CI = [18.22%; 30.73%]) vs. non-trauma-focused treatments (18.51%, 95% CI = [14.57%; 23.23%]), $Q_m(1) = 2.02$, $p = .16$, nor individual/combined (23.16%, CI = [17.74%; 29.65%]) vs. group treatments (19.10%, 95% CI = [9.35%; 35.09%]), $Q_m(1) = 0.28$, $p = .59$.

3.7. Publication bias

Visual inspection of the funnel plot suggested possible publication bias, which was confirmed by significant Egger's tests for uncontrolled effect sizes (pre- vs. post-treatment): intercept (B0) = 5.69, 95% CI = [3.63; 7.74], $p < .001$, and controlled effect sizes comparing active conditions to waitlist/no contact control treatments (post-treatment):

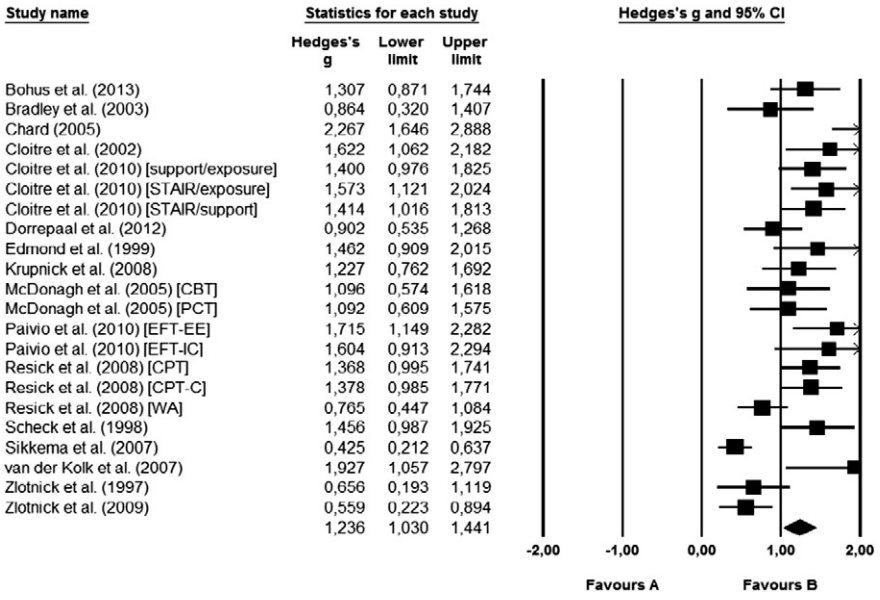

Fig. 2. Forest plot uncontrolled effect sizes (pre vs. post).

intercept (B0) = 5.26, 95% CI = [0.96; 9.56], $p = .02$, but not for controlled effect sizes comparing active conditions to TAU/placebo control conditions (post-treatment): intercept (B0) = 6.08, 95% CI = [−5.62; 17.77], $p = .24$. After adjustment for publication bias using Duval and Tweedie's trim and fill procedure, the mean uncontrolled effect size (pre vs. post) was reduced from $g = 1.24$ to $g = 0.93$, 95% CI = [0.73; 1.14], and the mean controlled effect sizes (post) reduced from $g = 0.72$ to $g = 0.18$, 95% CI = [−0.26; 0.62], and from $g = 0.50$ to $g = 0.21$, 95% CI = [−0.50; 0.92], respectively. However, the asymmetry in the funnel plots that is tapped by both the Egger's test and the trim and fill procedure when considering all studies combined may well be due to actual heterogeneity due to the smaller studies having (actual) larger underlying effect sizes (Sterne et al., 2011). For instance, such asymmetry could appear because larger studies involve predominantly group-focused therapies with relatively smaller effect sizes as opposed to the smaller studies that mostly involve individual treatments with larger treatment effects. Hence, we also conducted the publication bias analyses for the subgroups separately.

When looking at uncontrolled effect sizes (pre- vs. post-treatment), the degree of potential publication bias was comparable for trauma-focused and non-trauma-focused treatments, trauma-focused: intercept (B0) = 3.78; non-trauma-focused: intercept (B0) = 5.81. After adjustment for publication bias, the effect size for trauma-focused treatments ($k = 14$) was reduced from $g = 1.38$ to $g = 1.25$, 95% CI =[1.05; 1.46] and for non-trauma-focused treatments ($k = 8$) from g =0.97 to $g = 0.58$, 95% CI = [0.24; 0.93].

For controlled effect sizes (post-treatment), there was no evidence of publication bias for trauma-focused treatments, intercept (B0) = −0.75, 95% CI = [−15.08; 13.58]. Similarly, the effect size estimation remained unchanged when applying the trim and fill procedure ($g = 0.92$). However, for non-trauma-focused treatments, the Egger's test approached significance, intercept (B0) = 4.27, 95% CI = [−1.32; 9.85], $p = .06$. After adjusting for publication bias using the trim and fill procedure, the effect size for non-trauma-focused treatments (k =7) was reduced from $g = 0.23$ to $g = 0.10$, 95% CI = [−0.30; 0.50].

3.8. Additional analyses

In order to test the robustness of findings, the main analyses on uncontrolled effect sizes were repeated including all 36 studies meeting inclusion criteria 2–7, i.e. including the 20 studies that were only excluded because they used an uncontrolled and/or non-randomized

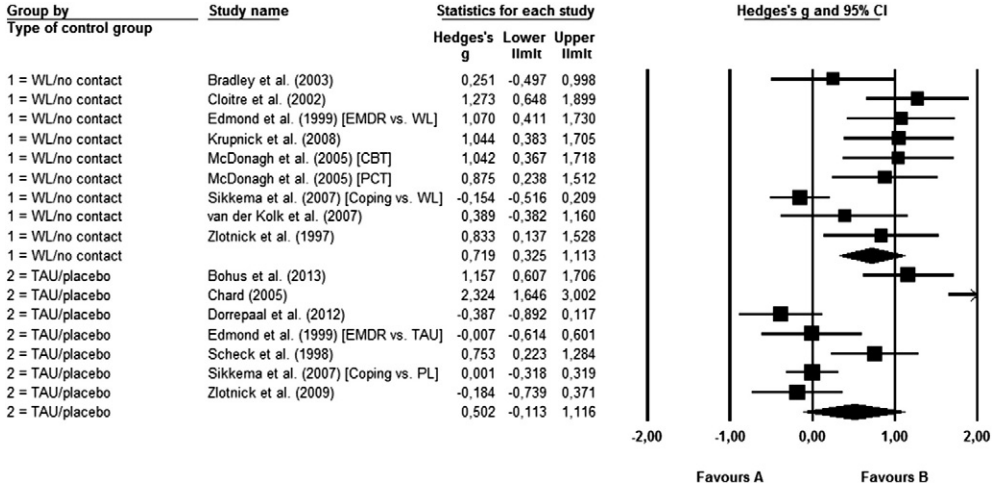

Fig. 3. Forest plot controlled effect sizes (post-treatment; RCTs only).

Table 3
Uncontrolled effect sizes (Hedges's *g*).

	Pre vs. post				Pre vs. FU1 (<6 m)				Pre vs. FU2 (≥6 m)			
	k	*M*	SE	95% CI	*k*	*M*	*SD*	95% CI	*k*	*M*	*SD*	95% CI
All active treatments	22	1.24	0.11	[1.03; 1.44]	11	1.59	0.61	[1.28; 1.91]	16	1.56	0.11	[1.35; 1.78]
Trauma-focused CBT	10	1.34	0.14	[1.10; 1.58]	6	1.86	0.15	[1.58; 2.15]	9	1.70	0.14	[1.44; 1.97]
Non-trauma-focused CBT	6	0.82	0.16	[0.51; 1.13]	3	1.11	0.29	[0.54; 1.67]	3	1.11	0.19	[0.73; 1.48]
EMDR	3	1.53	0.17	[1.20; 1.86]	1	1.82	0.33	[1.17; 2.47]	2	2.00	0.38	[1.24; 2.75]
Other	3	1.46	0.16	[0.14; 1.78]	1	1.24	0.24	[0.77; 1.71]	2	1.49	0.23	[1.05; 1.93]
Control conditions	15	0.38	0.09	[0.21; 0.56]	4	0.66	0.22	[0.23; 1.09]	2	0.37	0.28	[−0.17; 0.91]
Waitlist/no contact	7	0.23	0.07	[0.09; 0.37]	2	0.57	0.43	[−0.27; 1.41]	1	0.11	0.15	[−0.21; 0.42]
TAU/placebo	8	0.53	0.15	[0.23; 0.84]	2	0.77	0.27	[0.25; 1.29]	1	0.66	0.20	[0.27; 1.05]

k = number of treatment arms.
CBT = cognitive behavior therapy; EMDR = eye movement desensitization and reprocessing; TAU = treatment as usual; n/a = not applicable.

design (see Fig. 1; for details see also Appendix B [supplementary material published online]).[3]

Across all active treatments ($k = 42$), a large pre–post effect size was found, $g = 1.00$; 95% CI = [0.87; 1.14], whereas the average pre–post effect size for control conditions ($k = 22$) was small, $g = 0.30$, 95% CI = [0.18; 0.43]. Results of subgroup analyses showed that active treatments led to significantly higher pre–post effect sizes than both wait list/no contact control conditions, $Q_m(1) = 99.47$, $p < .001$, and active control conditions (e.g., treatment-as-usual, placebo), $Q_m(1) = 8.14$, $df = 1$, $p = .004$ (for details, see Appendix C [supplementary material published online]). The superiority of active treatments over control conditions remained significant at follow-up, FU 1: active treatments: $g = 1.31$, 95% CI = [1.06; 1.56], $k = 18$; control conditions: FU1: $g = 0.66$, 95% CI = [0.23; 1.09], $k = 4$; $Q_m(1) = 6.40$, $p = .011$; FU 2: active treatments: $g = 1.35$, 95% CI = [1.09; 1.60], $k = 24$; control conditions: $g = 0.26$, 95% CI = [−0.02; 0.53], $k = 5$, $Q_m(1) = 32.54$, $p < .001$.

In addition, uncontrolled pre- vs. post-treatment effect sizes were significantly larger for trauma-focused treatments, $g = 1.26$, 95% CI = [1.03; 1.49], $k = 19$, than for non-trauma-focused treatments, $g = 0.81$, 95% CI = [0.67; 0.94], $k = 23$, $Q_m(1) = 10.77$, $p < .001$, which was also replicated for pre-treatment vs. follow-up effect sizes (for details, see Appendix D [supplementary material published online]).

Finally, individual or combined treatments, $g = 1.18$, 95% CI = [0.99; 1.37], $k = 26$, showed significantly larger uncontrolled pre- vs. post-treatment effect sizes than group treatments, $g = 0.73$, 95% CI = [0.60; 0.86], $k = 16$, $Q_m(1) = 14.45$, $p < .001$, which was also replicated for pre-treatment vs. follow-up effect sizes (for details, see Appendix E [supplementary material published online]).

4. Discussion

The findings of this meta-analysis suggest that psychological interventions for PTSD in adult survivors of childhood abuse are efficacious. Across all active treatments, moderate to high effect sizes were found for the reduction of PTSD symptom severity as well as symptom levels of depression, anxiety, and dissociation. The magnitude of the average effect sizes obtained in the current meta-analysis is somewhat lower than that of earlier meta-analyses mainly focusing on treating PTSD in survivors of adult-onset trauma (Bisson et al., 2007; Bradley et al., 2005), but higher than effect sizes obtained in an earlier meta-analysis focusing on treatment of psychosocial problems in adult survivors of childhood sexual abuse (Taylor & Harvey, 2010). The level of dropout was similar to the level identified for PTSD treatments in general (Imel, Laska, Jakupcak, & Simpson, 2013).

There was a large heterogeneity in effect sizes between studies, with uncontrolled effect sizes ranging from $g = 0.43$ to $g = 2.27$, and controlled effect sizes ranging from $g = -0.39$ to $g = 2.32$. Two a priori hypotheses were tested to account for part of this heterogeneity. First, trauma-focused treatments were found to lead to significantly higher effect sizes than non-trauma focused interventions. This is in line with findings from earlier meta-analyses that mainly included treatment studies on PTSD following adult-onset trauma (Bisson et al., 2007), and in line with current treatment guidelines (Forbes et al., 2010). The importance of processing the trauma memory in PTSD treatment is also emphasized by current theoretical models of the disorder. Importantly, most theories suggest that characteristics of the trauma memory and/or excessively negative trauma-related appraisals lie at the core of the disorder (for reviews see Dalgleish, 2004; Ehlers et al., 2012). From a theoretical perspective, it is therefore highly plausible that the efficacy of PTSD treatments is related to the degree to which the treatment helps the individual to process the memory of the traumatic event.

In line with the second hypothesis, pure group treatments were found to be less efficacious than individual or combined treatments. This replicates earlier findings on PTSD treatment in general (Bisson et al., 2007), and treatment of psychosocial problems following childhood sexual abuse (Taylor & Harvey, 2010).

In sum, the results of the current meta-analysis replicate earlier findings in that individual trauma-focused treatments showed the highest effect sizes. They are also in line with current treatment guidelines recommending individual trauma-focused treatments as first-line interventions.

As in most earlier meta-analyses, we restricted our main analyses to RCTs. However, in order to test the robustness of findings we carried out additional analyses including non-randomized and/or uncontrolled studies, too. The reason for this decision was that the number of RCTs conducted with adult survivors of childhood abuse is still very limited. In order to represent the best evidence currently

Table 4
Between-group effect sizes (Hedges's *g*) at post-treatment.

	k	M	SE	95% CI
All active treatments vs. waitlist/no contact	9	0.72	0.20	[0.33; 1.11]
Trauma-focused CBT	3	0.88	0.30	[0.30; 1.47]
Non-trauma-focused CBT	3	0.48	0.39	[−0.28; 1.23]
EMDR	2	0.76	0.34	[0.10; 1.42]
Other	1	1.04	0.34	[0.38; 1.71]
All active treatments vs. TAU/placebo	7	0.50	0.31	[−0.11; 1.12]
Trauma-focused CBT	2	1.72	0.58	[0.58; 2.87]
Non-trauma-focused CBT	3	−0.12	0.12	[−0.37; 0.12]
EMDR	2	0.39	0.38	[−0.36; 1.13]

CBT = cognitive behavior therapy; EMDR = eye movement desensitization and reprocessing; TAU = treatment as usual; *k* = number of treatment arms.

[3] The 20 studies included in this step were Chard, Weaver and Resick (1997), Cloitre and Koenen (2001), Cohen and Hien (2006), Dorrepaal et al. (2010), Elklit (2009), Hébert and Bergeron (2007), Jepsen, Svagaard, Thelle, McCullough and Martinsen (2009), Kimbrough, Magyari, Langenberg, Chesney and Berman (2010), Lampe, Mitmansgruber, Gast, Schussler and Reddemann (2008), Lu et al. (2009), Lubin, Loris, Burt and Johnson (1998), Morgan and Cummings (1999), Resick et al. (2003), Sachsse, Vogel and Leichsenring (2006), Saxe and Johnson (1999), Sikkema et al. (2004), Stalker, Palmer, Wright and Gebotys (2005), Steil, Dyer, Priebe, Kleindienst and Bohus (2011), Wright, Woo, Muller, Fernandes and Kraftcheck (2003) and Zlotnick, Najavits, Rohsenow and Johnson (2003).

Table 5
Subgroup analyses comparing trauma-focused vs. non-trauma-focused treatments.

	k	*g*	SE	95% CI	Subgroup analysis	
					Q_m ($df = 1$)	*p*
Uncontrolled effect sizes						
Pre vs. post					4.79	.03
Trauma-focused	14	1.38	0.10	[1.19; 1.58]		
Non-trauma-focused	8	0.97	0.16	[0.65; 1.29]		
Pre vs. follow-up 1					8.36	.004
Trauma-focused	7	1.83	0.13	[1.60; 2.09]		
Non-trauma-focused	4	1.14	0.21	[0.72; 1.55]		
Pre vs. follow-up 2					4.02	.045
Trauma-focused	12	1.68	0.12	[1.45; 1.91]		
Non-trauma-focused	4	1.23	0.19	[0.85; 1.61]		
Controlled effect sizes (post)						
Active treatments vs. any control condition					5.46	.02
Trauma-focused	9	0.92	0.22	[0.49; 1.36]		
Non-trauma-focused	7	0.23	0.20	[−0.15; 0.62]		
Active treatments vs. waitlist/no contact control					0.35	.55
Trauma-focused	5	0.84	0.20	[0.45; 1.23]		
Non-trauma-focused	4	0.61	0.34	[−0.05; 1.27]		
Active treatments vs. TAU/placebo					6.45	.01
Trauma-focused	4	1.05	0.44	[0.18; 1.92]		
Non-trauma-focused	3	−0.12	0.12	[−0.37; 0.12]		

available, it therefore appeared informative to compare the results from controlled research with findings including all available evidence. Reassuringly, the pattern of findings was very similar in both types of analysis. For example, parallel results were obtained in the moderator analyses looking at the effect of trauma focus, and treatment modality on effect sizes.

Past research has shown that trauma-focused treatments are underutilized in routine clinical practice (Becker, Zayfert, & Anderson, 2004; van Minnen, Hendriks, & Olff, 2010). A frequently expressed concern is that trauma-focused treatments may not be safe in individuals suffering from high levels of symptom complexity. The current meta-analysis does not support this view. First, trauma-focused interventions were not only superior to non-trauma-focused ones when looking at PTSD symptom severities, but there was also a trend for the same effect when looking at comorbid symptomatology including dissociation. In addition, the two types of treatments did not differ regarding dropout rates. In sum, our findings do not support the notion that high levels of symptom complexity may be a contraindication for using trauma-focused treatments.

A number of limitations are noteworthy. First, the methodological quality of studies included in our meta-analysis was mixed. As a whole, treatment outcome research on PTSD following childhood abuse appears to lag behind the gold standard established in PTSD treatment research in general. Future research using more rigorous methodological approaches appears warranted. Second, there was a large heterogeneity in interventions included in the trauma-focused vs. non-trauma-focused groups of interventions compared in this meta-analysis. Unfortunately, there was not enough statistical power to compute more fine-grained analyses, e.g. comparing phase-based treatments to interventions using trauma-focused interventions from the very beginning. There is emerging evidence from a recent RCT directly comparing the two types of interventions that a phase-based approach comprising skills training and trauma-focused interventions is more effective than trauma-focused treatment alone (e.g., Cloitre et al., 2010). Nevertheless, more research is needed before definite conclusions can be drawn. Similarly, there was not enough power to directly compare the two major types of trauma-focused treatments, TF-CBT and EMDR. However, it should be noted that in the group of interest for our meta-analysis the evidence base is currently broader and more consistent for TF-CBT than for EMDR. Third, as only treatment studies with survivors of childhood trauma were included in the meta-analysis, no direct comparison of treatment effects in different trauma samples was possible. Future meta-analyses are needed that investigating trauma type as a moderator for the efficacy of different types of PTSD treatments. Fourth, although the literature search, study coding, and data retrieval from the articles were carried out by two independent researchers, no formal evaluation of inter-rater agreement was conducted. Finally, there was evidence for a large publication bias, which suggests that the effect sizes obtained in this meta-analysis may be an overestimation. This finding again underlines the need for

Table 6
Subgroup analyses comparing individual vs. group treatments.

	k	*g*	SE	95% CI	Subgroup analysis	
					Q_m ($df = 1$)	*p*
Uncontrolled effect sizes (pre vs. post)					9.63	.002
Individual or combined	17	1.36	0.10	[1.16; 1.56]		
Group	5	0.78	0.16	[0.47; 1.09]		
Controlled effect sizes (post)						
Active treatments vs. any control condition					4.93	.03
Individual or combined	10	0.86	0.22	[0.43; 1.30]		
Group	6	0.20	0.20	[−0.19; 0.59]		
Active treatments vs. waitlist/no contact control					2.08	.15
Individual or combined	5	0.97	0.15	[0.67; 1.27]		
Group	4	0.46	0.32	[−0.16; 1.08]		
Active treatments vs. TAU/placebo					4.24	.04
Individual or combined	5	0.80	0.42	[−0.02; 1.62]		
Group	2	−0.14	0.19	[−0.51; 0.23]		

Table 7
Effect sizes for associated symptoms.

	k	*g*	SE	95% CI	Subgroup analysis	
					Q_m ($df = 1$)	*p*
Depression						
Uncontrolled effect sizes (pre vs. post)						
Active treatments	14	1.10	0.08	[0.94; 1.27]	34.90	<.001
Control treatments	5	0.21	0.13	[−0.04; 0.46]		
Trauma-focused	11	1.18	0.10	[0.98; 1.37]	3.60	.06
Non-trauma focused	3	0.89	0.12	[0.66; 1.11]		
Controlled effect sizes (post)						
Active treatments vs. waitlist/no contact control conditions	3	1.08	0.19	[0.70; 1.45]		
Active treatments vs. TAU/placebo control conditions	3	1.29	0.35	[0.61; 1.98]		
Anxiety						
Uncontrolled effect sizes (pre vs. post)						
Active treatments	12	0.88	0.08	[0.73; 1.03]	10.40	<.001
Control conditions	3	0.36	0.14	[0.09; 0.64]		
Trauma-focused	9	0.94	0.07	[0.80; 1.08]	2.19	.14
Non-trauma focused	3	0.68	0.16	[0.36; 1.00]		
Controlled effect sizes (post)						
Active treatments vs. waitlist/no contact control conditions	3	1.08	0.23	[0.63; 1.54]		
Active treatments vs. TAU/placebo control conditions	1	0.66	0.26	[0.14; 1.17]		
Dissociation						
Uncontrolled effect sizes (pre vs. post)						
Active treatments	6	0.76	0.15	[0.47; 1.04]	17.47	<.001
Control conditions	5	0.07	0.08	[−0.09; 0.22]		
Trauma-focused	4	0.90	0.18	[0.54; 1.26]	3.53	.06
Non-trauma focused	2	0.46	0.15	[0.16; 0.75]		
Controlled effect sizes (post)						
Active treatments vs. waitlist/no contact control conditions	4	1.05	0.22	[0.62; 1.48]		
Active treatments vs. TAU/placebo control conditions	2	0.67	0.29	[0.10; 1.24]		

more systematic and more methodologically rigorous research in this area.

Despite these limitations, the current findings provide evidence that PTSD in adult survivors of childhood abuse can be treated effectively. In addition, our results suggest that the general recommendation of individual trauma-focused treatments as first-line interventions for PTSD (Bisson et al., 2007; Forbes et al., 2010) is also valid for this group of trauma survivors that have been underrepresented in earlier meta-analyses. Importantly, the meta-analysis also showed that treatment outcome research on PTSD following childhood abuse is lagging behind the general PTSD treatment research literature in terms of the number and methodological quality of studies. More research is needed to increase our knowledge on how best to treat this important group of patients.

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Contributors

TE, RW, PE and NM designed the study and wrote the protocol. RW, JF conducted literature searches and carried out the study coding, supervised by TE. JW, RW and TE conducted the statistical analyses. TE wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

Conflict of interest

All authors declare that they have no conflict of interest.

Supplementary data (Appendices A to E)

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.cpr.2014.10.004.

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