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Review

The role of parenting behaviors in childhood post-traumatic stress disorder: A meta-analytic review

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HIGHLIGHTS

- Significant associations were found between parenting behaviors and childhood PTSD.
- Parenting behavior accounted for 2.0–5.3% of the variance in child PTSD.
- Both negative and positive parenting were significantly associated with child PTSD.
- Positive and negative parenting effects did not differ statistically in magnitude.
- Methodological and trauma factors moderated the parenting–child PTSD association.

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ABSTRACT

Studies that have examined the association between parenting behaviors and childhood post-traumatic stress disorder (PTSD) have yielded mixed findings. To clarify the role of parenting in childhood PTSD we conducted a systematic review and meta-analysis of 14 studies that investigated the association between parenting and youth PTSD symptoms (total n = 4010). Negative parenting behaviors (e.g. overprotection, hostility) accounted for 5.3% of the variance in childhood PTSD symptoms. Positive parenting behaviors (e.g. warmth, support) account for 2.0% of variance. The negative and positive parenting and child PTSD symptom associations did not statistically differ in magnitude. Moderator analyses indicated that methodological factors and trauma variables may affect the association between parenting and child PTSD. Most studies relied upon questionnaire measures of general parenting style, and studies were predominantly cross-sectional with weaker evidence found in longitudinal studies. Given the small number of high quality studies available, only provisional recommendations about the role of parenting in childhood PTSD are made.

Contents

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1. Introduction

Childhood trauma exposure is associated with a range of adverse psychological outcomes, including posttraumatic stress disorder (PTSD), trauma-related specific phobias and other adjustment problems (de Vries et al., 1999; Keppel-Benson, Ollendick, & Benson, 2002; Meiser-Stedman, Yule, Smith, Glucksman, & Dalgleish, 2005; Perrin, Smith, & Yule, 2000; Stallard, Velleman, & Baldwin, 2001). PTSD has been linked to a range of traumatic events in childhood, including relatively common events such as motor vehicle accidents (de Vries et al., 1999; Stallard, Velleman, & Baldwin, 1998), with an estimated 16% of trauma exposed youth developing PTSD as a consequence (Alisic et al., 2014).

1.1. The potential role of social support following trauma

Research has consistently identified social support as a predictor of PTSD following trauma, both in samples of adults (Brewin, Andrews, & Valentine, 2000) and of young people (Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012). With respect to the latter, meta-analysis has found that social domains of low perceived social support (estimated population effect 0.33), poor family functioning (0.46), and social withdrawal (0.38) are each significant predictors of PTSD symptoms with moderate to large effect sizes, although for each the number of studies was relatively small (maximum $k = 7$; Trickey et al., 2012). More broadly, there is consistent evidence of social influences on child psychological outcomes post-trauma in long-term follow-up studies across a range of trauma types (e.g. Berkowitz, Stover, & Marans, 2011; Kliewer et al., 2004; Udwin, Boyle, Yule, Bolton, & O'Ryan, 2000).

In our own recent research, we asked young people aged 6–13 years to report on their perceptions of support approximately 1 month post-trauma, and found that the majority identified a parent as their main source of support, suggesting that parental behavior in particular should be a focus of research in this area (Dixon, 2016). This is consistent with a wider literature which suggests that parental behaviors may be influential in the development and maintenance of child anxiety (e.g. McLeod, Wood, & Weisz, 2007; Wood, McLeod, Sigman, Hwang, & Chu, 2003).

1.2. Conceptualizations of parenting behavior in the context of child trauma

Several researchers have considered the ways in which parents may alleviate or exacerbate child post-traumatic distress (Cobham, McDermott, Haslam, & Sanders, 2016; Scheeringa & Zeanah, 2001). Theoretically, models of PTSD highlight key domains that are likely to be relevant, particularly the way in which the trauma is encoded in memory and subsequently updated, the tendency for negative appraisals of the trauma and its sequalae, and the use of avoidant or otherwise maladaptive coping behaviors (Ehlers & Clark, 2000). Research supports the importance of these aspects of post-trauma responding to the development of PTSD in young people (e.g. Ehlers, Mayou, & Bryant, 2003; Meiser-Stedman, 2002; Stallard & Smith, 2007), and trauma-focused cognitive-behavior therapy (TF-CBT) tends to target each element, including in child focused interventions (Cohen, Mannarino, Berliner, & Deblinger, 2000; Smith et al., 2013). Importantly, parent-child interactions can influence the way in which young people remember and appraise events, and parents are influential in determining child engagement with trauma-related material (Cobham et al., 2016) and may model or encourage certain coping styles (Williamson, Creswell, Butler, Christie, & Halligan, 2016). Thus, there are clear potential mechanisms through which parents may input into child posttraumatic adjustment. In terms of specific aspects of parental behavior, to date the focus in the field has been on dimensions studied in relation to child anxiety, including parental overprotection, positive parenting and parental warmth, and also hostile or coercive parental behaviors.

1.3. Parental overprotection

Overprotection, including excessive involvement in a child's activities and lack of autonomy granting, is assumed to obstruct the development of self-efficacy and increase a child's perceived vulnerability to threat (Wood et al., 2003). In a meta-analysis of studies that examined parenting domains in relation to child anxiety, parental overprotection emerged as having a moderate effect (effect size 0.25), accounting for approximately 6% of the variance in childhood anxiety (McLeod et al., 2007). Such observations are particularly relevant to child PTSD, as child trauma exposure has been linked with increases in parent monitoring behavior (Bokszczanin, 2008; Henry, Tolan, & Gorman-Smith, 2004). Parents may be prone to engaging in more restrictive, less positive behaviors in this context, possibly due to fears that the child may be traumatized again (Scheeringa & Zeanah, 2001; Williamson, Creswell et al., 2016; Williamson et al., 2016). Theoretically, overprotection is likely to be a problematic parental response to child trauma, as it may limit the child's opportunities to engage with trauma-related material or activities, which may act as a barrier to recovery. Indeed, a number of studies have found that higher levels of overprotection are associated with increased child PTSS (Bokszczanin, 2008; Henry et al., 2004).

1.4. Parental support

Parental support, including positive involvement in the child's activities and expressions of affection and warmth towards the child, may

facilitate child coping post-trauma by providing a sense of security, coaching (e.g. providing direct instructions or recommendations) and modelling adaptive coping (e.g. Marsac, Donlon, Winston, & Kassam-Adams, 2013). Parents who are supportive, available and accepting are likely to provide additional opportunities for children to discuss and address trauma-related distress, and positive parental responses may reduce the likelihood that the child appraises the trauma or their reactions to it in a highly negative way. The impact of positive parental support has been examined in relation to child coping in response to several stressors including natural disasters, community violence and physical injury. However, evidence for a negative relationship between parental support and child PTSD symptoms (PTSS) is mixed (e.g. Bokszczanin, 2008; Marsac et al., 2013; Punamäki, Qouta, & El-Sarraj, 2001). For example, Punamäki et al. (2001) found a negative association between paternal warmth and child PTSD, indicating that more paternal warmth is associated with lower levels of child PTSD. However, this study also found a positive association between maternal warmth and child PTSD. Therefore, the role of parental support in child PTSS is uncertain.

1.5. Hostile parenting behavior

Finally, hostile parenting, including criticism or aggression towards the child (Morris et al., 2002) may impair a child's emotion regulation by increasing their sensitivity to anxiety (Gottman, Katz, & Hooven, 1997). Negative or critical parental responses may also reinforce child negative trauma-related appraisals and thereby influence PTSS directly. Previous research has found adult patients with PTSD whose relatives score highly on scales of expressed emotion (with high levels of criticism) have poorer treatment outcomes than patients whose families exhibit low expressed emotion (Tarrier, Sommerfield, & Pilgrim, 1999). Nonetheless, the research examining the relationship between parental behaviors and child PTSD has yielded mixed findings (Gewirtz, Forgatch, & Wieling, 2008; Marsac et al., 2013; Punamäki et al., 2001; Thabet, Ibraheem, Shivram, Winter, & Vostanis, 2009). For example, whereas some studies find a significant positive relationship between higher levels of parental hostility and greater child PTSS (Kelley et al., 2010; Valentino, Berkowitz, & Stover, 2010), others report non-significant (Rosario, Salzinger, Feldman, & Ng-Mak, 2008) or negative associations (Punamäki et al., 2001). As such, the potential for parents to influence child post-trauma adjustment is unclear.

1.6. Purpose of the current review

In sum, several parenting domains have been considered in relation to child PTSD, both theoretically and through empirical investigation. However, to date, the empirical evidence base has yielded mixed finding. To address this, we present a meta-analytic review of studies examining the association between parenting behaviors and child posttraumatic stress symptoms, to allow conclusions derived from the evidence base as a whole. For the purpose of this analysis, parenting was examined as a function of two polar dimensions with positive parenting practices (e.g. warmth, parental support) at one end of the continuum and negative parenting practices (e.g. overprotection, hostility) at the other, consistent with previous studies of child anxiety (e.g. McLeod et al., 2007). We also considered several potential moderators of effects. First, younger age and female sex have been found to increase the risk of developing PTSD (see Foy, Madvig, Pynoos, & Camilleri, 1996; Trickey et al., 2012). Second, the type of traumatic event (intended versus unintended event; collective versus individual trauma exposure) moderated effect sizes (ESs) of risk for PTSD development in previous meta-analyses (see Brewin et al., 2000; Trickey et al., 2012). Third, methodological factors, including method of assessment of PTSD (interview versus questionnaire; child versus parent informant) and of parenting (questionnaire, interview or observation), and study design (cross-section or longitudinal) have been found to influence the magnitude of associations found between the parenting and child psychopathology (McLeod et al., 2007). We examined each of these potential moderators in the present analysis.

2. Method

We conducted a computer based search of the psychological and medical electronic literature databases, including Medline, Embase, PsychInfo, PILOTS, PsychNet, and Web of Science. The search dated from 1980 (when the DSM first defined PTSD) to December 2014. The search terms were 'post-trauma*', OR 'posttrauma*', OR 'PTSD', OR 'PTSS', OR 'trauma*', OR 'injur*', AND 'parent' (including all search engine variants) OR 'famil*', OR 'behav*', AND 'child' (including all search engine variants) OR 'adolescent' (including all search engine variants). In addition, we contacted key authors to request details of any further published or unpublished studies and manually searched reference sections of relevant review papers (e.g. Foy et al., 1996; Gewirtz et al., 2008; Morris, Gabert-Quillen, & Delahanty, 2012; Trickey et al., 2012), book chapters, empirical articles and issues of journals (e.g. Journal of Traumatic Stress) to identify any studies that had not yet been included in the literature databases. A Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow chart (Fig. 1) describes the systematic and meta-analytic review process (Moher, Liberati, Tetzlaff, & Altman, 2009). Where we excluded studies based on more than one criterion, the primary exclusion criterion is shown.

2.1. Eligibility criteria

To be considered for inclusion studies had to include the following: a direct measure of parenting in relation to a specific child; a standardized measure of child PTSS (i.e. self-report); statistical testing of the

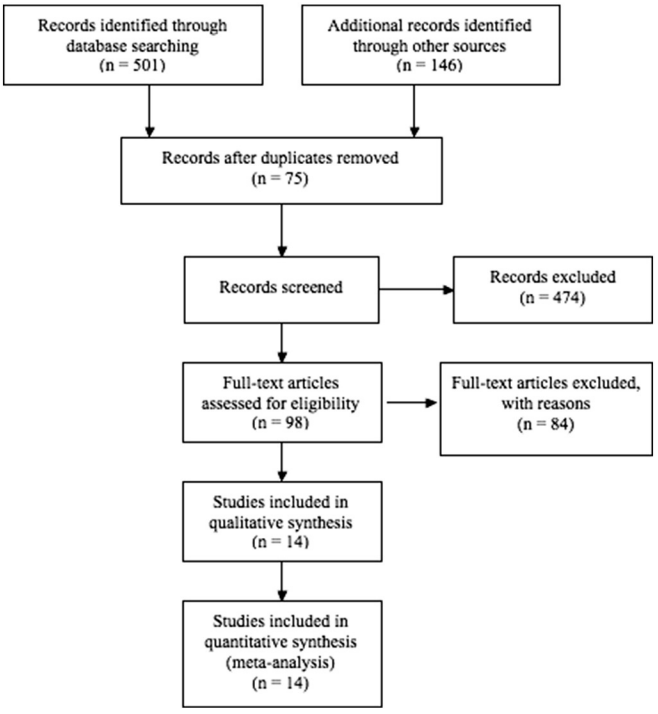

Fig. 1. PRISMA flow chart. Reasons for exclusion were: no parenting behavior(s) assessed (n = 49); parent perpetrators of abuse (n = 7); sample selected due to specific comorbid primary psychiatric disorder (n = 1); did not include a post-trauma measure of parenting behavior(s) (n = 2); article not an empirical study (n = 16); association between parenting behaviors and child PTSD not tested significantly (n = 2); did not assess child PTSD (n = 1); longitudinal study excluded in favor of another paper with same sample (n = 3); sample mean >19 years (n = 1); exposure to trauma did not meet DSM criteria (n = 1); studies excluded where insufficient data was provided to calculate effect sizes and information could not be obtained from the author (n = 1).

association between parenting and child PTSS; and a sample of child participants with mean age below 19 years.

Articles were excluded on the following grounds:

a) The article was a review that did not offer new data or only presented qualitative analysis;
b) The study sample was selected because the participants were experiencing a specific comorbid primary psychiatric disorder (e.g. substance abuse, eating disorders, etc.) which may limit the generalizability of results;
c) Single case studies;
d) Studies that examined child trauma where the parent was directly responsible or inflicted the trauma (e.g. child abuse) due to the numerous confounding variables involved in such samples;
e) Studies where the sample was not exposed to a traumatic event meeting DSM diagnostic criteria for PTSD (American Psychiatric Association, 2013).
f) Studies not written in English. Non-English papers were documented, but were not included in the review due to insufficient resources and facilities for translation.

Parenting was defined as patterns of parenting practices or behaviors towards the child (e.g. hostility, autonomy restriction), as reported by observers, children, or parents. As such, we did not include studies that exclusively measured family functioning or the family environment as these reflect a series of complex interactions within a family rather than direct parenting practices. We use the term 'child' throughout this review to describe both children and adolescents under the age of 19 years.

Fig. 1 presents a PRISMA flow chart for the study. Two authors (VW & JW) independently conducted searches for relevant literature, screened articles and extracted data. There was excellent inter-rater reliability (intraclass correlation = 0.78) and any disagreement on the eligibility of a study was discussed with the third author (RH) and a consensus was reached. One eligible paper was ultimately not included in this review as the corresponding author was unable to provide essential information regarding the trauma exposure of the sample that was required to calculate a reliable ES of the association between parenting and child PTSS (Khamis, 2005). On three occasions, the same data were reported in more than one article. In such cases, results from the most comprehensive article were used. Fourteen studies met the inclusion criteria for this review. Sample characteristics, methods of assessment and study ESs are shown in Table 1.

2.2. Data extraction

We extracted the following data from each study: (a) background and demographic information including study location, design, whether it was part of a larger study, family status, parents' years of education, ethnicity, socio-economic status; (b) number of participants; (c) child age range and mean age; (d) for longitudinal studies, assessment time points and retention rates; (e) child sex; (f) parent sex; (g) type of parenting behavior; (h) how the parenting behavior was measured (i.e. questionnaire, interview); (i) parenting behavior measure used; (j) parenting behavior informant (i.e. child, parent); (k) child trauma type; (l) how child PTSS were measured; (m) what child PTSS measure was used; (n) informant for child PTSS; (o) findings; (p) ESs and (q) any ethical issues or sources of bias. For more information see Table 1. Two authors (VW and JW) independently extracted and assessed data. Any discrepancies were checked and successfully resolved.

2.3. Study sample

The 14 included studies dated from 1996 to 2014 and involved 4010 participants. Children were aged between 9 and 16 years (M = 12.3, SD 1.77) and 23 ESs were included in the meta-analysis. In one case where the mean age of the child was not reported and the information could not be obtained from the study authors, the median age of the sample was calculated from the information provided in the article and used as a proxy for the mean. Eight of the included studies reported the ethnic composition of their sample; four studies consisted mostly of Caucasian participants and four studies consisted largely of non-Caucasian participants (e.g. African American, Hispanic, Asian). Three studies reported the percentage of intact families: Bokszczanin (2008) report

Table 1
Included studies, methods of assessment, sample characteristics, quality ratings and study effect size.

Study	n	Age	Mothers (%)	Parenting Informant	PTSS Informant	Parenting behavior	Design	Trauma type	Males (%)	Mean ES	SD	Quality
Bokszczanin (2008)	503	16.0 (2.5)	n/a	Child	Child	Support, overprotection[c]	Cross-sectional	Group	40.0	0.34	0.05	16
Cobham & Mcdermott (2014)	776	9.7 (1.2)	n/a	Parent	Child	Overprotection	Cross-sectional	Group	45.1	0.19	0.04	15[e]
Kelley et al. (2010)	381	12.0 (2.0)	99.5	Parent	Child	Hostility	Longitudinal	Group	n/a	0.16	0.05	14
Keppel-Benson et al. (2002)	50	11.6 (3.2)	88.0	Child[b]	Both[d]	Overprotection	Cross-sectional	Individual	58.0	0.24	0.15	14
Le Brocque et al. (2010)	175	10.7 (2.3)	84.0	Parent	Child	Support, overprotection	Longitudinal	Individual	64.0	0.00	0.08	10[e]
Marsac et al. (2013)	82	12.1 (2.7)	82.0	Both	Child	Support	Longitudinal[d]	Individual	70.0	0.01	0.11	16
Meiser-Stedman et al. (2006)	33	13.8 (1.9)	97.0	Parent	Child	Overprotection[c]	Longitudinal[d]	Individual	60.6	0.31	0.18	16[e]
Morris (2010)	35	11.7 (2.6)	94.0	Both	Child	Overprotection, support	Cross-sectional	Individual	60.0	0.39	0.18	16
Punamäki et al. (2001)	86	14.0 (0.8)	100	Child	Child	Support, hostility	Longitudinal[d]	Group	48.8	0.02	0.11	14
Rosario et al. (2008)	613	11.8 (0.7)	n/a	Both	Child[d]	Support, hostility	Longitudinal[d]	Individual	50.2	0.10	0.04	13
Thabet et al. (2009)	412	13.7 (1.1)	n/a	Child	Child[d]	Support	Cross-sectional	Group	48.5	0.34	0.05	17
Tillery et al. (2014)	205	13.6 (2.3)	n/a	Child	Child	Support, overprotection	Cross-sectional	Individual	51.2	0.23	0.07	17
Valentino et al. (2010)	91	12.1 (2.9)	89	Both	Both	Support, hostility	Cross-sectional	Individual	46.2	0.15	0.12	17[e]
Vernberg et al. (1996)	568	9.5[a]	n/a	Child	Child	Support	Cross-sectional	Group	45.0	026	0.04	15

Note. Age is reported in mean years, standard deviation reported in brackets. Mothers (%) = percentage of mothers that participated in the study. Males (%) = percentage of male children that participated in the study. ES = effect size. SD = standard deviation. Quality = methodological quality score (range = 0–18).

[a] Median age.
[b] Studies using an interview measure versus a questionnaire assessment.
[c] Study also examined poor family functioning.
[d] Longitudinal effects used in the analysis.
[e] Author was contacted and provided further information.

88% family intactness; Le Brocque, Hendrikz, and Kenardy (2010) reported 74% family intactness; and Morris (2010) reported 43% family intactness. Child PTSS were assessed by questionnaire measures in 11 studies and by interview measures in 3 studies.

Parenting behavior was measured using questionnaire measures in 13 studies, with 4 studies providing parent-report, 6 studies providing child-report, and 4 studies providing both parent and child report of parenting behavior. Where both mother and father report of parenting was available, we used an average of these in order for each study to contribute only one ES to the analysis. For longitudinal studies where multiple ESs measuring the association of parenting behavior and child PTSS at several time points were available, we used the ES provided for the first available time point in the analysis (see Table 1). As previous studies have shown poor agreement of parent and child reports of child Acute Stress Disorder (ASD) symptoms (Meiser-Stedman, Smith, Glucksman, Yule, & Dalgleish, 2007) and, compared to parent reports, older children identify significantly more PTSS by self-report (Scheeringa, Wright, Hunt, & Zeanah, 2006), we used child self-report ratings of PTSS in the analysis for the two cases where both parent and child report were available. If both continuous (PTSD symptom severity) and categorical (PTSD diagnosis) data were available for a given study, we used the ES for PTSD symptom severity due to the statistical compatibility of continuous variables in predictive research.

2.4. Meta-analytic method

We conducted meta-analyses using RStudio (version 0.98.507) and the Metafor package (Viechtbauer, 2010), and produced figures using STATA (Sterne, Bradburn, & Egger, 2008). We used Pearson's product-moment correlation (r) as the ES for the association of parenting and child PTSS as r is more readily interpretable in comparison to other ESs. We calculated ES values for each association of interest within each study, with separate ES values for each parenting behavior.

Two studies only reported the absence of statistical significance (e.g. "the findings were not statistically significant"). As these cases represent parenting-child PTSS effects that did not reach statistical significance, excluding these studies could potentially result in an upwardly biased meta-analysis estimate (Davis, Mengersen, Bennett, & Mazerolle, 2014). To avoid such artificial inflation of ES estimates, when results from a study were reported as not significant and F or t values were not available, a random number between the range of critical values of F or t at $p = 0.05$ was selected using a random number generator to calculate an estimate of ES (Enders, 2010; Murayama, Miyatsu, Buchli, & Storm, 2014).

We applied the Hedges-Olkin approach (Hedges & Olkin, 1985; Hedges & Vevea, 1998) using the Fisher transformed correlation coefficients with the results reported in Pearon's r following a back-conversion. To compare the ESs of negative parenting behaviors (e.g. hostility) to the ESs of positive parenting behaviors (e.g. support), we multiplied ESs by -1 when necessary to ensure that higher scores were indicative of more negative parenting behaviors. Therefore, for comparisons involving support, positive correlations signify that more of the parenting behavior was associated with fewer child PTSD symptoms.

We chose random-effects modelling with restricted maximum likelihood a priori as this method allows the meta-analytic results to be generalized to a wider population of studies (Hedges & Vevea, 1998; Huedo-Medina, Sánchez-Meca, Marin-Martinez, & Botella, 2006).[1] We conducted three separate meta-analyses to examine the association of parenting behaviors and child PTSS. First, we examined the association of overall parenting and child PTSS. For this analysis, one ES was generated for each study by averaging across all of the childhood PTSD and parenting behavior comparisons for the study (McLeod et al., 2007). Second, we investigated the association between negative parenting behaviors (overprotection, hostility) and child PTSS. All studies that examined negative parenting behaviors in relation to child PTSS contributed one ES to the analysis, created by averaging across all of the negative parenting behavior and child PTSS comparisons for the study. Third, we examined the association of positive parenting behaviors (i.e. support) and child PTSS. All studies that measured positive parenting behaviors in relation to child PTSS contributed one ES to the analysis as per above. The Chi^2 test was used to assess heterogeneity.

In addition to estimating meta-analytic ESs for both positive and negative parenting, we also explored whether these differed in magnitude. The fact that the same studies could contribute to the meta-analysis of negative parenting and the meta-analysis of positive parenting was taken into account. Direct statistical comparisons between dependent meta-analytic ESs (in this case due to the fact that the multiple outcomes come from the same studies, and are therefore correlated) present problems when primary studies do not report the inter-correlations between them (as in this case, and most meta-analyses). Recent work has shown that a three-level hierarchical linear modelling approach, in which outcomes are treated as nested within studies, reliably yields unbiased ES estimates and standard errors, and can therefore be used to compare dependent meta-analytic ESs when correlation estimates are missing (van den Noortgate, López-López, Marín-Martínez, & Sánchez-Meca, 2015). Therefore, this approach was used to examine conservatively the differences between the negative and positive parenting dimensions.

Sensitivity analyses were conducted to determine whether the results were impacted by the approach to calculating ES estimates, in terms of: a) using the first available time point to calculate an ES in longitudinal studies; and b) using an average of mother and father report of parenting where both were available.

In order to determine whether there was any significant publication bias, we first created funnel and forest plots to provide a visual representation of the data. We then conducted rank correlation tests (Begg & Mazumdar, 1994) and regression tests (Egger, Smith, Schneider, & Minder, 1997) to determine whether or not there was evidence of publication bias. Finally, we used Duval and Tweedie's trim and fill proceedure to determine an estimate of the ES after accounting for publication bias (Duval & Tweedie, 2000).

We conducted moderator analyses on the overall, negative and positive parenting behavior-child PTSS analyses, including variables where there were at least four studies in each sub-category (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003). We used meta-regression when a moderator was a continuous variable in order to quantify the relationship between the magnitude of the moderator and the parenting – child PTSS effect (Borenstein, Hedges, Higgins, & Rothstein, 2009). We examined the following variables as potential moderators of the association between parenting behavior-child PTSS: study design (cross-sectional or longitudinal); whether the trauma was intentional, unintentional, or mixed; whether the trauma was a group (e.g. natural disaster) or individual trauma (e.g. assault); how child PTSS were measured (questionnaire or interview); informant for child PTSS; how parenting was measured (questionnaire or interview); the parenting behavior informant; type of parenting measured in each study (negative parenting behaviors, positive, or both); child mean age[2]; study location (USA or Other); child sex; parent sex; and time since trauma at the first study assessment. We combined mixed and intentional

[1] We did not conduct a Hartung-Knapp adjustment as part of our original analysis. We ran a sensitivity analysis to examine the possible implications of this. Applying the adjustment did not alter the findings and results were essentially identical to the original analyses.

[2] One study only had median versus mean child age available. We conducted sensitivity analysis to examine whether including median age as a proxy for child mean age in this one case had a significant effect. This was not the case. Excluding the study which used median age from moderator analyses did not alter the findings and age remained non-significant as a moderator in both the overall (between-group $Q = 3.63$, $p = 0.06$) and positive (between-group $Q = 3.19$, $p = 0.07$) parenting-PTSS analyses to which the study contributed an ES.

subcategories of the trauma intentional moderator to allow for a meaningful contrast between subsets ($k = 4$).

Two authors (VW and JW) independently assessed methodological quality and the quality of the reported data relevant to the research question (e.g. the association between parenting behaviors and child PTSS) for all included studies using a nine-item checklist adapted from Kmet, Lee, and Cook (2004). Adapted items on the checklist include an assessment of whether: the study design was evident and appropriate; the outcome measure(s) of parenting behavior and PTSS were well defined; and the analytic methods used were described and appropriate. Studies were scored depending on the extent to which the specific criteria were met ('yes' = 2, 'partial' = 1, 'no' = 0) and we calculated a summary score for each study by summing the total score across all items of the scale (Table 1). All disagreements were resolved in a consensus meeting.

3. Results

3.1. Meta-analysis of overall parenting-child PTSS

Meta-analysis of combined negative and positive parenting behaviors yielded a significant mean effect of the overall parenting and child PTSS association of 0.20 ($p < 0.0001$, 95% CI 0.13, 0.26). This meets the criteria for a small effect and suggests that overall parenting behaviors accounted for approximately 3.8% of the variance in childhood PTSD. A forest plot of the associations between overall parenting and child PTSS can be found in Fig. 2.

The results of the heterogeneity analysis were highly significant, ($Q(13) = 44.6$, $p < 0.0001$), which potentially indicates the presence of moderating variables (Huedo-Medina et al., 2006). Between-group differences in ES related to study-level moderators were tested using the between-group Q statistic within a random effects model. Results revealed no significant moderating effect on the association between parenting and child PTSS of whether the trauma was intentional, unintentional, or mixed (between-group $Q(2) = 0.05$, $p = 0.82$); child PTSS measurement (questionnaire, interview; $Q(1) = 0.22$, $p = 0.64$); parenting behavior measurement (questionnaire, interview; $Q(1) = 0.07$, $p = 0.79$); type of parenting measured in each study ($Q(2) = 0.67$, $p = 0.71$); whether the trauma was a group or individual trauma ($Q(1) = 2.72$ $p = 0.10$); child mean age ($Q(1) = 1.6$, $p = 0.21$); parent sex ($Q(1) = 2.1$, $p = 0.15$); study location ($Q(1) = 0.21$, $p = 0.65$); and time since trauma at the first study assessment ($Q(1) = 0.36$, $p = 0.55$).

Moderator analyses did identify significant between-group Q statistics for the relationships between parenting – child PTSS and study design ($Q(1) = 14.12$, $p = 0.0002$) parenting behavior informant ($Q(2) = 8.20$, $p = 0.02$) and child sex ($Q(1) = 5.03$, $p = 0.03$). The results of these moderator analyses are shown in Table 2. Follow-up analyses suggest that larger ESs were found for: (i) cross-sectional designs (ES = 0.27) compared to longitudinal designs (ES = 0.09) although both population ES estimates were significantly greater than zero; and (ii) child (ES = 0.28) in comparison to parent (ES = 0.15), or both parent and child (ES = 0.12) reports of parenting behavior (population ES estimates were significantly greater than zero for each set of informants). Meta-regression analysis indicated a significant negative association between parenting- child PTSS and (iii) the percentage of males in a study ($B = -0.009$), meaning the ES decreases by 0.09 with every 10% increase in the percentage of males.

3.2. Meta-analysis of negative parenting-child PTSS

Meta-analysis examining exclusively negative parenting behaviors (hostility, overprotection) identified a significant negative parenting and child PTSS association mean ES of 0.23 ($p < 0.0001$, 95% CI 0.15, 0.31). This mean ES meets the criteria for a small effect, suggesting that negative parenting was associated with approximately 5.3% of the variance in childhood PTSS. A forest plot of this analysis can be found in Fig. 3.

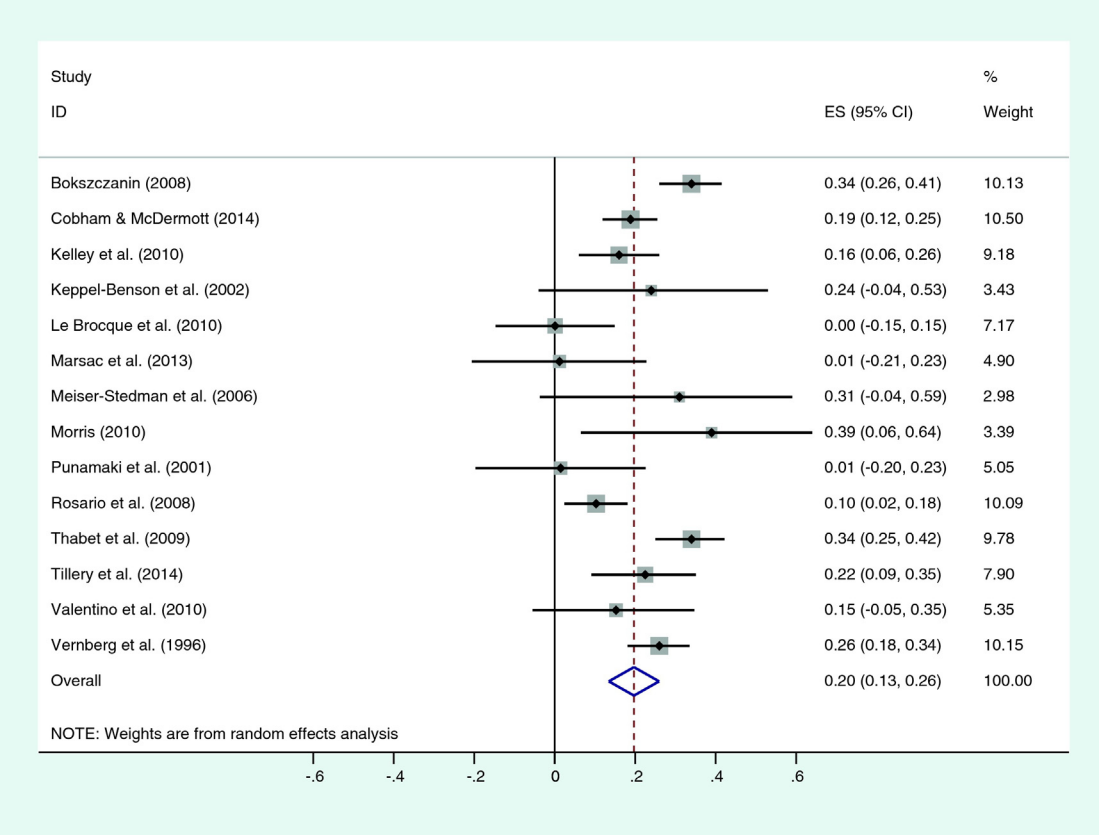

Fig. 2. Forest plot of the associations between overall parenting behaviors and child PTSS. CI = confidence intervals.

Table 2
Moderator analyses for overall parenting and child posttraumatic stress symptoms.

Moderator	*r*	CI, 95%	*Q*	Between-group *Q*	Tau^2
Random effects model	0.196	0.131, 0.26	44.59		0.01
Study design			19.28	14.12**	0.0026
Longitudinal	0.093*	0.002, 0.17			
Cross-sectional	0.273**	0.215, 0.33			
Parenting informant			20.87	8.20*	0.0035
Child	0.279***	0.208, 0.35			
Parent	0.148*	0.061, 0.235			
Both	0.122*	0.018, 0.226			
Percentage males	0.638*	−0.016, −0.001	27.66	5.03*	0.0058

Note. CI = confidence interval, *Q* = Cochran's (1954) measure of homogeneity, Tau^2 = between study variance in random effects model.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

Table 3
Moderator analyses for negative parenting and child posttraumatic stress symptoms.

Moderator	*r*	CI, 95%	*Q*	Between-group *Q*	Tau^2
Random effects model	0.23***	0.15, 0.306	41.97		0.012
Study design			22.01	7.48**	0.006
Longitudinal	0.136*	0.004, 0.23			
Cross-sectional	0.315**	0.227, 0.403			

Note. CI = confidence interval, *Q* = Cochran's (1954) measure of homogeneity, Tau^2 = between study variance in random effects model.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

The heterogeneity analysis produced significant results, ($Q(10) = 42.0$, $p < 0.0001$), potentially indicating the presence of moderator variables. The only significant moderator of the negative parenting and child PTSS association was study design (between-group ($Q(1) = 7.5$, $p = 0.006$). The results of this moderator analysis are shown in Table 3. Analyses indicated that significantly larger ESs were found for cross-sectional design (ES = 0.32) compared to longitudinal study design (ES = 0.14), although both population ES estimates were significantly greater than zero.

3.3. Meta-analysis of positive parenting-child PTSS

The mean ES of the positive parenting and child PTSS association was 0.14, suggesting that positive parenting accounted for 2.0% of the variance in child PTSS, and was statistically significant ($p < 0.05$, 95% CI 0.02, 0.26). A forest plot of this analysis can be found in Fig. 4. The heterogeneity analysis produced strongly significant results ($Q(10) = 62.1$, $p < 0.0001$) suggesting the presence of moderator variables.

Significant moderators of the relationship between parenting and child PTSS were study design (between-group $Q(1) = 6.52$, $p = 0.01$), parenting behavior informant ($Q(2) = 12.5$, $p = 0.002$), and group vs individual trauma ($Q(1) = 4.25$, $p = 0.04$). The results of moderator analyses are shown in Table 4. Follow up analyses suggested that larger ESs were found for (i) cross-sectional designs (ES = 0.24) compared to longitudinal designs (ES = −0.01), (ii) child (ES = 0.22) in comparison to parent (ES = −0.19), or both parent and child (ES = −0.02) informants of parenting behavior reports (iii) group trauma (ES = 0.25) in comparison to individual trauma (ES = 0.05).

Finally, to test whether the mean effects for the positive and negative parenting strategies were significantly different, a three-level hierarchical linear modelling approach (van den Noortgate et al., 2015) was utilized. The results of this analysis indicate that the negative and positive parenting and child PTSS associations are not significantly different as the difference in ESs for negative and positive parenting (ES difference = 0.073, 95% CI −0.06, 0.21, *SE* = 0.068) was not significant ($p = 0.28$).

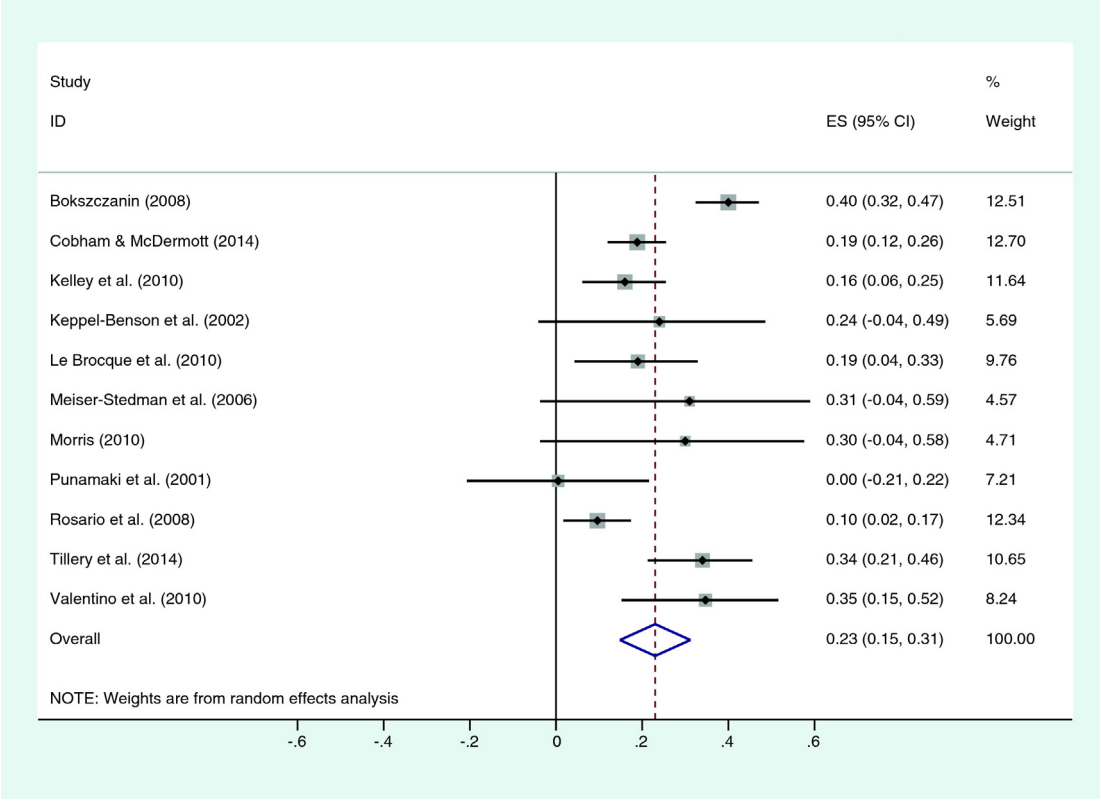

Fig. 3. Forest plot of the associations between negative parenting behaviors and child PTSS. CI = confidence intervals.

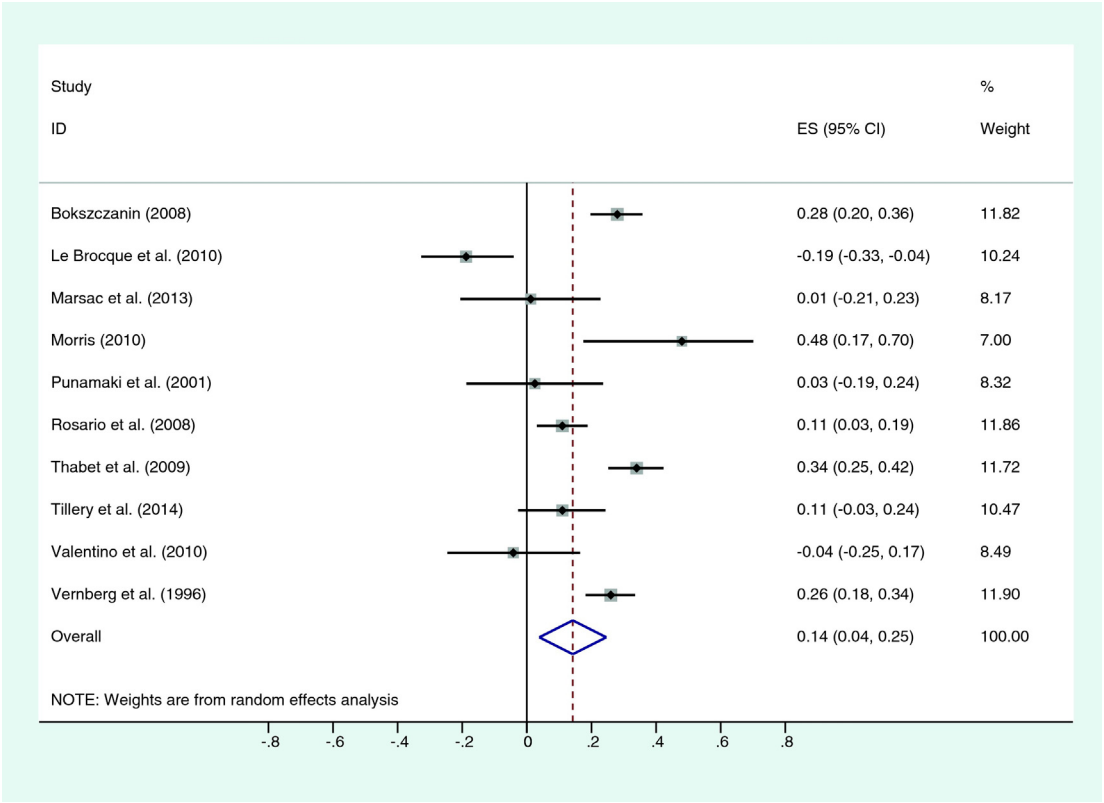

Fig. 4. Forest plot of the associations between positive parenting behaviors and child PTSS. CI = confidence intervals.

3.4. Sensitivity analyses

We conducted sensitivity analysis to substantiate the method of using an average ES estimate of mother and father report of parenting, by using the alternative approach of calculating a composite ES of the mother and father reports. We calculated the composite effect using the weighted means of the individual ESs as recommended for combining multiple subgroups (Borenstein et al., 2009). The use of a composite effect did not alter the results of the overall parenting (ES = 0.20; $p < 0.0001$, 95% CI 0.14, 0.26), positive parenting (ES = 0.14; $p < 0.05$; 95% CI 0.02, 0.26) or negative parenting–PTSS association (ES = 0.23; $p < 0.0001$; 95% CI 0.15, 0.31).

We also conducted a sensitivity analysis to examine the possible impact of using the first available time point to calculate a single ES in studies that included multiple time points ($k = 3$). We calculated composite ES estimates across time points (Borenstein et al., 2009). Use of a composite effect again did not substantially alter the results of the overall parenting-PTSS analysis which yielded a significant mean effect of 0.19 ($p < 0.0001$, 95% CI 0.13, 0.27), or the associations between PTSS and positive (ES = .l5, $p < 0.01$; 95% CI 0.04, 0.26) and negative parenting (ES = 0.22, $p < 0.0001$; 95% CI 0.13, 0.31).[3]

Table 4
Moderator analyses for positive parenting and child posttraumatic stress symptoms.

Moderator	*r*	CI, 95%	*Q*	Between-group *Q*	Tau^2
Random effects model	0.14	0.022, 0.255	62.09		0.030
Study design			30.98	6.52**	0.016
Longitudinal	−0.007	−0.154, 0.141			
Cross-sectional	0.239**	0.122, 0.357			
Parenting informant			26.65	12.48*	0.009
Child	0.224***	0.134, 0.315			
Parent	−0.19	−0.436, 0.056			
Both	−0.016	−0.221, 0.189			
Group trauma			28.56	4.25*	0.017
Individual trauma	0.053	−0.075, 0.18			
Group trauma	0.253*	0.112, 0.393			

Note. CI = confidence interval, *Q* = Cochran's (1954) measure of homogeneity, Tau^2 = between study variance in random effects model.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

3.5. Publication bias

No evidence for publication bias was found for overall parenting and positive parenting. For overall parenting and positive parenting, visual inspection, rank correlation, and Egger's tests (smallest $p = 0.82$) indicated non-asymmetric funnel plots (Supplementary Figs. 5 & 7). Furthermore, the trim and fill procedure did not impute any studies for overall parenting or positive parenting. For negative parenting, the trim and fill procedure indicated moderate publication bias (Supplementary Fig. 6). After adjusting for missing studies (n = 4), the ES decreased from ES of 0.23 to 0.14 ($p < 0.001$, 95% CI 0.02–0.25). The rank correlation ($Tau = 0.16$, $p = 0.54$) and Egger's ($p = 0.71$) tests were not significant.

4. Discussion

The primary aim of this review was to identify the nature and strength of the relationship between parenting behaviors and childhood

[3] Note that in calculating a combined effect across time points for the sensitivity analysis, the variance of the combined effects was assumed at $r = 0.5$ and attrition was not incorporated in the calculations which may have influenced the results.

PTSS. In particular, we focused on the association between child PTSS and two broad parenting constructs: negative parenting behaviors (e.g. overprotection, hostility) and positive parenting behaviors (e.g. warmth, support). Although based on a relatively small number of studies, the results of the meta-analysis indicate that the association of parenting behaviors and child PTSS is modest but reliable, with parenting behavior overall accounting for 3.8% of the variance in childhood PTSD. Further analysis yielded significant mean ES estimates for both negative (5.3% of child PTSS variance) and positive parenting (2% of variance). The ESs for these two parenting constructs were not significantly different when tested formally.

4.1. Negative aspects of parenting

In order to provide further insight into the significant association between negative parenting and child PTSS the sub-dimensions of this parenting construct and corresponding individual study ESs were reviewed in detail. Of the seven studies that investigated parental overprotection and child PTSS, four reported significant associations, with ESs in the small (Cobham & McDermott, 2014; Keppel-Benson et al., 2002; Le Brocque et al., 2010) to moderate range (Bokszczanin, 2008; Meiser-Stedman, Yule, Dalgleish, Smith, & Glucksman, 2006; Morris, 2010; Tillery, Long, & Phipps, 2014). The variation in the strength of effects may reflect sample characteristics and the measurement tools utilized, as both showed substantial variability (see Table 1). For example, Cobham and McDermott (2014) reported the smallest association between overprotection and child PTSS (see Fig. 3) and it is notable that parenting was assessed using an interview schedule which, while based on child anxiety etiology, had not previously been validated. Nonetheless, overall the available evidence suggests that there is a modest but reliable association between overprotective parenting and child posttraumatic distress.

Less consistent results were reported in the five studies which examined critical or hostile parenting and child PTSS. Of these, only two studies found that higher levels of parental hostility were significantly associated with more child PTSS (Kelley et al., 2010; Valentino et al., 2010) and the majority of reported effects were small (Punamäki et al., 2001; Kelley et al., 2010; Rosario et al., 2008). It is notable that the majority of studies which examined parental hostility and child PTSS received lower methodological quality scores (see Table 1) and this was often due to incomplete descriptions of sampling methods, thus the potential for sampling bias must be considered. Furthermore, Punamäki et al. (2001) found that neither maternal nor paternal hostility/criticism was significantly associated with higher levels of child PTSS; however, as Punamäki et al. (2001) was the only study to examine simultaneously both maternal and paternal hostility in relation to child PTSS, further investigation is warranted.

The observation that lower levels of autonomy granting and excessive control may be more consistently associated with child PTSS than overtly negative parenting behaviors (such as hostility) is in line with the broader child anxiety literature, which emphasizes the key role of parental autonomy restriction in child anxiety etiology (McLeod et al., 2007). Child trauma exposure has been linked with increases in parent monitoring behavior (Bokszczanin, 2008; Henry et al., 2004) and parents may be persistently overprotective of their child following a trauma due to fears that the child may be traumatized again (Scheeringa & Zeanah, 2001). The results of the current review tentatively suggest that, in comparison to parental hostility or criticism, overprotective parenting practices are more likely to be obstructive to the child's post-trauma recovery process. To date, no intervention studies have focused on decreasing parental overprotectiveness or control following child trauma (for a review see Stallard, 2006) and the direction of the effects remains unclear.

4.2. Positive parenting domains

Previous research has also highlighted the importance of parental warmth and support for child adjustment post-trauma (Marsac et al., 2013; Pynoos & Nader, 1988; Vogel & Vernberg, 1993). However, the results of our positive parenting analyses yielded a small effect, explaining only 2.0% of the variance in child PTSD. Moreover, the ten studies which examined the association between parental support and child PTSS yielded mixed findings. Six studies reported negative associations between warm or supportive parenting and child PTSS, with ESs ranging from small (Bokszczanin, 2008; Rosario et al., 2008; Vernberg, Silverman, La Greca, & Prinstein, 1996) to large (Morris, 2010), suggesting that more warm, supportive parenting is associated with fewer child PTSS. Conversely, three studies reported significant *positive* associations between parental warmth and child PTSS, indicating that greater parental warmth may be associated with more PTSS (Le Brocque et al., 2010; Punamäki et al., 2001; Valentino et al., 2010). For example, Le Brocque et al. (2010) found a small, yet significant, positive association between parental support and child PTSS following a traumatic accident (e.g. falls, motor vehicle accidents); while Punamäki et al. (2001) found a positive association between maternal warm support and child PTSS and a negative association between paternal warm support and child PTSS. The majority of studies that reported negative associations relied on child-report of both parenting and PTSS and the potential influence of single-source error must be considered. Overall, the available evidence suggests that parental support and/or warmth are not consistently/strongly associated with child PTSS, and warrant further investigation before being considered as a potential intervention target.

Although ES estimates of the parenting-child PTSS association were slightly larger for the negative parenting dimension than for positive parenting behaviors, it is important to note that the difference in ESs for these two parenting constructs was not significant when tested formally. The need for caution in drawing conclusions regarding the relative impact of positive versus negative parenting behavior is further underscored by the assessments of publication bias (i.e. Eggers test, rank correlation, “trim and fill”). Evidence of possible publication bias was present for negative parenting using the trim and fill method and after adjusting for missing studies, the association between negative parenting and child PTSS was smaller in magnitude and more consistent with that for positive parenting. It should be noted that publication bias is not the only explanation for funnel plot asymmetry (other explanations include data irregularities, poor methodological design of small studies, or true heterogeneity). Tests of publication bias assume homogeneity, which was not the case for our data; and the Egger's and rank correlation tests did not find evidence of publication bias. Nonetheless, the ES for the negative parenting-PTSS association may be smaller than estimated. No evidence of publication bias was found for overall or positive parenting.

4.3. Moderators of effects

In addition to the main effects, we identified significant moderators of the association between parenting and child PTSS, including study design, child sex, whether the trauma was a group or individual trauma, and the parenting behavior informant. With respect to study design, cross-sectional studies yielded a stronger relationship between child PTSS and parenting. Cross-sectional studies, which assess child PTSS and parenting simultaneously, provide no indication as to the direction of effects, and the weaker effect found in the studies where longitudinal effects were incorporated may suggest an influence of the child on parenting behavior. Alternatively, as longitudinal studies frequently experience difficulties with participant retention, this finding may reflect inherent differences between participants who continue to take part in projects in comparison to those who drop out.

Child sex was a significant moderator in the overall parenting meta-analysis with a greater proportion of female children in a study sample yielding a greater mean effect. This finding is consistent with other reviews (Brewin et al., 2000; Foy et al., 1996; Trickey et al., 2012) and supportive of female sex as a potential moderator in the association of parenting and child PTSS. Previous research has found girls to exhibit

more internalizing symptoms than boys, who generally display more externalizing problems (Cooley-Quille, Boyd, Frantz, & Walsh, 2001; Winje & Ulvik, 1998), and the exclusive measurement of PTSS may only adequately take into account adverse reactions in females post-trauma. Future research should further understanding of boys' difficulties post-trauma by broadening outcome measures to include a wider range of adverse reactions.

Whether the trauma was a group or individual trauma was found to moderate the association between positive parenting and child PTSS. Group trauma yielded a significantly higher ES than individual trauma which could reflect the impact of a mass trauma on family functioning and available parental support (Chrisman & Dougherty, 2014). Previous research has documented the significant association between parent and child PTSS (Morris et al., 2012), between parental non-PTSD psychopathology and child PTSS (Morris et al., 2012) and the association between poor family functioning and maternal depressive and PTSD symptoms (Wickrama & Kaspar, 2007). While we were unable to examine statistically the effects of parent PTSD and other parental psychopathology (e.g. depression), as few of the included studies consistently measured these factors, previous research suggests that parents' own psychological difficulties may make it more difficult for parents to provide their children with the support needed post-trauma (McFarlane, 1987; Morris et al., 2012; Vernberg et al., 1996). Future studies examining the association between child PTSS and parenting behaviors could consider the role of particular types of trauma as well as parent psychological adjustment difficulties, which may influence the parenting-child PTSS relationship.

Parenting informant was a significant moderator in the overall and positive parenting meta-analyses, with child report of parenting yielding a pattern of greater effects across all analyses. These results may reflect parents' own psychological adjustment difficulties or social desirability bias in parent report, as research in non-clinical samples has found parents to be overly positive in self-reports of parenting behaviors compared to child or observer report (Bögels & van Melick, 2004; Gaylord, Kitzmann, & Coleman, 2003). Alternatively, as several of the studies that utilized child reports of parenting also relied on child report of PTSS this may have resulted in single informant bias. In fact, Valentino et al. (2010) was the only study in this review to include both parent and child reports of parenting as well as child PTSS. Such methodological deficiencies mean the results should be interpreted with caution and future studies employing systematic observational assessments are suggested. Assessment of child PTSD by interview or questionnaire methods and the study location were not significant moderators across all the meta-analyses conducted in this review. There were also no significant moderating effects of child age across all the meta-analyses conducted, which suggests that the effects of parenting behaviors on child PTSS are not affected by child age. This is in line with the findings of previous reviews that younger age is not a moderator for the development of child PTSD (Foy et al., 1996; Trickey et al., 2012).

4.4. Overview of the literature

Some key considerations arose in reviewing the overall body of research in this area. First, more than half of the studies included in this review utilized a cross-sectional design, and there was evidence that longitudinal studies yielded smaller effects. It is difficult to draw strong conclusions based on this observation, as cross-sectional studies also tended to have higher quality ratings (range 15–17 versus 10–16 for longitudinal designs). Nonetheless, the direction of causation, whether child post-trauma difficulties elicit negative parenting behaviors or vice versa, remains unclear and should be examined in future prospective studies. The possibility that parental behaviors may be a response to child distress rather than a cause of it has been particularly highlighted in the anxiety literature in relation to overprotective parenting (Hudson, Doyle, & Gar, 2009). It is also possible that genetic factors or other extraneous variables underpin observed associations. Genetic influences in relation to parenting behavior may occur as a consequence of the parent's own genes or due to genetically driven child traits which elicit certain parenting styles (Klahr & Burt, 2014), with some evidence indicating that the latter effects are stronger for negative versus positive parenting aspects (Oliver, Trzaskowski, & Plomin, 2014).

It is also worth noting that parenting behaviors may be indicative of wider characteristics of the family environment that are relevant to child PTSS (Bokszczanin, 2008; La Gaipa, 1990). A high level of conflict within the family may be perceived by youth as a lack of family support or 'negative support' and such negative family support, including blaming or showing disinterested responses, has been found to significantly hinder child psychological recovery post-trauma (Gleser, Green, & Winget, 1981; Kaniasty, 2005; Lepore, Silver, Wortman, & Wayment, 1996). Bokszczanin (2008) also reported that family conflict was negatively associated with parental support, with a large ES, which reinforces previous findings that high-conflict family atmosphere following a trauma may be perceived by youth as a lack of support, contributing to child adjustment difficulties (La Gaipa, 1990; La Greca & Bearman, 2003; Udwin et al., 2000). These findings underscore the role of poor family functioning as a potential risk factor in the development of child PTSS and suggest that any post-trauma efforts to alter parental support should also target the broader family context. Along the same lines, the wider context may also be important to understanding both parental and child responses following trauma. Thus, in a recent qualitative study of families living in a South African context where levels of adversity and child trauma are high, we found that caregivers of trauma exposed youth placed a particularly strong emphasis on ensuring protection from future harm, but both this and levels of child PTSS could potentially be explained by the real levels of ongoing contextual threat (Williamson et al., 2016).

Almost all of the studies included in the current review used questionnaires as the sole method of assessing parenting. Where children versus parents reported on parenting behavior, effects were stronger in magnitude. However, overall, questionnaire based measures of parenting are subject to bias and independent, observational assessments are considered to be the gold standard in the wider parenting literature. In this respect, it is encouraging that there are new developments in the literature that will support observational assessments of parenting following child trauma (e.g. Alisic, Barrett, Bowles, Conroy, & Mehl, 2016; Marsac & Kassam-Adams, 2016). It is also the case that the focus of the current review was on dimensions of parenting that tended to be relatively broad. Few studies specifically examined change in parenting since the trauma, or included questions that focused on trauma-specific parental responses, although there were some notable exceptions to this (Cobham & McDermott, 2014; Keppel-Benson et al., 2002). In the wider literature, there are examples of studies that have examined specific aspects of parental support, such as providing opportunities to talk about the trauma (Stallard et al., 2001), offering positive re-framing coping advice regarding the trauma and its sequalae (Kilmer & Gil-Rivas, 2010), or attempting to reinstate the child's pre-trauma routines (Greeff & Wentworth, 2009). The limited nature of this evidence base made it impossible to include such observations in our meta-analysis, but it is worth considering that existing research has highlighted a number of specific ways in which parents may respond to support children with posttraumatic distress (e.g. Alisic, Boeije, Jongmans, & Kleber, 2012; Prinstein, La Greca, Vernberg, & Silverman, 1996; Williamson, Creswell, 2016; Williamson et al., 2016).

In addition to the focus on general parenting domains, the existing evidence base provides little information about the *process* by which parenting could influence child outcomes. Thus, although a number of cognitive-behavioral and emotional processes have been identified in the literature as being associated with the development of PTSD, there has been little consideration of whether factors such as child negative appraisals or emotional dysregulation mediate any influence of parental behavior. Moreover, parental PTSD has been established as a risk factor

for child PTSD, and has been linked to parenting difficulties in a number of studies (see Trickey et al., 2012). However, a limited number of studies in our review included measures of parental PTSS ($k = 3$) and we could not take account of this in our analyses. Identifying specific aspects of parental post-trauma support that may influence child PTSS, elucidating the pathways via which they exert that influence, and taking account of parental mental health are each likely to inform the development of more effective, family based interventions.

A final observation in relation to the evidence included in the current review concerns the types of samples that were included. The majority of studies in this review were conducted in relatively low-risk contexts (e.g. USA, Australia, UK, and Poland). Only two studies in this review were based in non-Western, high-risk environments (Punamäki et al., 2001; Thabet et al., 2009). Index trauma in four studies was child exposure to a natural disaster (e.g. Hurricane Katrina). In six studies, child trauma exposure consisted of serious illness and/or injuries (e.g. road traffic accidents) and four studies focused on exposure to community violence. Time since trauma varied between studies with some studies conducting assessments immediately following trauma exposure during hospital treatment and others delivering assessments up to 5 years post-trauma. Taken together, despite child exposure to a range of traumatic experiences, additional research is needed in high-risk, non-Western contexts to further our understanding of the relationship between parenting and child PTSS.

4.5. Clinical implications

Previous research has found parental participation in child PTSD treatment to result in improved child outcomes compared to child-only or parent-only interventions (Deblinger, Lippmann, & Steer, 1996; Runyon, Deblinger, & Steer, 2010; Salloum, Scheeringa, Cohen, & Storch, 2014). These findings tentatively suggest that there may be some benefit in simultaneously addressing particularly negative parenting practices during the course of child PTSD treatment. A potentially beneficial supplement to child treatment may include a session for parents to consider and discuss the adverse implications of negative parenting practices, such as parental overprotection, on child adjustment with a clinician and the provision of support and guidance for behavior change (Cobham et al., 2016). Moreover, as research has found adult patients with PTSD whose relatives score highly on scales of expressed emotion with high levels of criticism have poorer treatment outcomes than patients whose families exhibit low expressed emotion (Tarrier et al., 1999), efforts to improve poor family communication following child trauma exposure could be advantageous to child recovery. This is supported by the promising results of the Child and Family Traumatic Stress Intervention that aims to improve parent-child communication of feelings and symptoms post-trauma (Berkowitz et al., 2011). However, as the direction of effects, whether child symptoms evoke negative parenting or vice versa, remains unclear, it is also possible that effective treatment of child PTSS alone may result in changes in parenting practices.

4.6. Strengths and limitations

This review was limited by several factors that should be noted when interpreting the results. First, although the systematic search strategy was thorough, limiting the inclusion to studies written in English may have excluded some studies of interest. Second, we included published and unpublished studies in this review, in order to limit the potential impact of publication bias and provide a more objective, complete answer as to the magnitude of the association between parenting and child PTSS (McAuley, Pham, Tugwell, & Moher, 2000). Meta-analyses that exclude unpublished data have been found to over-represent studies with statistically significant findings and result in less precise estimates of ES than reviews including grey, unpublished literature (Conn, Valentine, Cooper, & Rantz, 2003; McAuley et al., 2000). Nonetheless, this inclusion may have introduced other biases, as the methodological quality of unpublished, grey literature may be lower. The methodological quality of all included studies was assessed in order to examine the degree to which study design, conduct and analyses minimized potential errors and bias (Kmet et al., 2004). Third, the categorization of parenting practices into two broad dimensions of 'positive' or 'negative', while in line with the extant literature, does not allow for a detailed examination of specific parenting behaviors that may be influential in child PTSS. Fourth, studies that reported the association between both positive and negative parenting behaviors and child PTSS, such as Punamäki et al. (2001), contributed an ES to both analyses and this overlap may have influenced our findings. However, this meta-analytic technique allowed for a closely balanced comparison of positive ($k = 10$) and negative ($k = 11$) parenting dimensions.

The number of studies included in the meta-analysis was constrained by the limited number of studies that examined child PTSS and parenting behaviors. In addition, the child PTSS literature has several weaknesses, as pre-morbid psychological adjustment problems and previous life stressors are often not considered and non-validated psychopathology measures are employed. Thus, future studies with strong methodological rigor are needed to overcome potential bias and to further our understanding of the association between parenting and child PTSS. Finally, few of the studies included in this review documented the relationships between fathers' parenting practices post-trauma and child PTSS, with parent samples being predominantly composed of mothers. Those studies that did examine paternal parenting practices relied exclusively on child-perceptions of parenting. The inclusion of a more representative proportion of fathers in future research would allow for a more accurate understanding of the role of parenting behaviors in child PTSS.

5. Conclusions

In conclusion, we conducted a comprehensive review and meta-analysis of the associations between parenting behaviors and child PTSS. We found significant but small associations between parenting behaviors and child PTSS, particularly for negative parenting. However, no significant difference was found between the negative and positive parenting dimensions when tested formally. Given the small number of high quality studies available, we can make only tentative conclusions about the role of parenting and child PTSS. Nonetheless, given the modest proportion of variance accounted for by parenting, we suggest that other factors and influential moderator variables are considered in future research of child PTSD.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.cpr.2017.01.005.

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