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A Meta-Analytic Review of the Association Between Alienation Appraisals and Posttraumatic Stress Disorder Symptoms in Trauma-Exposed Adults

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Ehlers and Clark's (2000) cognitive model of posttraumatic stress disorder (PTSD) highlights the importance of negative appraisals in maintaining posttraumatic stress. Recent research suggests that alienation appraisals, defined as feeling disconnected from the self and others, mediate the association between traumatic experiences and subsequent PTSD symptoms. To our knowledge, no systematic review has yet explored the relation between alienation appraisals and PTSD symptoms in trauma-exposed adults, despite the important clinical implications posed by this association. A systematic search of the SCOPUS, Web of Science, PsycInfo, MEDLINE, CINAHL Plus, and PILOTS databases resulted in 470 studies, nine of which met full inclusion criteria. Studies were quality-assessed for risk of bias using the Quality Assessment Tool for Studies with Diverse Designs (QATSDD) quality assessment tool. A random-effects meta-analysis for the association between alienation appraisals and PTSD symptoms showed a large total effect size, $r = .57$, 95% CI [.46, .66], $z = 8.41$, $p < .001$. This large effect suggests that as alienation appraisals increase, PTSD symptoms increase. Although a strong positive association was found between alienation and PTSD symptoms, the mechanism of this association remains unclear. Limitations of the research included significant heterogeneity across studies and the fact that data were correlational. Future research to explore why alienation appraisals are significant in posttraumatic stress may further help to inform therapeutic approaches to targeting alienation appraisals in trauma survivors. Recommendations are made for the clinical assessment of alienation appraisals when exploring the impact of the traumatic experience on the survivor.

Exposure to traumatic events is common; however, most people who witness or experience traumatic events do not develop posttraumatic stress disorder (PTSD; Schnurr, Friedman, & Bernardy, 2002). A large-scale survey of 2,953 adults in the United States found that although 89.7% of the sample had been exposed to a traumatic event, only 8.3% of the sample met the diagnostic criteria for PTSD per the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5; Kilpatrick et al., 2013)*.

Researchers and clinicians alike have developed theoretical models to enhance our understanding of why some people exposed to trauma recover, whereas others develop PTSD. One of the most prominent theories is Ehlers and Clark's (2000) cognitive model of PTSD, which highlights the importance of cognitive appraisals for individuals who have experienced or witnessed traumatic events. Evidence suggests that negative cognitions about the self, others, and the world are crucial in developing and maintaining symptoms of posttraumatic stress. The salience of these negative cognitions led to the development of the Posttraumatic Cognitions Inventory (PTCI), which helps identify the key negative cognitions that may maintain PTSD in trauma survivors (Foa, Ehlers, Clark, Tolin, & Orsillo, 1999).

Although much research related to the cognitive model has focused broadly on negative appraisals (Foa et al., 1999; Keshet, Foa, & Gilboa-Schechtman, 2018), a growing body of work suggests that looking at specific appraisals, including alienation appraisals, in relation to PTSD symptoms has potential value for both theory development and clinical interventions (DePrince, Huntjens, & Dorahy, 2015). Alienation appraisals involve

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feeling disconnected from oneself and others, such as thinking “I am disconnected from people” and “I’ve lost a piece of myself” (DePrince, Chu, & Pineda, 2011). To date, no systematic review of which we are aware has assessed the relation between alienation appraisals and PTSD symptoms in trauma-exposed adults, despite and its clinical implications and important prior research regarding the association.

Ehlers and Clark’s (2000) seminal cognitive model posits that past experiences of trauma and the characteristics of the traumatic event influence how a person appraises their trauma (Ehlers & Clark, 2000). The model proposes that in comparison to trauma-exposed individuals who do not meet the diagnostic criteria for PTSD, individuals with PTSD are more likely to make negative appraisals about the traumatic event and its aftermath (Ehlers & Clark, 2000). Trauma appraisals, which have been defined as “people’s assessments of their thoughts, feelings, and behaviors” about the trauma, (DePrince, Zurbriggen, Chu, & Smart, 2010) can contribute to a sense of current threat as well as symptoms of PTSD (Ehlers & Clark, 2000).

Ehlers and Clark’s (2000) cognitive model, which posits the appraisal process to be a key factor in maintaining distress, has been well supported in research. For example, individuals who meet the diagnostic criteria for PTSD have been shown to report more negative trauma appraisals than individuals who do not meet the clinical threshold for PTSD (Zuj et al., 2017). Moreover, a recent meta-analysis revealed a large effect size ($r = .58$) for the association between negative appraisals of trauma and PTSD symptoms in trauma-exposed children and adolescents (Mitchell, Brennan, Curran, Hanna, & Dyer, 2017), and this large effect has been replicated and extended for in adult samples (Gomez De La Cuesta, Schweizer, Diehle, Young, & Meiser-Stedman, 2019). Prospective and mediation studies have provided evidence for the hypothesis that there is a directional pathway from trauma appraisals to PTSD symptoms. For example, one recent study showed that in a sample of students, the relation between childhood abuse and PTSD symptoms was mediated by trauma appraisals (Barlow, Goldsmith Turow, & Gerhart, 2017). In another study, negative appraisals prospectively mediated the relation between PTSD symptoms in survivors immediately after a car accident and at a 6-month follow-up assessment (Meiser-Stedman, Dalgleish, Glucksman, Yule, & Smith, 2009). Additionally, negative appraisals were found to prospectively maintain PTSD symptoms in a sample of trauma-exposed adults (Halligan, Michael, Clark, & Ehlers, 2003).

Building on the literature that has broadly examined negative appraisals, other work has pointed to the value in examining specific appraisals in relation to posttraumatic symptoms, for theory and intervention development. For example, in an early study in the traumatic stress literature, Roth and Newman (1991) used interviews to identify a range of appraisals common to women who had been sexually assaulted. Later work extended the focus on fear, helplessness, and horror to consider the roles that appraisals concerning shame, anger (Andrews,

Brewin, Rose, & Kirk, 2000), and self-blame (Breitenbecher, 2006) can have in relation to PTSD symptoms. DePrince and colleagues (2010) built upon further built upon Roth and Newman’s approach by identifying six common categories of appraisals—fear, anger, shame, self-blame, betrayal, and alienation—in a sample of adults exposed to different forms of trauma. Additionally, DePrince et al. (2011) found that appraisals of alienation and betrayal had the strongest associations with indicators of trauma-related distress.

Alienation has been defined as feeling disconnected from oneself and others (DePrince et al., 2011), and there is increasing empirical evidence that alienation appraisals are highly predictive of PTSD symptoms and other trauma-related distress. Alienation appraisals have been shown to be significantly related to symptoms of PTSD, dissociation, and depression in trauma-exposed women with histories of childhood and domestic abuse (DePrince et al., 2011), and have predicted the severity of PTSD, dissociative, and depressive symptoms in a sample of teenage girls in the child welfare system with histories of childhood abuse and neglect (Srinivas, DePrince, & Chu, 2015). In addition, Hebenstreit, Maguen, Koo, and DePrince (2015) found alienation appraisals to be a strong predictor of the profile of PTSD symptoms reported by female survivors of domestic abuse. Taken together, these findings suggest that alienation appraisals may be significant concerning how psychological distress presents itself in survivors of trauma, particularly that which occurred during childhood or is of an interpersonal nature. This emerging evidence base suggests that alienation appraisals, in particular, have important implications for psychological distress stemming from a range of trauma types and across clinical and nonclinical populations. In further support of this proposition, recent research by Mitchell et al. (2018) demonstrated that appraisals following a trauma fully mediated the relation between childhood and adulthood traumatic events and current symptoms of PTSD and depression in a sample of trauma-exposed, treatment-seeking adults. The authors found that alienation appraisals were the only significant mediator of this association when all appraisal categories (i.e., fear, anger, shame, self-blame, and betrayal) were considered concurrently. These findings from cross-sectional studies are supported by evidence from an outcome study that showed that trauma survivors who reported high scores on measures of on alienation appraisals had less favorable treatment outcomes in exposure therapy than those who reported lower scores (Ehlers et al., 1998).

To date, no systematic review of which we are aware has been conducted to explore the correlation between alienation appraisals and PTSD symptoms, despite the emerging evidence base for the importance of alienation and the pertinent clinical implications posed by this association. There is strong evidence to suggest that a reduction in negative trauma appraisals via psychotherapy is associated with a reduction in PTSD symptoms (Ehlers, Clark, Hackmann, McManus, & Fennell, 2005; Price, MacDonald, Adair, Koerner, & Monson, 2016; Karl, Rabe, Zöllner, Maercker, & Stopa, 2009) and that

high levels of alienation can interfere with exposure therapy for PTSD (Ehlers et al., 1998). The results of a recent high-quality meta-analysis supported this association between appraisals and PTSD (Gomez De La Cuesta et al., 2019). Gomez De La Cuesta et al. (2019) did not specifically explore alienation appraisals, despite the emerging evidence that they are highly germane in trauma-related distress (DePrince et al., 2011), and remain significant after controlling for other appraisal categories (Mitchell et al., 2018). In summary, the existing evidence suggests that alienation appraisals are significant in posttraumatic stress across a range of trauma types and samples. Thus, in the present meta-analytic review, we aimed to explore the association between alienation appraisals and symptoms of PTSD across a range of trauma types and diverse samples.

Method

Procedure

An initial scoping exercise was conducted to ensure that a systematic review of the association between alienation appraisals and PTSD symptoms had not been previously conducted. This scoping exercise enabled the inclusion and exclusion criteria to be refined and ensured there were enough papers to conduct a meta-analysis. Next, the protocol was registered on PROSPERO. Advice on search terms and electronic database selection was sought from a specialist librarian. After the first phase, which included screening each record by title and abstract, two independent reviewers screened the full text of each paper, using the inclusion and exclusion criteria to identify potential papers. MedCalc (Version 18; 2018) was used to calculate agreement between the two reviewers, using the kappa statistic. The following information was extracted from each record: author names, publication year, sample size, participant group, study design, mean age of participants (with range or standard deviation, where available), gender ratio of the sample, PTSD symptom measure, alienation measure, and reported correlation between alienation and PTSD symptoms. For articles that met the full eligibility criteria but did not report a correlation between alienation and PTSD symptoms, the research team contacted the authors directly to request this information.

Data analytic plan. We used MedCalc to first conduct a random-effects model and create a forest plot, followed by a Q test for heterogeneity. To assess for publication bias, MedCalc was used to conduct a funnel plot, and a quality assessment was completed by two independent reviewers using the Quality Assessment Tool for Studies with Diverse Designs (QATSD). Intraclass correlation coefficients were used to calculate the interrater reliability of the two independent reviewers' quality assessment ratings. Finally, using MedCalc, a sensitivity analysis was completed to calculate the effect size for cases in which studies deemed at high risk of bias were excluded, as such studies may have had confounding effects. We also conducted sensitivity analyses to explore any potential moderator effects.

Search procedure. Studies were identified following a systematic search for studies published since 1980, when PTSD was first introduced in the *DSM*, in the following databases: SCOPUS, Web of Science, PsycINFO, CINAHL Plus, MEDLINE, and the National Center for PTSD Research Published International Literature on Traumatic Stress (PILOTS). To reduce the risk of publication bias, searches did not specify a publication type. See the Supplementary Materials for the search terms and full search syntax used for each electronic database. The search was conducted for articles published between 1980 and May 16, 2019. Data were managed using RefWorks software.

Inclusion criteria. Studies included in the meta-analysis met the following inclusion criteria: (a) participants were indirectly exposed to, witnessed, or directly experienced a *DSM-IV/DSM-5* PTSD Criterion A traumatic event, to ensure that a broad range of trauma exposure types was included in the review, such as indirect trauma exposure in first responders, which is captured in the *DSM-5*; (b) participant age of 18 years or older; (c) the study included a validated quantitative questionnaire measure of both PTSD symptoms and alienation, to ensure studies that included nonvalidated questionnaire measures of alienation (e.g., one item asking if participants felt alienated), were excluded; (d) alienation was operationally defined as feeling disconnected from oneself and other people, to ensure studies that explored political alienation, defined as feeling alienated from one's own government, were excluded; (e) the study either reported a correlation between alienation appraisals and PTSD symptoms or this information was able to be obtained by study authors upon request; (f) that study was published in English. For articles that met the full eligibility criteria but did not report a correlation between alienation and PTSD symptoms, study authors were contacted directly, as previously described. Five sets of authors were contacted to request correlational results (Babcock-Fenerci & DePrince, 2018; DePrince et al., 2011; Gold & Cardeña, 1998; Hebenstreit et al., 2015; Kamphuis, Emmelkamp, & Bartak, 2003); four sets of authors provided this information on request, and one set did not provide this data (Gold & Cardeña, 1998).

Meta-analytic Procedure

A random-effects model was chosen a priori due to the heterogeneity in the questionnaire measures used to assess alienation and PTSD symptoms, as well as the diversity in the trauma types experienced by each sample. The PRISMA guidelines were followed throughout, and there were no missing data.

Selection of studies. Through electronic database searching, 470 articles were identified, with one additional article identified as having been recently published by a member of the research team. In total, we found 113 articles from SCOPUS, 67 from Web of Science, 110 from PsycInfo, 40 from MEDLINE, 26 from CINAHL Plus, and 114 from PILOTS.

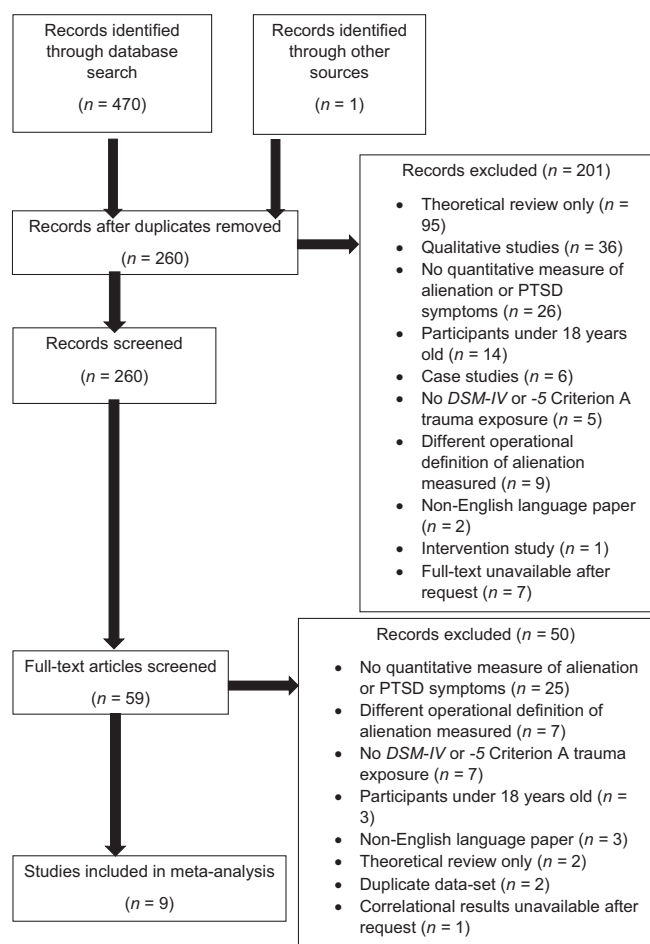


Figure 1. PRISMA flow chart. PTSD = posttraumatic stress disorder; *DSM* = *Diagnostic and Statistical Manual of Mental Disorders* (IV = 4th ed.; 5 = 5th ed.).

After removing 211 duplicates, we screened the titles and abstracts of 260 articles. Following the first phase of screening each record by title and abstract, two independent reviewers then screened the full text of each paper using the inclusion and exclusion criteria and a kappa statistic was used, as previously described, to calculate reviewer agreement. The results showed a total agreement between both reviewers after the full-text screening, $\kappa = 1.0$ (Cohen, 1960; Fleiss, Levin, & Paik, 2013).

Of the nine studies that met the full inclusion criteria (see Figure 1) and were included in the meta-analysis, two studies were prospective in design, and the remaining seven studies were cross-sectional. In total, 1,189 participants were included, with a mean sample size of 132.11 ($SD = 74.13$, range: 46–259). The mean participant age across studies was 38.42 years (range: 18–70).

Risk of bias and quality assessment of included studies. Once the full text of each article had been independently screened by two reviewers, each paper that met the full eligibility criteria for inclusion in the meta-analysis was quality

assessed for risk of bias. The two independent reviewers scored each study using the QATSDD quality assessment tool; in systematic review research, this tool is suitable for evaluating the risk of bias in both qualitative and quantitative studies (Sirriyeh, Lawton, Gardner, & Armitage, 2012). The QATSDD was deemed the most suitable quality assessment tool for the current review, as it enables studies that have similar research questions but diverse designs to be assessed using the same criteria. As all the studies that met the eligibility criteria were quantitative, only the 14 items for evaluating quantitative studies, which were of relevance to studies that reported correlations between two variables, were used in the quality assessment of the articles included in the current meta-analysis. Scores on the QATSDD ranged from 0 to 42, with higher scores indicative of higher-quality research. The creators of the QATSDD recommend that studies with a score above 60% are at low risk of bias, and studies with a score below 60% are at a higher risk of bias (Sirriyeh et al., 2012). The QATSDD was selected as it allowed us to assess the quality of studies that reported correlations between two variables of interest rather than those that evaluated treatment outcomes.

Results

Data Extraction

The correlation coefficient (Pearson's r) and sample size were extracted from each study and used in the random-effects model. For the two prospective studies that reported correlations between alienation and PTSD symptoms at different assessment points, the correlation for Time 1 data was extracted to ensure the maximum sample size and to minimize any potential intervention effects. Table 1 shows additional study characteristics of interest, including sample characteristics, participant age, gender ratios, alienation measure, PTSD symptom measure, and study design.

Effect Size for the Association Between Alienation Appraisals and PTSD Symptoms

A random-effects model was used, and the association between alienation appraisals and PTSD symptoms showed a total Pearson's r effect size of .57, 95% CI [.46, .66], $z = 8.41$, $p < .001$ (Cohen, 1988; Rosenthal, 1996). The effect size was large, suggesting that as alienation appraisals increased, so did symptoms of PTSD. The effect sizes for studies included in the meta-analysis ranged from .35 to .74. The effect sizes for each included study are shown in Figure 2. The Q test revealed a high level of heterogeneity, $Q = 50.52$, $p < .001$. The I^2 value indicated that 84.2% of the effect size variance was attributable to the variance between the studies included in the meta-analysis, $I^2 = 84.16$, 95% CI [71.59, 91.17].

Table 1
Summary of Included Studies

First Author (year)	N	PTSD symptom measure	Alienation measure	Participants	Design	Age		Gender ratio	Full scale <i>r</i>	Risk of bias ^c
						<i>M</i>	<i>SD</i>			
Babcock (2018) ^a	113	TSC-40	TAQ Alienation subscale	Mothers who survived maltreatment	Cross-sectional	30.2	Range: 23–47	100% female	.74	Low
Bonfils (2018)	46	CAPS	ISMIS Alienation subscale	Veterans	Cross-sectional	38.8	10.3	89.1% male	.35	Low
Brondolo (2017)	259	PDS	PTCI Alienation factor	Medical examiner employees exposed to work-related trauma	Prospective	n/a	n/a	63.3% female	.53	Low
Chapleau (2014)	60	PCL-S	BORI	Trauma-exposed adults with schizophrenia/schizoaffective disorder	Cross-sectional	50.3	11.09	93.3% male	.49	High
DePrince (2011); Hebenstreit (2015) ^b	227	PDS	TAQ Alienation subscale	Female survivors of nonsexual intimate partner abuse	Cross-sectional	33.4	11.0	100% female	.74	Low

(Continued)

Table 1
Continued

First Author (year)	PTSD symptom measure	Alienation measure	Participants	Design	Age		Gender ratio	Full scale <i>r</i>	Risk of bias ^c
					<i>M</i>	<i>SD</i>			
Dutra (2008)	PDS	YSQ-S Social Isolation/Alienation subscale	Trauma-exposed treatment-seeking adults	Cross-sectional	38.3	11.2	84% female	.33	Low
Kamphuis (2003) ^a	IES	TCIS Alienation subscale	Female postintimate stalking victims	Cross-sectional	21	4.23	100% female	.49	Low
Mehnert (2012)	PDS	Trauma-Related Thoughts & Attitudes Questionnaire Alienation subscale	Male train drivers who witnessed suicide attempts	Prospective	48	7.8	100% male	.59	Low
Mitchell (2018)	PDS	TAQ Alienation subscale	Trauma-exposed treatment-seeking adults	Cross-sectional	47.34	10.82	70.5% male	.66	Low

Note. PTSD = posttraumatic stress disorder; TSC-40 = Trauma Symptom Checklist-40; TAQ = Trauma Appraisal Questionnaire; CAPS = Clinician-Administered PTSD Scale; ISMIS = Internalized Stigma of Mental Illness Scale; PDS = Posttraumatic Diagnostic Scale; PTCI = Posttraumatic Cognitions Inventory; PCLS = Posttraumatic Stress Disorder Checklist Scale; BORI = Bell Object Relations Inventory; YSQ-S = Young Schema Questionnaire Short Form; IES = Impact of Events Scale; TCIS = Traumatic Constellation Identification Scale.

^aData provided by authors on request.

^bStudies used the same sample.

^cLow risk: > 60% on a quality assessment tool (QATSDD); high risk < 60% on QATSDD.

Meta-Analysis of Alienation and PTSD Symptoms

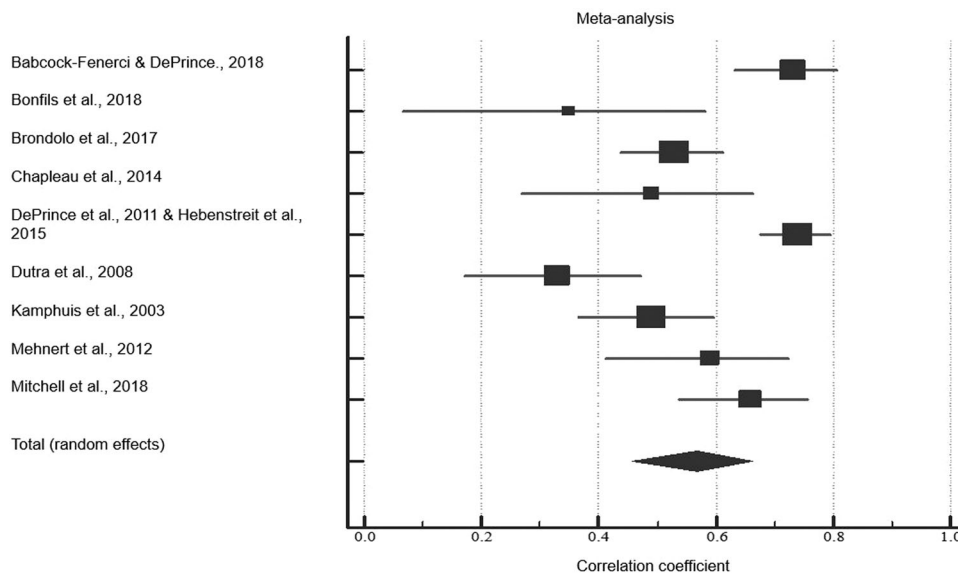


Figure 2. Forest plot of the association between alienation appraisals and posttraumatic stress disorder symptoms.

Quality Assessment and Risk of Bias

The intraclass correlation coefficient (ICC) of quality ratings between the two independent reviewers was high, $ICC = .98$, 95% CI [.92, .99]. Total scores ranged from 25 to 33 out of a possible total score of 42. The results showed that eight out of nine studies were assessed as having a low risk of bias, and only one study was judged as having a high risk of bias (Chapleau, Bell, & Lysaker, 2014). See the Supplementary Materials for the full quality assessment results for each study. The funnel plot in Figure 2 shows no significant asymmetry, which also suggests a low risk of publication bias.

Sensitivity Analysis

The effect sizes and levels of heterogeneity remained at similar magnitudes when the one study that had a high risk of bias (Chapleau et al., 2014) was removed, $r = .58$; when the two prospective studies (Brondolo, Eftekhazadeh, Clifton, Schwartz, & Delahanty, 2017; Mehnert, Nanninga, Fauth, & Schäfer, 2012) were removed, $r = .57$, $Q = 49.73$, $p < .001$, $I^2 = 87.94$, 95% CI [77.51, 93.53]; or when all three of these studies were removed, $r = .58$, $Q = 48.22$, $p < .001$, $I^2 = 89.63$, 95% CI [80.11, 94.59]. Additionally, the effect size and level of heterogeneity remained at a similar magnitude when only the five studies that measured PTSD symptoms using the Posttraumatic Diagnostic Scale (PDS) were included, $r = .59$, $Q = 34.98$, $p < .001$, $I^2 = 88.57$, 95% CI [75.96, 94.56]; and when the three studies that included only female participants were included, $r = .67$, $Q = 19.12$, $p < .001$, $I^2 = 89.54$, 95% CI [71.74, 96.13]. The effect size slightly increased when only the three studies that measured alienation appraisals using the Trauma Appraisal Questionnaire (TAQ) were included, $r = .72$; there was no significant heterogeneity, suggesting that the variance in how alienation appraisals were mea-

sured could account for much of the heterogeneity, $Q = 1.96$, $p = .380$.

Discussion

This systematic review revealed a strong, positive association between alienation appraisals and PTSD symptoms; the findings support the hypothesis that a large effect size would exist between alienation and PTSD symptoms. This result provides additional empirical support for Ehlers and Clark's (2000) cognitive model of PTSD, which highlights the importance of negative appraisals after a traumatic experience in the development and maintenance of posttraumatic stress symptoms. Furthermore, the results point specifically to the importance of the emerging evidence of the role of alienation appraisals in posttraumatic stress. The current findings are consistent with those reported in prior studies that demonstrated the salience of alienation appraisals in posttraumatic stress across a broad range of trauma types and samples (DePrince et al., 2011; Hebenstreit et al., 2015; Mitchell et al., 2018; Srinivas et al., 2015). Sensitivity analyses revealed that the questionnaire measure used to assess alienation appraisals accounted for much of the heterogeneity found. However, the magnitude of this effect size remained consistent when only the studies that used the TAQ to assess alienation were included.

The results of the quality assessment highlight several strengths of the included studies; eight out of nine included studies were judged to have a low risk of bias (Babcock Fenerci & DePrince, 2018; Bonfils et al., 2018; Brondolo et al., 2017; DePrince et al., 2011; Dutra, Callahan, Forman, Mendelsohn, & Herman, 2008; Kamphuis et al., 2003; Mehnert et al., 2012; Mitchell et al., 2018). The strengths of these studies included a grounding in an explicit theoretical framework, clear aims, good fit between stated research questions and methods

of data collection and statistical analysis, and critical discussion of strengths and limitations. Good justification for the method of analysis was evident across the studies except for one brief paper (Dutra et al., 2008); however, this may have been omitted due to limitations of word count. Only one study was deemed to be at a high risk of bias (Chapleau et al., 2014). This study provided less detail regarding the following criteria, which were only partially fulfilled: representativeness of the sample with a target group of a reasonable size, the rationale for the choice of data collection tools, and the statistical assessment of the reliability and validity of measurement tools used.

The strengths of the present review should be considered in light of its limitations. First, among all the included studies, there was not an equal mix of male and female participants in the trauma-exposed samples; this limits the generalizability of the results for each study individually. Five studies reported results for samples that were composed of either exclusively or mostly female participants. The remaining four studies reported results for samples that were either exclusively or mostly male. However, the effect sizes for alienation and PTSD symptoms were in the medium-to-very large range for all studies, suggesting that the role of alienation is significant in posttraumatic stress regardless of gender.

A methodological criticism of the current review is that, due to time constraints, OpenGrey was not used to search for articles; thus, potential studies that may have met the full inclusion criteria for the meta-analysis but reported nonsignificant findings may have been missed. Publication bias may have meant that relevant studies with nonsignificant results were omitted from the review, as these studies are less likely to be published and captured in the systematic search. However, it could be argued that excluding OpenGrey from the search may have helped to reduce the number of poor-quality studies reviewed in the selection process. The results showed that the papers included in the meta-analysis, despite being diverse in the assessments they used, were predominantly high in quality and had a low risk of bias. Furthermore, five bibliographic databases, including the PILOTS database, were systematically searched to ensure the search was as thorough and comprehensive as possible. The PILOTS database was searched to reduce the risk of publication bias, as this database often includes unpublished work and dissertations, many of which were captured as search results and screened against the eligibility criteria. The funnel plot (Figure 3) shows no significant asymmetry, which suggests that publication bias was not a significant issue in the current meta-analytic review (see Figure 3).

In terms of study design, seven of the nine included studies were cross-sectional in nature; thus, changes in alienation and PTSD symptoms were not measured over time, which limits the theoretical and directional conclusions that can be drawn from the review. Several of the included studies included clinical samples of participants who were in therapy, and the analyses did not control for the stage of therapy; thus, the data presented provide a snapshot in time only.

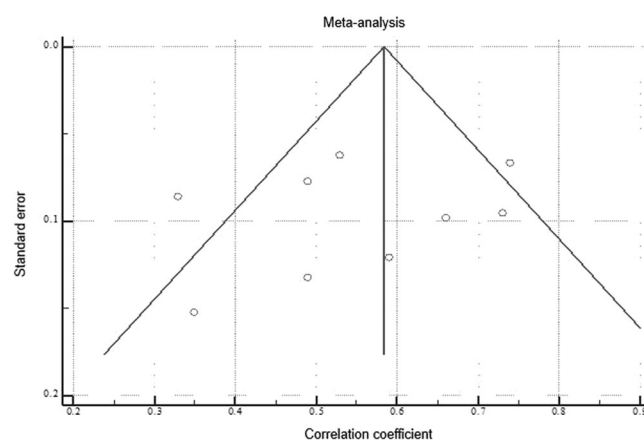


Figure 3. Funnel plot of the association between alienation appraisals and posttraumatic stress disorder symptoms.

A further limitation is that there was significant heterogeneity across the studies included in the meta-analysis. The results showed that 84.2% of the variance in effect size could be attributed to the variance between studies. This implicates other causal factors that may mediate the observed relations between alienation appraisals and posttraumatic stress. Despite this heterogeneity being viewed as a methodological weakness, the broad inclusion criteria ensured that the review was as wide-ranging as possible to collate evidence across studies that explored alienation and posttraumatic stress. The broad inclusion criteria were set as this ensured that the scope of the systematic review was comprehensive enough to capture evidence of the role of alienation across diverse studies using different questionnaire measures, varied participants, and various trauma types.

Another significant limitation was the small number of studies included and the variability in these studies; this meant it was not possible to conduct further moderator analyses. For example, as no two studies examined exactly the same type of trauma exposure, moderator analyses of trauma type were not conducted. The limited opportunity for moderator analyses in the current review poses a challenge in interpreting the precise nature of the association between alienation appraisals and PTSD symptoms. The strong effect sizes reported in this paper suggest that exploring alienation appraisals in PTSD is an important but relatively nascent area of research.

Despite heterogeneity in the assessments used and types of trauma exposure, the effect sizes ranged from medium to very large for all included studies. Therefore, the results of the current review tentatively suggest that alienation appraisals are significant in posttraumatic stress across a range of different types of trauma, an idea that warrants further attention. Further, the results may provide partial support for theories arguing that negative appraisals contribute to the maintenance of posttraumatic stress (Halligan et al., 2003; Meiser-Stedman et al., 2009). In particular, the large effect size observed suggests that alienation appraisals may contribute to the development or maintenance of PTSD symptoms. However, this assertion is limited as the

data used were correlational. Changes in PTSD symptoms and alienation were not measured over time, as seven out of nine included studies were cross-sectional in design. Future research that explores how alienation impacts trauma survivors in regard to the development of PTSD symptoms, maintenance of these symptoms, or perhaps both, is recommended.

Ehlers and Clark's (2000) seminal cognitive model of PTSD emphasized the importance of negative appraisals, which is evidenced in the large effect size found between alienation appraisals and PTSD symptoms. Early researchers pointed to alienation following trauma (e.g., Roth & Newman, 1990) and suggested that individuals who feel highly alienated after trauma exposure may require cognitive restructuring as well as graded exposure within the cognitive treatment model of PTSD (Ehlers et al., 1998). That early work combined with the evidence presented in this systematic review points to the potential value of clinically assessing alienation appraisals when exploring the impact of the traumatic experience on the survivor to inform the psychological formulation and treatment plans. Alienation appraisals may then be directly targeted using cognitive behavioral therapeutic techniques, such as cognitive restructuring.

Evidence shows that a stronger therapeutic alliance is associated with increased treatment adherence for adults with PTSD (Keller, Zoellner, & Feeny, 2010) and is predictive of reduced PTSD symptoms in trauma-exposed adults (Cloitre, Chase Stovall-McClough, Miranda, & Chemtob, 2004). Future research could explore whether a strong therapeutic alliance may indirectly reduce alienation appraisals by providing a safe relationship in which the trauma survivor can trust, connect with, and feel understood by another person (Hembree, Rauch, & Foa, 2003). This foundation of trust in the therapeutic relationship may then lay the groundwork for the trauma survivor to socially connect with others in their personal lives. Sensitively challenging alienation appraisals in trauma survivors via cognitive restructuring, within the context of a strong therapeutic alliance, is recommended as an avenue of exploration for future work (Barlow et al., 2017; Ehlers et al., 1998; Hembree et al., 2003).

Unsurprisingly, we found a large effect size for the relation between alienation appraisals and PTSD symptoms, as alienation comes under Criterion D—negative alterations in cognition and mood—in the *DSM-5* diagnostic criteria for PTSD. Previous studies exploring other appraisal categories that have significant overlap with core PTSD symptoms in the *DSM-5*, such as fear and anger, have shown that when all appraisal categories are considered concurrently, only alienation appraisals significantly mediate the association between trauma and PTSD symptoms (Mitchell et al., 2018). This suggests that alienation appraisals may be a maintenance factor for PTSD symptomatology as well as a symptom of PTSD in itself. This is similar to avoidance, which is conceptualized as both a core PTSD symptom in the *DSM-5* and, often, a key maintenance factor targeted in psychological therapy. Conceptualization of appraisals as a maintenance factor for distress in PTSD is supported by treatment studies that have shown responsiveness to

therapy to be mediated by changes in negative trauma appraisals (Jensen, Holt, Mørup Ormhaug, Fjermestad, Wentzel-Larsen, 2018; Kleim et al., 2013).

A recent comprehensive meta-analysis by Gomez De La Cuesta et al. (2019) found a large effect size for negative self-appraisals, $r = .61$; a medium effect size for negative world appraisals, $r = .46$; and a small effect size for self-blame appraisals, $r = .28$, and PTSD symptoms; the authors of that meta-analysis did not explore alienation appraisals specifically. Building on the findings presented by Gomez De La Cuesta et al., the current review demonstrates a large effect size between alienation appraisals and PTSD symptoms when exploring the contribution of alienation appraisals specifically; this suggests that, perhaps, alienation appraisals are particularly important following trauma exposure.

The exclusion criteria for the present review limited the included studies to those with adult samples only. This means that the large effect size found between alienation appraisals and PTSD symptoms in adults cannot be assumed in trauma-exposed children and adolescents. However, a recent systematic review by Mitchell and colleagues (2017) found a very similar effect size ($r = .58$) between appraisals and PTSD symptoms in children and adolescents, suggesting that cognitive appraisals may play a key role in posttraumatic stress for both young people and adults. As the specific role of alienation appraisals was not addressed in Mitchell et al.'s review, further research exploring alienation in trauma-exposed children and adolescents may be warranted given the results of the present study as well as initial links between alienation and posttraumatic stress identified in adolescents (Srinivas et al., 2015).

Although a strong, positive association between alienation appraisals and PTSD symptoms was uncovered, the mechanism of this association remains unclear. It is tentatively hypothesized that increased alienation may be related to reduced social support. Increased social support has been shown to be an effective buffer against PTSD symptoms by reducing negative trauma appraisals (Woodward et al., 2015; Zang et al., 2017). Thus, perhaps individuals who endorse alienation appraisals also have reduced social support, which maintains their PTSD symptoms. Future research that explores why alienation appraisals are significant in posttraumatic stress may further help to inform therapeutic approaches to target alienation appraisals in trauma survivors. Recent evidence suggests that variables such as age, trauma type, time since trauma exposure, and single versus multiple trauma exposures do not moderate the relation between maladaptive appraisals and PTSD symptoms, suggesting the significance of the appraisal process after trauma exposure (Gomez De La Cuesta et al., 2019). The current review suggests alienation appraisals to be particularly pertinent.

In conclusion, the present study was the first to review the emerging evidence base of the association between alienation appraisals and PTSD symptoms in trauma-exposed adults. The conclusions drawn from this meta-analytic review are strengthened by the high quality and low risk of bias of

the studies included. The findings are clinically useful for practitioners who work therapeutically with trauma-exposed adults.

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Meta-Analysis of Alienation and PTSD Symptoms

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