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The association between social support and posttraumatic stress symptoms among survivors of betrayal trauma: a meta-analysis

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ABSTRACT

Background: Betrayal traumas have a particularly deleterious effect on mental health. Although social support is a robust predictor of posttraumatic stress disorder (PTSD) symptom severity, it is not clear what factors may impact this relationship among betrayal trauma survivors.

Objective: This study sought to describe the association between social support and PTSD symptom severity among survivors of betrayal trauma and examine whether methodological, sample, trauma, and social support characteristics moderated this association.

Method: A comprehensive search identified 29 studies that assessed the cross-sectional association between PTSD symptom severity and social support among 6,510 adult betrayal trauma survivors.

Results: The average effect size ($r = -.25$; 95% CI: $-.30, -.20$) was small to medium, with significant heterogeneity between studies ($I^2 = 71.86$). The association between PTSD and social support was stronger when the trauma was perpetrated by a romantic partner compared to mixed perpetrators, even after accounting for covariates. There was also a significant effect of support type depending on whether the support was provided in the context of trauma disclosure. Specifically, positive reactions to trauma disclosure were not associated with PTSD symptoms whereas general positive social support (not disclosure focused) was associated with fewer PTSD symptoms. Negative reactions to trauma disclosure were associated with more PTSD symptoms. None of the included studies measured general negative social support outside of trauma disclosure.

Conclusions: Our findings suggest that social support may be a particularly important buffer against PTSD symptoms when experiencing traumatic betrayal by an intimate partner. Additionally, our results suggest that social support interventions for those experiencing betrayal trauma should focus on reducing negative responses to disclosure and bolstering general satisfaction with social support.

La asociación entre el apoyo social y los síntomas de estrés postraumático entre los sobrevivientes de un trauma por traición: un metaanálisis

Antecedentes: Los traumas de traición tienen un efecto particularmente perjudicial sobre la salud mental. Aunque el apoyo social es un fuerte predictor de la severidad de los síntomas del trastorno de estrés postraumático (TEPT), no está claro qué factores pueden afectar esta relación entre los sobrevivientes de traumas de traición.

Objetivo: Este estudio buscó describir la asociación entre el apoyo social y la severidad de los síntomas del TEPT entre los sobrevivientes de trauma de traición y examinar si las características metodológicas, muestrales, de trauma y de apoyo social moderaron esta asociación.

Método: Una búsqueda exhaustiva identificó 29 estudios que evaluaron la asociación transversal entre la gravedad de los síntomas de TEPT y el apoyo social entre 6.510 adultos sobrevivientes de trauma de traición.

Resultados: El tamaño del efecto promedio ($r = -.25$; IC del 95%: $-.30, -.20$) fue de pequeño a mediano, con heterogeneidad significativa entre los estudios ($I^2 = 71.86$). La asociación entre el TEPT y el apoyo social fue más fuerte cuando el trauma fue perpetrado por una pareja romántica en comparación con perpetradores mixtos, incluso después de tener en cuenta las covariables. También hubo un efecto significativo del tipo de apoyo dependiendo de si el apoyo se proporcionó en el contexto de la revelación del trauma. Específicamente, las reacciones positivas a la revelación del trauma no se asociaron con síntomas de TEPT, mientras que el apoyo social positivo general (no enfocado en la revelación) se asoció con menos síntomas de TEPT. Las reacciones negativas a la revelación del trauma se asociaron con más síntomas de TEPT. Ninguno de los estudios incluidos midió el apoyo social negativo general fuera de la revelación del trauma.

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Interpersonal trauma; child abuse; intimate partner violence; assault; rape; social support; social negativity; PTSD

PALABRAS CLAVE

Trauma interpersonal; abuso infantil; violencia de pareja; asalto; violación; apoyo social; negatividad social; Trastorno de estrés postraumático

关键词

人际创伤; 儿童虐待; 亲密伴侣的暴力行为; 袭击; 强奸; 社会支持; 社会消极性; PTSD

HIGHLIGHTS

- A meta-analysis of 29 studies examined the relationship between social support and PTSD symptom severity among survivors of betrayal trauma.
- Negative reactions to trauma disclosure were associated with more severe PTSD symptoms.
- Positive reactions to trauma disclosure were not associated with PTSD symptoms.
- General positive social support was associated with fewer PTSD symptoms.
- The relationship between social support and PTSD symptom severity was stronger when trauma was perpetrated by a romantic partner compared to mixed perpetrators.

Conclusiones: Nuestros hallazgos sugieren que el apoyo social puede ser un amortiguador particularmente importante contra los síntomas del TEPT cuando se experimenta una traición traumática por un compañero íntimo. Además, nuestros resultados sugieren que las intervenciones de apoyo social para quienes experimentan el trauma de traición deben centrarse en reducir las respuestas negativas a la revelación y reforzar la satisfacción general con el apoyo social.

背叛创伤幸存者的社会支持与创伤后应激症状之间的关联：一项元分析

背景:背叛创伤对心理健康具有特别有害的影响。尽管社会支持是创伤后应激障碍 (PTSD) 症状严重程度的可靠预测指标, 但尚不清楚什么因素可能影响背叛创伤幸存者之间的这种关系。

目的:本研究旨在描述背叛创伤幸存者中社会支持与PTSD症状严重程度之间的关联, 并考查方法, 样本, 创伤和社会支持特征是否调节这种关联。

方法:全面搜索确定了29项研究, 评估了6,510名背叛创伤成年幸存者中PTSD症状严重程度与社会支持之间的横断面关联。

结果:平均效应大小 ($r = -.25$; 95%CI: $-.30, -.20$) 从小到中, 研究之间存在显著的异质性 ($I^2 = 71.86$)。当浪漫伴侣遭受创伤时, 即使控制了协变量, 相较于混合犯罪者, PTSD与社会支持之间的联系也更强。根据是否在创伤性披露背景中提供支持的支持类型也会产生显著影响。具体而言, 对创伤性披露的积极反应与PTSD症状无关, 而总体积极的社会支持 (不针对披露) 与更少的PTSD症状相关。对创伤暴露的负面反应与更多PTSD症状相关。所纳入的研究均未在创伤性披露之外衡量总体的负面社会支持。

结论:我们的研究表明, 当亲密伴侣遭受背叛创伤时, 社会支持可能是防止PTSD症状的特别重要的缓冲。此外, 我们的结果表明, 针对遭受背叛创伤的人社会支持的干预措施应聚焦于减少对披露的负面反应, 并提高对社会支持的总体满意度。

Posttraumatic stress disorder (PTSD) is one of the most commonly diagnosed mental health conditions following exposure to a traumatic event; however, rates and severity of PTSD vary widely following exposure to different types of trauma (Kessler et al., 2017; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Betrayal trauma theory conceptualizes trauma as existing on a spectrum according to the degree of closeness between the perpetrator and survivor (Freyd, 1994). High betrayal trauma includes physical, sexual, and psychological abuse perpetrated by someone close to the victim; low betrayal trauma includes experiences of non-interpersonal trauma and violence perpetrated by someone who is not close or unknown to the victim (Kline & Palm Reed, 2020). Research has shown that the experience of betrayal during a trauma is uniquely predictive of overall severity of PTSD symptoms, PTSD-related avoidance, and emotional numbing, above and beyond severity of the injury, trauma type, and perceived life threat (Kelley, Weathers, Mason, & Pruneau, 2012). Studies have also found that traumas characterized as high in betrayal are associated with more depressive symptoms, dissociative symptoms, alexithymia, and physical health problems, among other adverse outcomes (e.g. Gobin & Freyd, 2009; Goldsmith, Freyd, & DePrince, 2012; Lawyer, Ruggiero, Resnick, Kilpatrick, & Saunders, 2006; Marriott, Lewis, & Gobin, 2016; Martin, Comer, DePrince, & Freyd, 2013). Understanding important factors that are associated with PTSD severity among

survivors of betrayal traumas may point to critical intervention targets for this high-risk group.

Several meta-analyses have shown that social support is a robust protective factor against receiving a PTSD diagnosis and experiencing higher PTSD symptom severity in a wide variety of trauma populations (Blais et al., 2021; Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003; Shand, Cowlshaw, Brooker, Burney, & Ricciardelli, 2015; Wright, Kelsall, Sim, Clarke, & Creamer, 2013; Xue et al., 2015; Zalta et al., 2021). Given the interpersonal nature of betrayal traumas, it is quite likely that social support may play a particularly important role in buffering against PTSD symptoms among betrayal trauma survivors. For example, social support may help to break cycles of revictimization common with betrayal traumas (Gobin & Freyd, 2009). However, given that betrayal traumas are associated with more disrupted interpersonal relationships relative to other trauma exposures (e.g. DiLillo, 2001; DiMauro, Renshaw, & Blais, 2018; Golding, Wilsnack, & Cooper, 2002), meta-analyses focused on trauma in general may not accurately reflect the relation between social support and PTSD for betrayal trauma survivors. One recent meta-analysis by Dworkin, Brill, & Ullman, (2019) examined the association between responses to disclosure of trauma and psychopathology, broadly defined, among interpersonal trauma survivors. However, this meta-analysis focused exclusively on responses to disclosure, rather than social support

more broadly, and examined a broader group of interpersonal trauma survivors, including those that did not involve physical or sexual abuse (e.g. survivor of a violent crime). Thus, a meta-analysis examining the relationship between social support and PTSD symptoms among betrayal trauma survivors is warranted.

The current meta-analysis aimed to examine the relationship between social support and PTSD symptoms, and potentially important moderators of this relationship, among adults exposed to betrayal trauma using a Betrayal Trauma Theory framework (BTT; Freyd, 1994). Based on BTT, several characteristics related to the nature of the sample and the nature of the trauma may moderate the relationship between social support and PTSD symptoms among survivors of betrayal trauma. Betrayal traumas can occur in different types of relationships with varying degrees of closeness and dependency on the perpetrator; thus, perpetrator type might be an important moderator of the relationship between social support and PTSD. Because experiencing betrayal trauma violates masculine gender norms (Monteith, Gerber, Brownstone, Soberay, & Nazanin, 2019), social support may have less of an impact on PTSD symptoms for men. We also hypothesize that social support may not have as strong of a protective effect for survivors of sexual traumas, which are associated with higher PTSD symptoms relative to other traumas (e.g. Valentiner, Foa, Riggs, & Gershuny, 1996). Studies of sexual assault often include incidents characterized by a varying degree of force (e.g. verbal pressure to physical force; Koss et al., 2007) and assault severity has been implicated in PTSD symptom severity (Brown, Testa, & Messman-Moore, 2009; Peter-Hagene & Ullman, 2015), how likely survivors are to disclose (Hahn, Hahn, Gaster, & Quevillon, 2020), and the degree to which individuals blame survivors (Adams-Clark & Chrisler, 2018). Additionally, individuals who seek support such as emergency medical care, police intervention, legal protection, or housing may be experiencing more severe violence and may have less access to informal supports that will meet their needs (Hamby, 2014). Thus, sexual assault severity and sample recruitment will be examined as moderators.

In addition to these moderators implicated by BTT, previous meta-analyses on the relationship between social support and PTSD point to several social support characteristics that may also moderate the relationship between social support and PTSD symptom severity among survivors of betrayal trauma. Several meta-analyses have shown that harmful effects of negative social reactions (e.g. blame, treating the person differently, social constraint, making demands) on psychopathology, including PTSD symptoms, are more impactful than the salubrious

effects of positive forms of social support (Blais et al., 2021; Dworkin et al., 2019; Zalta et al., 2021). Given that betrayal traumas involve violation of trust (Gobin & Freyd, 2014), negative social reactions are likely to reinforce these beliefs. Moreover, the meta-analysis by Dworkin et al. (2019) highlights how social support is assessed in different contexts. Although one body of the trauma literature has focused on the types of supportive responses survivors receive after disclosing their trauma, particularly among interpersonal trauma survivors (Dworkin et al., 2019), social support has most commonly been assessed using global measures of perceived availability and satisfaction with social support (Zalta et al., 2021). Given that responses to disclosure involve time-specific but very intense interactions whereas general perceptions of support availability and satisfaction involve an aggregate of diffuse interactions, it is quite possible that these differing contexts may impact the relationship between social support and PTSD symptom severity. Thus, the current meta-analysis sought to examine how each of these variables separately (valence and context) as well as the combination of these variables (valence by context) moderates the relationship between social support and PTSD symptom severity.

1. Method

1.1. Search procedures

The current meta-analysis is an extension of a larger meta-analysis examining the relationship between PTSD symptom severity and social support following all types of trauma (Zalta et al., 2021). Several complementary search strategies were used to conduct a systematic search. The electronic databases searched, search terms, and search dates are described in full in Zalta et al. (2021). In addition to database searches, we reviewed the reference lists of relevant previous meta-analyses and systematic or other literature reviews along with all the references of journal articles that were deemed eligible for the meta-analysis. Journals that publish articles on PTSD were hand searched from 1980 or the journal's first issue to June 2019 including *Journal of Traumatic Stress*, *Journal of Anxiety Disorders*, *Psychological Trauma: Theory, Research, Practice, and Policy*, and *Anxiety, Stress, and Coping*. The senior author (AKZ) posted a request for unpublished data on several professional listservs including the Association for Behavioural and Cognitive Therapies, the American Psychological Association Division of Trauma Psychology (Division 56), and the American Psychological Association Society for Military Psychology (Division 19). Finally, all researchers who were the first, last, or corresponding author on at least two studies deemed to be eligible for the meta-

analysis were emailed to request recently published data or unpublished data that might be eligible for the meta-analysis.

1.2. Inclusion criteria

The larger meta-analysis (Zalta et al., 2021) required PTSD symptoms to be assessed at least one month after trauma exposure. In studies of betrayal trauma, it is common for individuals to be in an ongoing relationship with the perpetrator and therefore to experience an ongoing risk of traumatization. Thus, for the current meta-analysis, this one-month criterion was eliminated, to allow for the inclusion of participants who could be experiencing ongoing trauma at the time of data collection. To be included, studies were required to be quantitative studies written in English after 1980. Eligible samples were age 18 and over and were exposed to betrayal trauma, defined as physical or sexual abuse (regardless of severity) from a caregiver, or any history of physical or sexual violence in the context of a romantic relationship. Studies that assessed participants exposed to a sexual assault in which the perpetrator was not assessed or reported were included because the vast majority of sexual assaults are perpetrated by an individual that is known to the survivor (Department of Justice, 2017). Thus, it is likely that the data from these studies predominantly reflect participants exposed to betrayal trauma. Samples were deemed ineligible if participants had been recruited based on psychiatric symptoms, including clinical trials, because these samples likely include individuals with a restricted range of symptoms, which could affect the correlation between PTSD and social support. Studies were required to include a validated measure of PTSD symptom severity and a social support measure, which went in a single direction from better to worse.

1.3. Study selection

The titles and abstracts of articles were inspected according to the inclusion and exclusion criteria by a single rater. All raters were trained by the senior author (AKZ) and demonstrated fidelity to the rating criteria prior to conducting independent reviews. Raters at the abstract level took an extremely conservative approach in which studies were only excluded if they clearly met an exclusion criterion. Articles that were identified as requiring a full-text review were read by two independent raters who, in cases of disagreement, discussed and came to a consensus. Remaining questions regarding inclusion/exclusion were discussed by the study team until a consensus was reached. If the article did not contain the necessary information to establish inclusion/exclusion, the

corresponding author was contacted for clarification. If the author did not respond to the inquiry, the article was excluded. The PRISMA flow diagram is presented in Figure 1.

For the present study, the titles and abstracts of studies in the original meta-analysis (Zalta et al., 2021) were reviewed to determine whether they met the betrayal trauma criteria. This resulted in the identification of seven studies for inclusion in this study, which were also part of the original meta-analysis. Studies that were excluded from the original meta-analysis based on inclusion criteria that overlapped with those of the present study were excluded. Studies that were excluded from the original study due to PTSD being assessed less than one month since trauma were re-evaluated to assess whether they met the other criteria for the present study, using the same inclusion decision method described above. The references of newly included studies were scanned for additional potentially eligible studies.

Eligible studies were then evaluated for sample overlap. If applicable, we selected the study with the largest available sample size. When sample size was the same across studies, we prioritized studies that were published over dissertations, as these studies were likely evaluated more rigorously. In cases of multiple published studies, the first published study was selected. If an effect size was not available and the author did not respond to our email inquiry for the effect size, we went down the list of overlapping articles to identify any other studies with an available effect size.

1.4. Coding of studies

Similar to the study selection process, eligible studies were coded by two authors, who met to address any discrepancies between codes. For more information about the development of the coding manual, see Zalta et al. (2021). Studies were coded for the following continuous characteristics: date of publication, mean age, percent of female participants, percent of white participants, percent of participants married/cohabitating, percent heterosexual participants, percent reporting rape according to the Sexual Experiences Survey (SES; Koss et al., 2007), and mean scores of the subscales on the Conflict Tactics Scale-Revised (CTS-2; Straus, Hamby, Boney-McCoy, & Sugarman, 1996). Several dichotomous study quality and measurement characteristics were coded including whether the study was published in a peer-review journal, whether the PTSD measure was administered in English, whether the PTSD measure was rated based on a specific traumatic event, and whether the social support measure was validated. The PTSD measure used was coded; measures

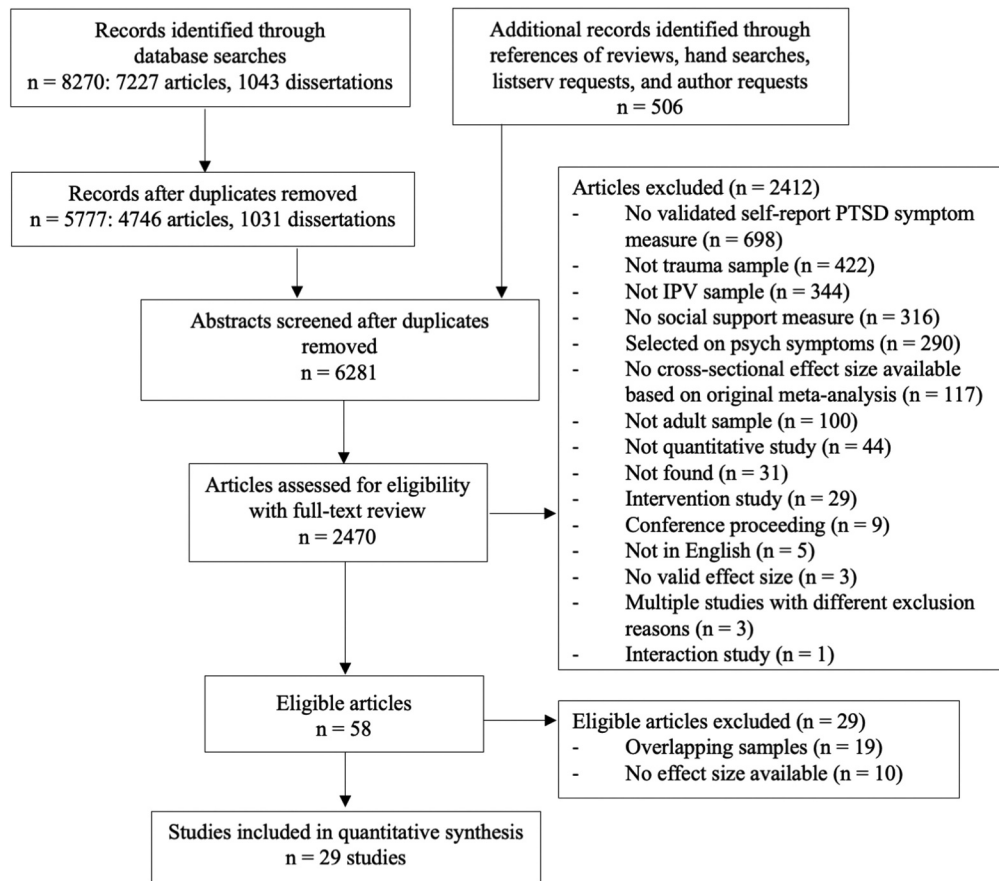


Figure 1. PRISMA flow chart.

Note. In the process of retrieving the full text of the reports from the database searches, several additional reports were identified (i.e., reports with very similar titles or additional reports sent to us by authors when reprints were requested). These reports were included in the total number of records identified through database searches.

that were uncommonly used (i.e. used in < 2 studies) were collapsed into an ‘other’ category.

The developmental timing of trauma was coded as adulthood, childhood (occurred before age 18), mixed, or unknown. Type of interpersonal trauma required for study inclusion was categorized as sexual assault, physical violence, or mixed. The mixed category included cases where participants could have experienced physical or sexual violence or studies that required multiple types of violence exposure. Perpetrators’ relationship to participants was categorized as a partner, family member, or mixed (i.e. the participant’s relationship to the perpetrator varied among study participants). Although we originally planned an ‘acquaintance’ category for this variable, none of the included studies focused exclusively on victimization by this type of perpetrator. Social support was coded according to valance (i.e. positive or negative) and whether or not it was provided specifically in the context of trauma disclosure (i.e. yes or no). The country of origin was recorded for each study; however, due to a preponderance of studies conducted in the USA, those conducted elsewhere were collapsed into an ‘other’ country category. Although we attempted to code population according

to civilian or veteran status, the search strategy only yielded studies with civilian samples. Sample recruitment was categorized as IPV services when participants were recruited from any site where they were seeking emergency medical care, legal or law enforcement assistance, or shelter related to interpersonal trauma. Sample recruitment also included categories for undergraduates, community members, and ‘other’ settings.

The study quality measure included the following items: internal reliability of the PTSD instrument > .7 (Yes [1] vs. No/Not reported [0]); internal reliability of the social support instrument > .7 (Yes [1] vs. No/Not reported/single item measure [0]); the amount of score-level missing data < 20% (Yes [1] vs. No/Not reported [0]); and if the authors used an appropriate method for handling missing data at the score level (scored ‘yes’ [1] if there was no missing data, if the authors used listwise deletion if there was less than 10% missing data, or if the authors used a multiple imputation procedure for more than 10% missing data).

For the effect size, we coded a bivariate correlation (r) between a measure of PTSD symptom severity and a measure of social support along with the

sample size of that correlation. The magnitude of the correlation was interpreted as small (0.10), medium (0.30), or large (0.50; Cohen, 1992). If multiple measures of PTSD and/or social support were assessed in one study, all eligible effect sizes were coded. Effect sizes were coded such that higher levels of positive social support represented higher scores and higher levels of PTSD represented higher scores. Therefore, the expected relationship between social support and PTSD was negative. If articles reported effect sizes in which poorer social support was represented by higher scores, then the reported effect size was reversed. When an effect size was not available in the article, we contacted the study authors to request the data.

1.5. Analyses

Comprehensive Meta-Analysis version 3.3.070 was used to calculate weighted effect sizes, test for heterogeneity, and identify moderators. Random effects models were used to calculate the overall weighted effect size, due to expected heterogeneity. The Q statistic was used to evaluate the significance of heterogeneity and the I^2 index was used to evaluate the proportion of variability in a set of effect sizes that is due to true between-study differences. Grubbs' test was used to test for outliers via GraphPad (Grubbs, 1969). The impact of publication bias was examined by creating a funnel plot of the overall effect size and evaluating asymmetry of the funnel plot using Egger's test of the intercept (Egger, Smith, Schneider, & Minder, 1997) and Duval & Tweedie's trim-and-fill procedures (2000).

We then examined whether methodological characteristics were associated with both effect sizes to identify potential covariates. Mixed effect models were conducted using analysis of variance for categorical moderator variables and meta-regression analysis for continuous moderator variables. Any quality and measurement characteristics that were significantly associated with effect size at $p < .05$ were examined as simultaneous predictors in a meta-regression to determine which variables were uniquely predictive of effect size. Those that remained significant in the meta-regression were included as covariates in subsequent analyses examining sample, trauma, and social support characteristics.

Finally, we examined sample, trauma, and social support characteristics as moderators of effect sizes using analysis of variance for categorical moderator variables and meta-regression analysis for continuous moderator variables using mixed-effects models. Some studies measured multiple categories of the same moderator (e.g. they included a measure of disclosure focused and non-disclosure focused support). For these moderator analyses, we used the shifting unit-of-analysis approach (Cooper, 2010).

When categorical variables had more than two categories, if the omnibus test for the target moderator variable was significant at $p < .05$, we ran the meta-regression analyses with each category as the reference group (except the category with the smallest n_{effects}) to conduct all pairwise contrast analyses.

2. Results

2.1. Descriptive characteristics

A total of 29 studies with unique samples, with a total of 52 effects, were available for analysis (see Table A1). Cases of multiple effects within studies were due to the assessment of multiple types of social support or assessment using multiple PTSD or social support measures. Sample sizes ranged from 30 to 1729, resulting in a total of 6510 individuals. The mean sample age was 29.37 ($SD = 8.65$) and on average, samples were 92.6% female, 53.8% White, and 34.4% married/cohabitating. Studies primarily originated from the USA (86.2%). The developmental timing of trauma was in adulthood for 37.9% of the studies, childhood for 17.2% of the studies, mixed for 31.0% of the studies, and unknown for 13.8% of the studies. Trauma types included 55.2% sexual, 10.3% physical, 24.1% mixed violence, and 10.3% unknown. Most often, the relationship to the trauma perpetrator was a romantic partner (31.0%), followed by mixed (20.7%) and family (3.4%); however, many studies did not report the perpetrator (44.8%). For most studies, time since trauma could not be categorized (55.2%); 10.3% of the studies assessed participants less than 1 month after the trauma and 34.5% assessed participants more than a month after the trauma. Studies most often recruited from IPV services (34.5%) or undergraduates (34.5%), with other studies recruiting from the community (17.2%), and other sources (13.8%). A variety of self-report measures were used to assess PTSD symptom severity, though versions of the PTSD Checklist (41.4%; Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Weathers, Litz, Herman, Huska, & Keane, 1993; Weathers et al., 2013) and PDS/PSS-SR (31.0%; Foa, Cashman, Jaycox, & Perry, 1997; Foa, Riggs, Dancu, & Rothbaum, 1993) were the most common. Twelve studies included the SES to assess sexual assault characteristics. Out of the eight studies that included data on the prevalence of completed rape in their sample, the average was 54.4%, ranging from 35% to 74%. Because only two of the five studies that included the CTS2 reported data and only one study reported the percentage of individuals who were heterosexual, these variables were not included in analyses.

2.1.1. Overall effect size

The overall random effects estimate was $-.25$ (95% CI: $-.30, -.20$, $Z = -9.75$, $p < .001$), indicating that higher levels of positive social support and lower levels of

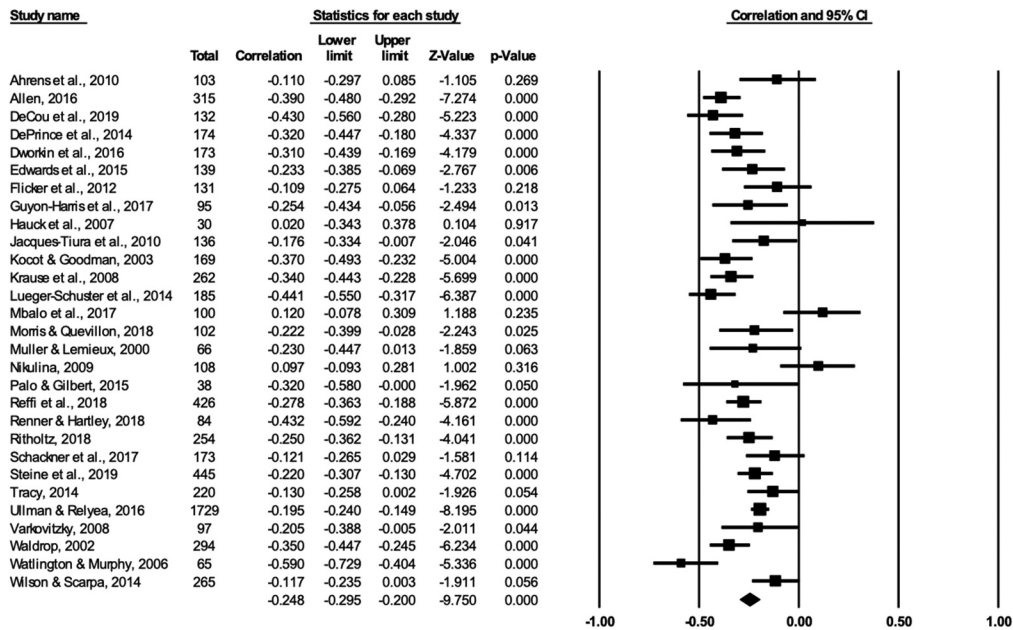


Figure 2. Plot of effect sizes for the association between PTSD and social support.

negative social support are negatively associated with PTSD symptom severity among interpersonal trauma survivors (see Figure 2 for an effect size plot). No outliers were detected using Grubbs' test (Grubbs, 1969) and the estimates with one study removed ranged from $-.24$ to $-.26$, suggesting that any potential outliers had minimal influence on the overall effect size. Heterogeneity analyses indicated there was significant variance attributable to between-study variance ($Q[df] = 99.50 (28), p < .001, I^2 = 71.86$) and that there was a substantial degree of heterogeneity (Higgins, Thompson, Deeks, & Altman, 2003). Egger's test of the intercept was not significant indicating symmetry in the funnel plot ($t(27) = 0.46, p = .647$; see Figure 3 for the funnel plot). Further, trim-and-fill procedure using a random-effects model indicated that no studies were missing to the right of the mean, suggesting that publication bias was unlikely.

2.2. Moderator analyses

Categorical and continuous moderator analyses are presented in Tables 1 and 2, respectively.

2.2.1. Methodological characteristics

Several methodological and quality characteristics were evaluated to determine potential covariates. The only significant predictor of the effect size was the PTSD measure utilized. Contrast analyses showed that studies using the Posttraumatic Stress Disorder Checklist (Blanchard et al., 1996; Weathers et al., 1993, 2013) to assess PTSD symptom severity had a larger effect size compared to studies that used the Posttraumatic Diagnostic Scale/PTSD Symptom Scale – Self-report (Foa et al., 1997, 1993) and studies using measures in the Other category. Our quality

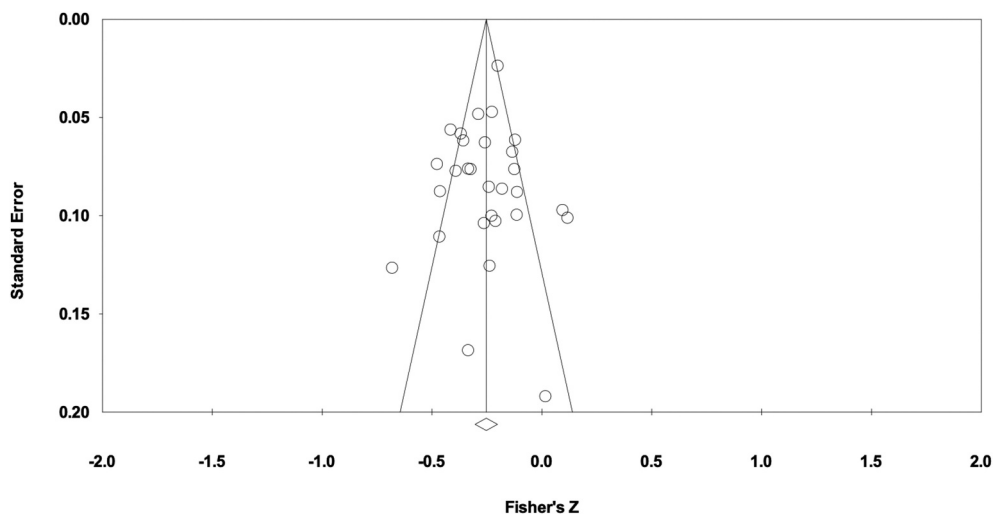


Figure 3. Funnel plot of effect sizes for the association between PTSD and social support.

Table 1. Moderator analyses of the categorical methodological sample, trauma, and social support characteristics.

| Moderator | <i>N</i> _{effects} | <i>r</i> | 95% CI | <i>Q</i> (df) |
|--|-----------------------------|----------|------------|---------------|
| Dissertation/unpublished data | | | | 0.24 (1) |
| Yes | 6 | -.22 | -.34, -.09 | |
| No | 23 | -.25 | -.31, -.20 | |
| Effect size reported in article | | | | 0.63 (1) |
| Yes | 25 | -.24 | -.29, -.19 | |
| No | 4 | -.30 | -.45, -.15 | |
| PTSD measure used | | | | 19.59 (3)*** |
| PCL | 12 | -.34 | -.39, -.29 | |
| IES-R | 4 | -.23 | -.33, -.12 | |
| PDS/PSS-SR | 9 | -.14 | -.23, -.05 | |
| Other | 4 | -.18 | -.28, -.07 | |
| PTSD rated to specific event | | | | 0.03 (1) |
| Yes | 11 | -.24 | -.32, -.16 | |
| No | 18 | -.25 | -.31, -.19 | |
| Social support measure ^a | | | | 0.00 (1) |
| Validated | 24 | -.25 | -.30, -.20 | |
| Author developed/single item | 4 | -.24 | -.45, -.01 | |
| Country | | | | 0.62 (1) |
| USA | 25 | -.26 | -.30, -.21 | |
| Other | 4 | -.16 | -.38, .08 | |
| Time since trauma | | | | 0.35 (1) |
| Less than 1 month | 3 | -.29 | -.41, -.17 | |
| Greater than 1 month | 10 | -.25 | -.34, -.16 | |
| Relationship to perpetrator | | | | 7.26 (1)** |
| Partner | 9 | -.31 | -.39, -.23 | |
| Mixed | 6 | -.10 | -.23, .03 | |
| Trauma timing | | | | 0.76 (2) |
| Adulthood | 11 | -.26 | -.36, -.16 | |
| Childhood | 5 | -.26 | -.38, -.13 | |
| Mixed timing | 9 | -.21 | -.30, -.12 | |
| Recruitment method | | | | 5.76 (3) |
| Community | 5 | -.17 | -.25, -.09 | |
| Undergraduate | 10 | -.21 | -.29, -.13 | |
| IPV services | 10 | -.28 | -.38, -.18 | |
| Other | 4 | -.32 | -.43, -.20 | |
| Violence type | | | | 3.92 (2) |
| Sexual | 16 | -.21 | -.27, -.14 | |
| Physical | 3 | -.35 | -.56, -.11 | |
| Mixed | 7 | -.31 | -.41, -.21 | |
| Social support valence ^b | | | | 10.23 (1)** |
| Positive | 27 | -.17 | -.25, -.08 | |
| Negative ^c | 13 | -.35 | -.42, -.28 | |
| Social support context ^b | | | | 2.70 (1) |
| General | 18 | -.28 | -.35, -.21 | |
| Responses to disclosure | 14 | -.21 | -.27, -.15 | |
| Social support valence by context ^b | | | | 35.38 (2)*** |
| Positive general | 18 | -.28 | -.35, -.21 | |
| Positive responses to disclosure | 11 | .04 | -.07, .15 | |
| Negative responses to disclosure ^c | 13 | -.35 | -.42, -.28 | |

PCL = PTSD Checklist, IES-R = Impact of Events Scale – Revised, PDS/PSS-SR = Posttraumatic Diagnostic Scale/PTSD Symptom Scale – Self-Report.

^aStudies were excluded from this analysis if they included both validated and author-developed/single-item measures of social support.

^bFor moderators in which different categories were represented within a single study, we used a shifting unit-of-analysis approach (Cooper, 2010).

^cEffect sizes measuring negative social support were reverse coded to allow for direct comparison to positive social support. Therefore a negative relationship indicates that more negative social support is associated with more severe PTSD.

p* < .05, *p* < .01, ****p* < .001

Table 2. Meta-regressions of continuous moderators.

| Moderator | <i>N</i> _{effects} | Coefficient | SE | <i>Z</i> | <i>p</i> | <i>R</i> ² analog |
|------------------------------|-----------------------------|-------------|--------|----------|----------|---------------------------------|
| Publication date | 29 | 0.0024 | 0.0050 | 0.48 | .6284 | 0.00 |
| Study quality | 29 | 0.0005 | 0.0323 | 0.02 | .9874 | 0.00 |
| Mean Age | 27 | -0.0052 | 0.0032 | -1.60 | .1096 | 0.00 |
| % Female | 29 | 0.0035 | 0.0013 | 2.59 | .0095 | 0.26 |
| % Married or cohabitating | 9 | -0.0046 | 0.0045 | -1.02 | .3054 | 0.00 |
| % White | 23 | 0.0005 | 0.0012 | 0.40 | .6864 | 0.00 |
| % Rape | 8 | -0.0025 | 0.0047 | -0.54 | .5899 | 0.00 |

variable, publication year, the country that the study was conducted in (US v. non-US), whether the PTSD measure focused on a specific event, whether the PTSD measure was administered a month post-

trauma, and whether a validated social support measure was used were all unrelated to effect size. Therefore, the PTSD measure was the only variable included as a covariate in subsequent moderator analyses.

2.2.2. Sample, trauma, and social support characteristics

Sample Characteristics. Results showed that the percentage of the study sample who were female was significantly associated with effect size. We created a scatterplot to examine this effect (Figure A1); the scatterplot showed that only a few studies included mostly male participants and therefore, it is possible

that these studies served as leverage points in the analysis. Further, this effect was no longer significant after adjusting for the PTSD measure used (Table A2). No other sample characteristics (i.e. age, race, marital status, recruitment) were related to the association between social support and PTSD.

Trauma characteristics. Participants' relationship to the perpetrator was the only trauma characteristic that was associated with effect size; this moderator remained significant after adjusting for PTSD measure (Table A3). Specifically, studies that focused on interpersonal violence perpetrated by a romantic partner demonstrated a stronger association between social support and PTSD than studies that included mixed perpetrator types. Family could not be examined as a perpetrator category, because there was only one study that focused on this perpetrator type. Violence type, developmental timing of trauma, and percentage of the sample reporting completed rape, were unrelated to effect size.

Social Support Characteristics. Social support valence (positive v. negative) was a significant predictor of effect size and remained significant after adjusting for PTSD measure (Table A4). Specifically, studies assessing negative support had a significantly larger effect size than positive support. Whether the social support measure was disclosure focused did not have a significant impact on effect size. We then tested the impact of social support type by context, as one of our goals was to expand on findings from the Dworkin et al. (2019) study. This analysis indicated that the effect of support type differs by context and this moderator remained significant after accounting for the PTSD measure used (Table 3). Specifically, positive responses to disclosure were unrelated to PTSD ($Z = 0.67, p = .505$). Higher levels of negative responses to disclosure and lower levels of general positive support (not disclosure focused) were associated with greater PTSD symptom severity. Contrast analyses showed that the strength of the relationship between social support and PTSD did not differ between negative responses to disclosure and general positive support ($p = .116$). However, both negative responses to disclosure and general positive support revealed larger effects than positive responses to disclosure.

3. Discussion

This meta-analysis examined the cross-sectional association between social support and self-reported PTSD symptoms among adult survivors of betrayal traumas. The overall weighted effect size was small to medium ($r = -.25$), indicating that higher levels of positive support and lower

levels of negative support were associated with lower PTSD symptom severity. This overall effect was consistent with previous meta-analyses examining the relationship between social support and PTSD symptoms across all trauma types (overall weighted cross-sectional effect size of $-.27$ in Zalta et al., 2021). Notably, our results revealed a substantial degree of heterogeneity in this effect, supporting the need for further examination of moderators of this effect.

A primary goal of this study was to examine the association between social support and PTSD symptoms through a BTT lens. This theory suggests that the impact of trauma will be more severe when the survivor experiences a greater degree of betrayal (i.e. having a close or dependent relationship with the perpetrator). Our findings showed that the association between social support and PTSD symptoms was stronger when the trauma was perpetrated by a romantic partner compared to 'mixed' perpetrators, even after controlling for methodological covariates. This finding may suggest that having other sources of support is particularly important in cases where trauma is being perpetrated by an intimate partner. Studies have generally shown that women in abusive romantic relationships have impoverished social networks and poor quality of support (Levendosky et al., 2004). Researchers have generally attributed this to the fact that perpetrators purposefully isolate their partner to maintain control over them and victims often fail to disclose the abuse, resulting in a failure to receive quality support. Thus, social supports may be particularly important in helping survivors of intimate partner violence overcome the cycle of abuse, resulting in reduced PTSD severity. It could also be that studies that focused specifically on partner perpetrated betrayal trauma were more likely to be characterized by repeated instances of abuse, whereas studies of 'mixed' perpetrators may have been more heterogeneous in regard to abuse frequency. Notably, the perpetrator type was unknown and could not be categorized for 45% of the samples and only one study explicitly examined trauma perpetrated by family members. Thus, our results must be interpreted with caution. Moreover, the perpetrator type is only a proxy for the survivors' sense of closeness and dependency on the perpetrator. Further research is needed to evaluate how the degree of betrayal affects the relationship between social support and PTSD symptom severity.

Another objective of this study was to expand on previous meta-analyses (Dworkin et al., 2019; Zalta et al., 2021) and explore the extent to which the valence and context of social support impact the relationship between social support and PTSD symptom severity among survivors of betrayal trauma. Negative responses to disclosure of trauma (e.g.

Table 3. Meta-regression of social support valence by context adjusting for PTSD measure.

| Variable | Coef. | SE | 95% CI | Z | p | Q(df) |
|--|---------|--------|-----------------|-------|--------|--------------|
| PTSD Measure Used (ref = PCL) | | | | | | 7.81 (3) |
| IES-R | 0.0528 | 0.0813 | −0.1076, 0.2112 | 0.64 | 0.5242 | |
| PDS/PSS-SR | 0.1482 | 0.0605 | 0.0296, 0.2668 | 2.45 | 0.0143 | |
| Other | 0.1582 | 0.0777 | 0.0058, 0.3105 | 2.04 | 0.0418 | |
| Social support valence by context (ref = Negative responses to disclosure) | | | | | | 36.56 (2)*** |
| Positive general | 0.0953 | 0.0607 | −0.0236, 0.2141 | 1.57 | 0.1163 | |
| Positive responses to disclosure | 0.3875 | 0.0660 | 0.2582, 0.5168 | 5.87 | 0.0000 | |
| Social support valence by context (ref = Positive general) | | | | | | |
| Positive responses to disclosure | 0.2923 | 0.0646 | 0.1656, 0.4189 | 4.52 | 0.0000 | |
| Negative responses to disclosure | −0.0953 | 0.0607 | −0.2141, 0.0236 | −1.57 | 0.1163 | |

$N_{\text{effects}} = 42$. Because different social support valences were represented within a single study, we used a shifting unit-of-analysis approach (Cooper, 2010). To conduct all pairwise comparisons of social support valence by context, meta-regressions were re-run with each category as the reference variable except the Positive responses to disclosure group. No studies assessed negative general support. PCL = PTSD Checklist. IES-R = Impact of Event Scale – Revised. PDS/PSS-SR = Posttraumatic Diagnostic Scale/PTSD Symptom Scale – Self-report.

*** $p < .001$

blame, treating someone differently after disclosure) were associated with more severe PTSD symptoms, consistent with previous research (Dworkin et al., 2019; Zalta et al., 2021). Negative responses to trauma disclosure are likely to reinforce negative beliefs about oneself, others, and the world, which are thought to play a critical role in the aetiology and maintenance of PTSD symptoms (see Zalta, 2015 for a review). Notably, there were no studies in our meta-analysis that examined general negative support outside of the disclosure context. Studies in other trauma samples have shown that general negative support (e.g. criticism, social conflict, negative social experiences, social constraint, making too many demands) is associated with more severe PTSD symptoms (Bonanno, Rennicke, & Dekel, 2005; Dirkzwager, Bramsen, & Van Der Ploeg, 2003; Halvorsen & Kagee, 2010; Kratz et al., 2010; Nayback-Beebe & Yoder, 2011). Thus, further exploration of the impact of general negative support among survivors of betrayal trauma is warranted.

Our results with respect to positively valenced support varied based on the context of the support. General positive support was associated with fewer PTSD symptoms, consistent with previous meta-analytic findings that perceived social support, enacted support, and structural support were associated with fewer PTSD symptoms among a broad range of trauma survivors (Zalta et al., 2021). By contrast, positive responses to trauma disclosure were not significantly associated with PTSD symptoms in the current study. Similarly, Dworkin et al. (2019) found that received positive reactions to trauma disclosure, such as those measured by the Social Reactions Questionnaire (Ullman, 2000), were associated with more psychopathology cross-sectionally with a very small effect ($r = 0.06$), but were not associated with psychopathology longitudinally ($r = 0.00$). Several explanations may help to account for these results. As we previously noted, responses to disclosure involve time-specific but

often emotionally intense interactions, whereas general perceptions of support availability and satisfaction involve an aggregate of diffuse interactions. Given the role of negative cognitions in the development and maintenance of PTSD, it is possible that a single positive interaction, even one that is emotionally salient, might not serve as sufficient evidence to combat negative beliefs about oneself, others, and the world. By contrast, an individual's global assessment that they have supportive others that they can trust and rely on may have a greater impact combating such negative beliefs. Additionally, having positive social support more generally may enhance survivors' perceived ability to cope with the trauma, consistent with the stress-buffering hypothesis of social support (Cohen & Wills, 1985). In the case of betrayal trauma, general positive support may also enhance a survivors' readiness and willingness to leave an abusive relationship, which could ultimately shorten the duration or severity of the experienced abuse (Rose, Campbell, & Kub, 2000). Currently, it is unclear whether the specific pattern of results we observed with respect to positive support in different contexts is specific to betrayal/interpersonal trauma or extends to other traumas more broadly; thus, further research in this area would help to determine whether this phenomenon is more universal.

Although it appeared as though the association between social support and PTSD symptom severity might be stronger in studies that had a higher proportion of male participants, there were very few studies that included any male participants (24%), and this association was no longer significant after adjusting for the PTSD measure used. Thus, it is unclear whether the findings were not robust due to insufficient samples or whether this finding was driven by methodological factors. Notably, the samples that included male participants varied quite widely with respect to the developmental timing of the trauma, trauma type and severity, the nature of the sample (recruitment and age), and the severity of

PTSD symptoms. For example, one study that included a predominantly male sample (76% male) was Lueger-Schuster et al.'s (2014) study of adult survivors of child abuse by Catholic clergy. This study included largely older participants (mean age of 56) who had disclosed their abuse to an independent victims' protection commission and who generally reported high PTSD symptoms. Allen's (2016) study of individuals who experienced a sexual assault since the age of 14 (41% male) were recruited through Mechanical Turk and an undergraduate sample, were in their late 20s on average (mean age = 27), and had relatively low PTSD symptoms (23% meeting clinical threshold). Muller and Lemieux (2000) recruited a community sample of adults (mean age 33, 36% male) who had experienced both physical and sexual abuse (52%), physical abuse alone (37%), or sexual abuse alone (5%) in childhood. The diversity of studies including male participants points to the fact that men also experience a wide variety of betrayal traumas. Our findings suggest that social support may be an important buffer against PTSD symptoms among male betrayal trauma survivors and that further research in this area is needed.

We also attempted to explore several other sample- and trauma-related characteristics as moderators of the relationship between social support and PTSD symptom severity. Two potential indicators of trauma severity, the percentage of the sample reporting completed rape and sample recruitment, were unrelated to effect size. Though it is important to note that we were only able to assess the percent of completed rape in eight samples. We were also unable to assess our third severity measure, CTS2 scores, because although five studies used this measure, only two reported scores in their sample. Thus, it may be the case that the severity of interpersonal violence has the main effect on both decreasing social support and increasing PTSD symptom severity without impacting the strength of the relationship between social support and PTSD symptom severity. However, the fact that interpersonal violence researchers do not consistently report violence severity and frequency using standardized measures hampers our ability to draw conclusions about trauma severity as a moderator.

Several other trauma-related variables including developmental timing of trauma and violence type also did not moderate the relationship between social support and PTSD symptom severity. Research has shown that approximately 50% of individuals who experience childhood sexual abuse experience a sexual assault later in life (Walker, 2019). Thus, the samples that were recruited based on presence of sexual abuse in childhood may have had high rates of adulthood sexual assault and vice versa, making it difficult to isolate the unique impact of abuse that

occurred in only one time period on the relation between social support and PTSD symptom severity. Similarly, samples recruited based on a particular violence type (e.g. sexual or physical abuse) may have experienced other forms of abuse, such as emotional abuse, which has been shown to be strongly predictive of PTSD symptom severity (Pico-Alfonso, 2005). Thus, our results highlight the challenges of trying to disentangle the effects of these trauma attributes when they so commonly co-occur.

Several limitations of the present study should be noted. Because this study focused on cross-sectional effects, we are not able to draw conclusions about the relation between social support and PTSD symptom severity over time. Although previous meta-analyses have evidenced a longitudinal relationship between social support and PTSD (Zalta et al., 2021), research has also shown a strong bi-directional association between social support and PTSD symptoms (e.g. Platt, Lowe, Galea, Norris, & Koenen, 2016). We also focused on PTSD symptom severity instead of diagnoses of PTSD and therefore opted to focus on self-report measures of PTSD and social support. It is possible that the use of clinician administered measures and analyses based on diagnosis may lead to different results. We excluded studies drawn from clinical samples to ensure that there was no restriction of range in PTSD severity, which could artificially reduce the effect size. Although we expect that participants included in the meta-analysis may have met the clinical threshold and/or been seeking treatment outside of the study, this means that our results may not generalize to treatment-seeking or clinical populations. We also chose to include studies of individuals who experienced sexual assaults in which the perpetrator was not assessed or not reported. Although we chose to include these samples because of the high likelihood that they involved betrayal traumas, we cannot be sure that all participants in the sample experienced a betrayal trauma (e.g. participants sexually assaulted by a stranger). Finally, we were unable to examine the role of sexual orientation, due to this variable being rarely being reported. Instead, there appeared to be a trend of studies recruiting women who experienced abuse from men, thereby potentially assuming heterosexuality. This trend is ethically concerning in terms of making sexual minority individuals invisible within this body of research. Additionally, some research suggests that among sexual minority individuals, those who identify as bisexual (who could presumably be enrolled in studies of male violence against women) experience the highest rates of violence (Chen, Walters, Gilbert, & Patel, 2020) compared to individuals who are heterosexual, gay, or lesbian. Thus, we are unable to draw conclusions about the role of social support for a particularly vulnerable group.

The current meta-analysis has important implications for clinical assessment and intervention with

survivors of betrayal trauma both for prevention and amelioration of PTSD symptoms in the aftermath of betrayal trauma. The potential for social support interventions to help trauma survivors identify, foster, and benefit from healthy support networks has been noted in existing literature (Sippel, Pietrzak, Charney, Mayes, & Southwick, 2015). Our findings confirm that this is likely an important intervention target for survivors of betrayal trauma. Clinicians working with survivors of interpersonal trauma should prioritize assessment of social supports available to survivors of interpersonal violence and offer information about resources available in areas where support may be lacking. Consistent with the matching hypothesis (Cohen & McKay, 1984; Cohen & Wills, 1985; Cutrona, 1990), survivors of betrayal trauma may particularly benefit from identification of or connection to sources of support for needs arising with the decision to exit a relationship (e.g. housing, financial assistance, legal assistance). Moreover, our findings provide additional support that interventions focused on building healthy relationships, including availability and satisfaction with social support, may be an important adjunct to trauma-focused treatments for interpersonal trauma survivors with PTSD (Cloitre, Jackson, & Schmidt, 2016). Given that the relationship between social support and PTSD was not moderated by developmental timing of trauma, type of interpersonal violence, or the severity of sexual trauma experienced, social support assessment and intervention could be important for survivors experiencing betrayal trauma of different violence types, severities, and across the lifespan.

With regard to support in the context of disclosure, our findings, consistent with those of Dworkin et al. (2019), demonstrated that negative responses to disclosure exacerbate PTSD symptoms, and positive responses to disclosure are not necessarily associated with lower PTSD symptoms. This finding indicates that interventions focusing on educating support people about responses to disclosure should emphasize avoidance of deleterious reactions that appear to play a role in the exacerbation of PTSD symptoms. Given the potential negative impact of a disclosure experience, clinicians can provide support to trauma survivors in identifying likely sources of positive support upon disclosure, weighing the potential benefits and risks of disclosing to a given individual, and creating strategies for coping with possible negative responses. Clinicians may also play a role in helping a client challenge victim-blaming or other negative messages they may have received during a disclosure experience. Dyad and group-focused interventions that address these concerns have been developed (Des Groseilliers, Marchand, Cordova, Ruzek, & Brunet, 2013; Edwards & Ullman, 2018) but have not been widely tested or disseminated.

Our findings also suggest several avenues for future research. As noted previously, we were surprised that our search did not identify any studies that focused on the association between social support and PTSD among veteran survivors of interpersonal trauma. Approximately 38% of the female veterans and 4% of the male veterans' experience sexual assault while in the military (Wilson, 2018). Veterans also experience high rates of intimate partner violence (Tharp, Sherman, Bowling, & Townsend, 2016). Veterans may also be at increased risk for social negativity including institutional betrayal and back-lash from peers (Mengeling, Booth, Torner, & Sadler, 2014). Additionally, only six of the studies in the present analysis included men. Given that research has demonstrated differences in how people perceive betrayal trauma survivors according to gender (Bates, Kaye, Pennington, & Hamlin, 2019) and individuals' propensity to seek support based on gender (Armstrong III & Kammrath, 2015), further research is needed to understand how betrayal traumas in different gendered contexts, such as the military, impact the relation between social support and PTSD.

In sum, this meta-analysis found that social support is associated with PTSD symptom severity among betrayal trauma survivors and that both the valence and the context of the support meaningfully impact this relationship. These findings have important clinical implications and suggest different strategies for ways to intervene in social relationships to help mitigate the impact of betrayal trauma. Our results also highlight a number of areas in which there is a paucity of research in the betrayal trauma literature, including the impact of general negative support, as well as the relationship between social support and PTSD with veteran and LGBTQ samples exposed to betrayal trauma. Thus, further research, particularly among understudied and vulnerable populations, is clearly needed.

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Disclosure statement

No potential conflict of interest was reported by the authors.








Data Availability Statement

The data and coding manuals used in this meta-analysis have been deposited and can be viewed at: https://osf.io/jx3py/?view_only=aac6a7be338c404f9b3881b0be4d51da

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Appendix

Table A1. Study characteristics (N = 29).

| Study Name | Sample Description | N | Country | Age (M) | % F | Recruitment | Violence type | Trauma timing | Perpetrator | PTSD measure | Specific event | ES reported | SS measure validated | Diss/Unpub | SS valence by context | Overall ES |
|--|--|-----|--------------|---------|-------|-------------|---------------|---------------|-------------|--------------|----------------|-------------|----------------------|------------|-----------------------|------------|
| Ahrens, Stansell, & Jennings, 2010 | Sexual assault survivors | 103 | USA | 37.55 | 100 | C | Sexual | Mixed | Mixed | PDS/PSS-SR | No/Unkn | No | Yes | No | PD, ND | -.11 |
| Allen, 2016 | Sexual assault survivors since age 14 | 315 | USA | 27.3 | 58.7 | O | Sexual | Mixed | NR | PCL | Yes | Yes | Yes | Yes | PG | -.39 |
| DeCou, Mahoney, Kaplan, & Lynch, 2019 | Sexual assault survivors who had disclosed | 132 | USA | 23.59 | 87.1 | U | Sexual | Mixed | NR | PCL | No/Unkn | Yes | Yes | No | ND | -.43 |
| DePrince, Welton-Mitchell, & Srinivas, 2014 | IPV survivors who reported to police | 174 | USA | 33.4 | 100 | IPV | Mixed | Adult | Partner | PDS/PSS-SR | No/Unkn | Yes | Yes | No | PG | -.32 |
| Dworkin, Pittenger, & Allen, 2016 | Survivors of sexual assault since age 14 | 173 | USA | 19.72 | 82.66 | U | Sexual | NR | NR | PCL | No/Unkn | Yes | Yes | No | PG | -.31 |
| Edwards, Dardis, Sylaska, & Gidycz, 2015 | IPV survivors who had disclosed | 139 | USA | 18.83 | 100 | U | NR | NR | Partner | IES-R | Yes | Yes | Yes | No | PD, ND | -.23 |
| Flicker, Cerulli, Swogger, & Talbot, 2012 | IPV survivors seeking order of protection | 131 | USA | 34 | 100 | IPV | NR | Adult | Partner | PDS/PSS-SR | No/Unkn | Yes | No | No | PD, ND | -.11 |
| Guyon-Harris, Ahlfs-Dunn, & Huth-Bocks, 2017 | Pregnant women with histories of child abuse or IPV | 95 | USA | 26.2 | 100 | C | Mixed | Mixed | Mixed | PCL | No/Unkn | Yes | Yes | No | PG | -.25 |
| Hauck, Schestatsky, Terra, Krueh, & Cetlin, 2007 | Sexual assault survivors seeking care in emergency room | 30 | Brazil | 27.8 | 100 | IPV | Sexual | Adult | NR | Other | No/Unkn | Yes | No | No | PG | .02 |
| Jacques-Tiura, Tkatch, Abbey, & Wegner, 2010 | Sexual assault survivors since age 14, who had disclosed | 136 | USA | NR | 100 | C | Sexual | Mixed | NR | Other | No/Unkn | Yes | Yes | No | PG, ND | -.18 |
| Kocot & Goodman, 2003 | IPV survivors seeking legal services | 169 | USA | 30.73 | 100 | IPV | Mixed | Adult | Partner | PCL | No/Unkn | Yes | Yes | No | PG | -.37 |
| Krause, Kaltman, Goodman, & Durton, 2008 | Women who had experienced IPV in past month | 262 | USA | 32.6 | 100 | IPV | NR | Adult | Partner | PCL | Yes | Yes | Yes | No | PG | -.34 |
| Lueger-Schuster et al., 2014 | Adult survivors of child abuse by Catholic clergy | 185 | Austria | 56 | 24 | O | Mixed | Child | NR | PCL | No/Unkn | No | No | No | PG | -.44 |
| Mbalo, Zhang, & Ntuli, 2017 | Sexual assault survivors | 100 | South Africa | 27 | 100 | IPV | Sexual | Mixed | Mixed | PDS/PSS-SR | No/Unkn | Yes | Yes | No | PG | .12 |
| Morris & Quevillon, 2018 | Survivors of sexual assault since age 14 | 102 | USA | 20.17 | 100 | U | Sexual | Mixed | NR | PCL | No/Unkn | Yes | Yes | No | PD, ND | -.22 |
| Muller & Lemieux, 2000 | Adult survivors of childhood abuse | 66 | USA | 33 | 64 | C | Mixed | Child | Family | Other | No/Unkn | Yes | Yes | No | PG | -.23 |
| Nikulina, 2009 | Sexual assault survivors who had disclosed | 108 | USA | 21.43 | 100 | U | Sexual | Adult | Mixed | PDS/PSS-SR | Yes | Yes | Yes | Yes | PD, ND | .10 |
| Palo & Gilbert, 2015 | Childhood sexual abuse survivors | 38 | USA | 19.01 | 100 | U | Sexual | Child | NR | PCL | Yes | Yes | No | No | ND | -.32 |
| Reffi, Boykin, & Orcutt, 2018 | Survivors of adolescent or adulthood sexual assault | 426 | USA | 35.6 | 73.7 | O | Sexual | NR | NR | PCL | Yes | Yes | Yes | No | PD, ND | -.28 |
| Renner & Hartley, 2018 | IPV survivors presenting to legal clinic | 84 | USA | 31.65 | 100 | IPV | Mixed | Adult | Partner | IES-R | No/Unkn | No | Yes | No | PG | -.43 |
| Ritholtz, 2018 | Survivors of sexual assault since age 14 | 254 | USA | NR | 100 | U | Sexual | NR | NR | PCL | No/Unkn | Yes | Yes | Yes | PG, ND, PD | -.25 |
| Schackner, Weiss, Edwards, & Sullivan, 2017 | Women experiencing IPV in their current relationships | 173 | USA | 36.31 | 100 | C | Physical | Adult | Partner | PDS/PSS-SR | Yes | Yes | Yes | No | PD, ND | -.12 |
| Steine et al., 2019 | Adult survivors of childhood sexual abuse | 445 | Norway | 39 | 95 | IPV | Sexual | Child | Mixed | IES-R | No/Unkn | No | Yes | No | PG | -.22 |

(Continued)

Table A1. (Continued).

| Study Name | Sample Description | N | Country | Age (M) | % F | Recruitment | Violence type | Trauma timing | Perpetrator | PTSD measure | Specific event | ES reported | SS measure validated | Diss/Unpub | SS valence by context | Overall ES |
|---------------------------|---|------|---------|---------|-----|-------------|---------------|---------------|-------------|--------------|----------------|-------------|----------------------|------------|-----------------------|------------|
| Tracy, 2014 | Survivors of adolescent or adulthood sexual assault | 220 | USA | 20 | 100 | U | Sexual | Mixed | NR | PDS/PSS-SR | No/Unkn | Yes | Yes | Yes | PG | -.13 |
| Ullman & Relyea, 2016 | Sexual assault survivors since age 14 who had disclosed | 1729 | USA | 37 | 100 | O | Sexual | Mixed | Partner | PDS/PSS-SR | Yes | Yes | Yes | No | PD, ND | -.20 |
| Varkovitzky, 2008 | Survivors of adolescent or adulthood sexual assault | 97 | USA | 19.01 | 100 | U | Sexual | Adult | Mixed | Other | Yes | Yes | Yes | Yes | PG, PD, ND | -.21 |
| Waldrop, 2002 | Help-seeking IPV survivors | 294 | USA | 34.5 | 100 | IPV | Physical | Adult | Partner | PDS/PSS-SR | No/Unkn | Yes | Yes | Yes | PD | -.35 |
| Watlington & Murphy, 2006 | African American IPV survivors | 65 | USA | 32.2 | 100 | IPV | Physical | Adult | Partner | PCL | Yes | Yes | Yes | No | PG | -.59 |
| Wilson & Scarpa, 2014 | Undergraduate female survivors of child abuse | 265 | USA | 19 | 100 | U | Mixed | Child | NR | IES-R | Yes | Yes | Yes | No | PG | -.12 |

% F = Percent female. ES = Effect size. SS = social support. Diss/Unpub = Dissertation/Unpublished data. USA = USA of America. For recruitment type, C = community, IPV = Intimate Partner Violence Services, U = undergraduate, O = other, Unkn = Unknown, NR = Not reported. For PTSD measure, PCL = PTSD Checklist, IES-R = Impact of Event Scale - Revised, PDS/PSS-SR = Posttraumatic Diagnostic Scale/PTSD Symptom Scale - Self Report. For perpetrator, mixed indicates that a variety of perpetrator types was reported by sample. The specific event column refers to whether the PTSD measure was assessed based on a specific traumatic event. The SS measure validated column refers to whether the social support measure was a validated instrument versus an author-developed measure or single-item measure. The SS valence by context column indicates the type of social support assessed with PG = Positive general, PD = Positive responses to disclosure, ND = Negative responses to disclosure. Overall ES refers to the combined effect size for a given study based on all included effects.

Table A2. Meta-regression percent female adjusting for PTSD measure.

| Variable | Coef. | SE | 95% CI | Z | p | Q(df) |
|-------------------------------|--------|--------|-----------------|------|--------|------------|
| PTSD Measure Used (ref = PCL) | | | | | | 11.80(3)** |
| IES-R | 0.1032 | 0.0703 | -0.0347, 0.2410 | 1.47 | 0.1425 | |
| PDS/PSS-SR | 0.1853 | 0.0571 | 0.0733, 0.2972 | 3.24 | 0.0012 | |
| Other | 0.1732 | 0.0821 | 0.0123, 0.3340 | 2.11 | 0.0348 | |
| Percent female | 0.0015 | 0.0014 | -0.0013, 0.0043 | 1.06 | 0.2887 | |

*N*_{effects} = 29. PCL = PTSD Checklist. IES-R = Impact of Event Scale – Revised. PDS/PSS-SR = Posttraumatic Diagnostic Scale/PTSD Symptom Scale – Self-report.
***p* < .01

Table A3. Meta-regression of relationship to perpetrator adjusting for PTSD measure.

| Variable | Coef. | SE | 95% CI | Z | p | Q(df) |
|---|--------|--------|-----------------|------|--------|----------|
| PTSD Measure Used (ref = PCL) | | | | | | 8.73(3)* |
| IES-R | 0.0658 | 0.1028 | -0.1357, 0.2673 | 0.64 | 0.5221 | |
| PDS/PSS-SR | 0.2291 | 0.0856 | 0.0613, 0.3969 | 2.68 | 0.0075 | |
| Other | 0.0249 | 0.1713 | -0.3109, 0.3606 | 0.15 | 0.8846 | |
| Relationship to perpetrator (ref = partner) | 0.2143 | 0.0761 | 0.0652, 0.3635 | 2.82 | 0.0049 | |

*N*_{effects} = 15. PCL = PTSD Checklist. IES-R = Impact of Event Scale – Revised. PDS/PSS-SR = Posttraumatic Diagnostic Scale/PTSD Symptom Scale – Self-report.
**p* < .05

Table A4. Meta-regression of social support valence adjusting for PTSD measure.

| Variable | Coef. | SE | 95% CI | Z | p | Q(df) |
|---|---------|--------|------------------|-------|--------|------------|
| PTSD Measure Used (ref = PCL) | | | | | | 12.40(3)** |
| IES-R | 0.0483 | 0.0981 | -0.1441, 0.2406 | 0.49 | 0.6228 | |
| PDS/PSS-SR | 0.2398 | 0.0706 | 0.1015, 0.3782 | 3.40 | 0.0007 | |
| Other | 0.1581 | 0.0975 | -0.0331, 0.3493 | 1.62 | 0.1051 | |
| Social support valence (ref = positive support) | -0.2071 | 0.0653 | -0.3352, -0.0791 | -3.17 | 0.0015 | |

*N*_{effects} = 40. PCL = PTSD Checklist. IES-R = Impact of Event Scale – Revised. PDS/PSS-SR = Posttraumatic Diagnostic Scale/PTSD Symptom Scale – Self-report.
***p* < .01.

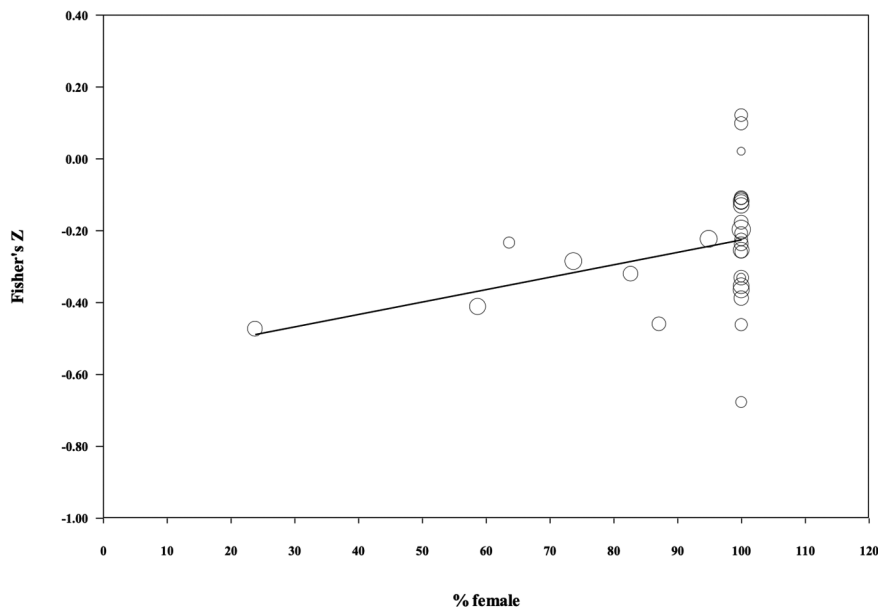


Figure A1. Scatterplot of percent female by effect size.