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Examining PTSD Treatment Choice Among Individuals with Subthreshold PTSD

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Abstract

Subthreshold posttraumatic stress disorder (PTSD) is associated with impairment and has a prevalence rate comparable to full PTSD. Yet, little is known regarding treatment preferences among individuals with subthreshold PTSD, even though they seek trauma-related treatment at a similar rate to those with full PTSD. This study explored subthreshold diagnostic PTSD diagnostic category and treatment preference in undergraduate ($N = 439$) and trauma-exposed community ($N = 203$) samples. Participants completed the Posttraumatic Stress Diagnostic Scale (PDS), viewed standardized treatment rationales, and made a hypothetical PTSD treatment choice: prolonged exposure (PE), sertraline, combination treatment, or no treatment. The PDS was used to categorize individuals into four PTSD categories: no trauma exposure, trauma exposure only, subthreshold PTSD, and full PTSD. Within the samples, 8.9% ($n = 39$) of undergraduates and 16.7% ($n = 34$) of community members met subthreshold PTSD criteria. The majority of individuals with subthreshold PTSD in each sample reported impairment, 59.0% of undergraduates and 76.5% of community members. Within subthreshold PTSD groups, the most commonly selected treatments were PE (61.5%) for undergraduates and combination treatment (47.1%) for community members. Findings underscore the necessity of further examining subthreshold PTSD, which may hold important clinical implications for treatment processes and outcomes.

Keywords

posttraumatic stress disorder; subthreshold posttraumatic stress disorder; treatment choice; prolonged exposure; sertraline

Subthreshold posttraumatic stress disorder (PTSD) (also referred to as partial, subsyndromal, or subclinical PTSD; Blanchard, Hickling, Taylor, Loos, & Gerardi, 1994; Grubaugh et al., 2005; Stein et al., 1997) generally refers to the presence of clinically significant PTSD symptoms that fall short of the full Diagnostic and Statistical Manual of

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Mental Disorders PTSD diagnostic criteria (DSM-5; American Psychiatric Association [APA], 2013). Initially developed as a way of classifying Vietnam veterans who did not meet full PTSD criteria but were still experiencing symptoms and impairment (Weiss et al., 1992), research on subthreshold PTSD has extended to civilian samples (e.g., Breslau, Lucia, & Davis, 2004; Marshall et al., 2001; Stein, Walker, Hazen, & Forde, 1997). Although individuals with subthreshold PTSD report substantial distress (e.g., Dickstein, Walter, Schumm, & Chard, 2013; Grubaugh et al., 2005; Marshall et al., 2001), little attention has been given to the clinical significance and potential treatment needs of this population (Zlotnick, Franklin, & Zimmerman, 2002).

As individuals with subthreshold PTSD do not meet full symptomatic criteria, impairment may be the next best criterion for establishing subthreshold diagnosis (Zlotnick et al., 2002). Research has consistently shown that individuals with subthreshold PTSD experience significant distress and impairment (Mylle & Maes, 2004), which is at greater levels than trauma-exposed individuals without PTSD (Jakupcak et al., 2007), but less than individuals with full PTSD (Breslau et al., 2004). Individuals with subthreshold PTSD also report depressive symptoms (Cukor, Wyka, Jayasinghe, & Difede, 2010), suicidal ideation (Marshall et al., 2001), alcohol use (Adams, Boscarino, & Galea, 2006), anger and aggression (Jakupcak et al., 2007), impairment in social and family functioning (Stein et al., 1997; Zlotnick et al., 2002), work-loss days (Breslau et al., 2004), and medical illnesses (Zhang, Ross, & Davidson, 2004). Although some suggest that designating subthreshold PTSD as its own clinical concept pathologizes common reactions to trauma (e.g., Breslau et al., 2004), others support the concept of subthreshold PTSD as a means to potentially identify a crucial subpopulation that experiences significant psychopathology and functional impairment that persists (e.g., Jakupcak et al., 2007). Though we should not pathologize common reactions to trauma, we should also not ignore the potentially clinically relevant impairment experienced by individuals with subthreshold PTSD.

Further underscoring the need for clinical attention toward this population is that prevalence rates of subthreshold PTSD are similar to those of full PTSD. For example, in an epidemiological study, past month prevalence rates were comparable between full PTSD (2.7% of women; 1.2% of men) and partial PTSD (3.4% of women; 0.3% of men; Stein et al., 1997). Similarly, lifetime prevalence of full PTSD among Vietnam veterans was 30.9% for males and 26.0% for females, whereas prevalence rates of lifetime partial PTSD was 22.5% for males and 21.2% for females (Weiss et al., 1992). As demonstrated by these comparable prevalence rates, there may be a sizable and clinically meaningful number of individuals in the former diagnostic category that could be potentially overlooked when adhering to more stringent diagnostic criteria. Evidence that some individuals after trauma exposure fall short of full diagnostic criteria for PTSD, yet still experience psychological and functional impairment, is consistent with the notion that PTSD is dimensional in nature rather than its own distinct taxon (Broman-Fulks et al., 2006).

Though subthreshold PTSD is consistently linked with significant impairment, its trajectory and stability over time is less clear. Some evidence suggests that subthreshold PTSD remits at a higher rate than full PTSD following trauma exposure (Blanchard et al., 1997) and that individuals with subthreshold PTSD are more likely to improve at a higher and faster rate

than individuals with full PTSD (Shiner et al., 2012). It is difficult to make causal statements surrounding the course of subthreshold PTSD and the extent to which it may remit on its own, however, as neither of the above studies experimentally manipulated or examined potential effects of treatment on symptom remission. Notably, when left untreated, subthreshold PTSD can be stable and chronic (Cukor et al., 2010). In a longitudinal study assessing symptoms of 9/11 World Trade Center disaster recovery workers, 29.0% meeting subthreshold PTSD at baseline met criteria for subthreshold or full PTSD at one year follow-up, and 25.0% still met criteria at two year follow-up (Cukor et al., 2010). Accordingly, psychological and functional impairment associated with subthreshold PTSD may not remit on its own for a substantial minority of individuals.

Little is known regarding treatment seeking behaviors or effective treatment options for those with subthreshold PTSD (Kornfield, Klaus, McKay, Helstrom, & Oslin, 2012). There is some evidence, however, to suggest that patterns of treatment seeking may be comparable, as indicated by a survey of a random sample of community members in which individuals with full and subthreshold PTSD were identified, then asked about whether they had sought help following their traumatic experience (Stein et al., 1997). Despite individuals with full PTSD reporting greater impairment, there was a similar rate of help seeking for trauma-related symptoms between individuals with full PTSD (60.0%) and subthreshold PTSD (52.6%). Though little is known about treatment options for individuals with subthreshold PTSD, for those with full PTSD a number of treatments have been shown to be effective. Prolonged exposure (PE) and sertraline, a selective serotonin reuptake inhibitor, are both considered efficacious PTSD interventions (e.g., Benedek, Friedman, Zatzick, & Urano, 2009; Powers, Halpern, Ferenschak, Gillihan, & Foa, 2010). In the treatment preference literature thus far, PTSD treatment choices have been explored in clinical and non-clinical samples, asking individuals to make real or hypothetical treatment choices and generally have found a treatment preference for PE over sertraline (e.g., Angelo, Miller, Zoellner, & Feeny, 2008; Chen, Keller, Zoellner, & Feeny, 2013; Feeny, Zoellner, Mavissakalian, Roy-Byrne, 2009; Zoellner, Feeny, & Bittinger, 2009; Zoellner, Feeny, Cochran, & Pruitt, 2003).

Specific factors that may influence PTSD treatment choice include psychopathology and treatment beliefs. Individuals with more severe PTSD and depression prefer sertraline over PE (e.g., Feeny et al., 2009; Rytwinski, Rosoff, Feeny, & Zoellner, 2014) and individuals are more likely to select a treatment if they find it credible and have a positive reaction to it (Zoellner et al., 2009). Literature regarding the influence of prior treatment history on PTSD treatment choice is mixed, with some evidence finding that previous treatment experience may play a role in current choice of treatment among individuals with PTSD (Pruitt, Zoellner, Feeny, Caldwell, & Hanson, 2012; Rytwinski et al., 2014). It should be noted that while these factors have been linked to treatment choice regarding full PTSD, no study to our knowledge has examined these relationships in individuals with subthreshold PTSD.

Unlike previous treatment choice studies (e.g., Feeny et al., 2009; Zoellner et al., 2009), the current study included both monotherapy (i.e., PE or sertraline) and combination treatment (i.e., PE *and* sertraline) choices. A recent meta-analysis found that, although individuals are more likely to receive monotherapy in clinical settings, combination treatments may be a

more effective treatment than monotherapy medication for certain disorders, such as depression, panic disorder, and obsessive-compulsive disorder (Cuijpers et al., 2014). In a randomized controlled multi-site trial comparing medication, psychotherapy, and combination of medication and psychotherapy among individuals with chronic depression, treatment preferences moderated treatment outcome, such that individuals who received their preferred treatment reported less depressive symptoms and higher remission rate at the end of treatment (Kocsis et al., 2009). This study highlights the importance of presenting both monotherapy and combined therapy treatment options to individuals, if consistent with the efficacy literature, as some might not do as well if they are forced to select a monotherapy, when they really wanted combination treatment or vice versa. In spite of these findings, individuals are more likely to receive a monotherapy in real-world clinical settings (e.g., Olfson & Marcus, 2010), meaning that they might not be presented with both treatment options. This is important to note as meta-analytic findings indicate that when individuals receive the treatment they prefer, they are more likely to have a better treatment outcome and less likely to drop out of treatment (Swift & Callahan, 2009).

The current study examined PTSD treatment preference in two samples, undergraduates and trauma-exposed community members, with a wide range of trauma exposure. To maximize generalizability of the current study, two large samples of undergraduates and trauma-exposed community members were utilized. An undergraduate sample was included as this demographic group has endorsed high rates of trauma exposure and is at an age where there is a high likelihood of future trauma exposure (e.g., Tjaden & Thoennes, 1998; Turchik, 2012). The primary aims of the current study were: 1) to examine impairment, psychopathology, and prior treatment history among individuals with subthreshold PTSD; and 2) to explore PTSD treatment beliefs and treatment preference among individuals with subthreshold PTSD. Based on prior research (e.g., Breslau et al., 2004; Feeny et al., 2009; Jakupcak et al., 2007), we hypothesized that individuals with subthreshold PTSD will report significant functional impairment and psychopathology and will be more likely to report a treatment history than either trauma-exposed individuals without PTSD and individuals with no trauma exposure, but less than full PTSD. Given the lack of literature of treatment beliefs and choice among those with subthreshold PTSD, we did not specify directionality of these hypotheses.

Method

Participants

Undergraduate sample—Participants were 439 undergraduate students from two large metropolitan university campuses who were recruited via undergraduate psychology subject pools. Eligibility for the study included being 18 to 65 years old and English fluency. See Table 1 for demographic information. Within the sample, 51.9% ($n = 228$) reported experiencing one or more traumatic events on the Posttraumatic Stress Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997). Allowing for the endorsement of experiencing more than one trauma, 7.8% reported combat, imprisonment, or torture, 23.2% reported a sexual assault, 30.3% a life-threatening illness, 33.8% a non-sexual assault, 36.8% a natural disaster, 46.9% a serious accident, and 21.1% reported other traumatic

events (e.g., witnessing or hearing about someone's death or suicide). Using the DSM-IV PTSD Criterion A event definition (i.e., person experienced or witnessed a traumatic event and responded in a fearful, helpless, or horrified way), 36.5% ($n = 159$) had Criterion A traumas.¹ For the worst Criterion A trauma experienced, 0.6% reported combat, imprisonment, or torture, 5.1% reported a sexual assault, 5.2% a natural disaster, 18.7% a life-threatening illness, 21.9% a non-sexual assault, 28.4% a serious accident, and 20.0% reported other traumatic events.

Trauma-exposed community sample—Participants were 203 trauma-exposed community members from two metropolitan areas who were recruited via flyers, newspaper, radio advertisements, and mental health agencies. Eligibility for the study included being 18 to 65 years old, having experienced a self-reported trauma, and English fluency. See Table 1 for demographic information. Within the sample, 96.6% ($n = 196$) reported experiencing one or more traumas explicitly queried on the PDS (Foa et al., 1997). Allowing for the endorsement of experiencing more than one trauma, 14.3% reported a natural disaster, 25.5% reported a life-threatening illness, 35.2% combat, imprisonment, or torture, 40.3% a serious accident, 57.1% a sexual assault, 58.1% a non-sexual assault, and 33.7% reported other traumatic events (e.g., finding a family member's dead body). Using the DSM-IV PTSD criterion, 72.4% ($n = 139$) had Criterion A traumas.² For the worst trauma experienced, 1.5% reported a natural disaster, 5.2% reported a life-threatening illness, 8.2% reported combat, imprisonment, or torture, 10.4% reported a serious accident, 26.0% reported a non-sexual assault, 33.3% reported a sexual assault, and 15.6% reported other traumas.

Data from these samples, examining other factors, has been previously reported (Pruitt et al., 2012; Rytwinski et al., 2014).

Materials

Treatment rationales for sertraline and PE were delivered via digital recording by a male or female psychiatrist or psychologist (both gender and training counterbalanced) who used a standardized script. Rationales contained similar sections that addressed background information, established efficacy, hypothesized treatment mechanism, treatment procedures, and potential side effects (see Pruitt et al., 2012). The PE and sertraline rationales did not differ on indices of sentence structure, grade level, and reading ease (Microsoft Inc., 2000). The treatment rationales were counterbalanced by order of rationale shown first (PE versus sertraline).

Measures

Treatment history questionnaire—The self-report treatment history questionnaire assesses whether participants have had prior psychotherapy and/or pharmacotherapy mental health treatment for PTSD and/or other psychiatric problems (e.g., depression).

¹Using DSM-5 PTSD criteria (APA, 2013) in the undergrad sample, 43.1% ($n = 180$) had Criterion A traumas.

²Using DSM-5 PTSD criteria (APA, 2013) in the community sample, 84.4% ($n = 162$) had Criterion A traumas.

Posttraumatic Stress Diagnostic Scale (PDS; Foa et al., 1997)—The PDS is self-report measure that assesses DSM-IV PTSD criteria A-F. The PDS utilizes a checklist to indicate traumatic events experienced and/or witnessed (e.g., serious accident, natural disaster, non-sexual assault, sexual assault, military combat). If more than one traumatic event is indicated, the most bothersome traumatic event is identified and used to complete the rest of the measure. DSM-IV Criterion A is met if experienced or witnessed a traumatic event (Criterion A1) and responded in a fearful, helpless, or horrified way (Criterion A2). Seventeen items assess symptom severity/frequency experienced within the past month. Items are rated on a 4-point scale from 0 (*not at all or only one time*) to 3 (*5 or more times a week/almost always*), with higher scores indicating more severity and frequency of symptoms. Nine “yes/no” items assess impairment severity experienced in the past month, with “yes” for any, and up to the 9 items, indicating impairment. The PDS has good psychometric properties including strong internal consistency ($\alpha = .92$) and good test-retest reliability ($r = .87$; Foa et al., 1997). The PDS also has high convergent validity, with 82.0% agreement for PTSD diagnosis between the PDS and Structured Clinical Interview (Foa et al., 1997).

The PDS was used to categorize individuals into the “full PTSD,” “subthreshold PTSD,” “trauma exposure only,” or “no trauma exposure” group. Individuals were included in the “full PTSD” group if they reported experiencing Criterion A trauma, at least one re-experiencing (Criterion B), three avoidance (Criterion C), and two hyperarousal symptoms (Criterion D), reported symptoms lasting longer than one month, and reported functional impairment. The “subthreshold PTSD” definition was based on definitions reported in prior studies that used a more conservative subthreshold PTSD definition that did not specify an impairment criterion (Dickstein et al., 2013; Stein et al., 1997). Individuals were categorized in the “subthreshold PTSD” group if they reported experiencing a Criterion A trauma and at least 1 symptom in each symptom cluster (Criteria B-D). Individuals were categorized in the “trauma exposure only” group if they reported either experiencing a Criterion A trauma, but did not meet subthreshold PTSD symptom criteria, or reported experiencing a trauma, but did not meet criteria for a Criterion A trauma. Individuals were categorized in the “no trauma exposure” group if they did not endorse any potentially traumatic events on the PDS.

Quick Inventory Depressive Symptomatology: Self-Report (QIDS-SR₁₆; Rush et al., 2003)—The QIDS-SR₁₆ is a 16-item self-report measure that assesses depressive symptom severity and frequency in the past week. Higher scores indicate more symptom severity and frequency. The QIDS-SR₁₆ demonstrates high concurrent validity, as it was strongly associated with the Hamilton Rating Scale for Depression ($r = .84$) and Inventory for Depressive Symptomatology ($r = .96$; Rush et al., 2003).

Credibility Scale (CS) and Personal Reactions Scale (PRS) (Addis & Carpenter, 1999)—The CS assesses how much the treatment is perceived to be logical, scientifically based, and effective. The CS contains 7 items (e.g., “How logical does this therapy seem to you?”) rated on a 7-point scale from 1 (*not at all*) to 7 (*extremely*). The PRS assesses how much the treatment will personally help by improving symptoms and increasing ability to understand and cope with symptoms. The PRS contains 5 items (e.g.,

“If you had PTSD and went for treatment, how helpful do you think this therapy would be for you?”) rated on a 7-point scale from 1 (*not at all*) to 7 (*extremely*). Treatment beliefs (CS and PRS) for PE and sertraline were rated separately. Internal consistency was strong for both samples (Undergraduate Sample: CS: PE $\alpha = .90$, sertraline $\alpha = .87$; PRS: PE $\alpha = .93$, sertraline $\alpha = .88$; Community Sample: CS: PE $\alpha = .94$, sertraline $\alpha = .92$; PRS: PE $\alpha = .96$, sertraline $\alpha = .96$).

Composite scores for PE and sertraline treatment beliefs were calculated by combining the respective CS and PRS measures (Zoellner et al., 2009). This was done so that single scores represented PE treatment beliefs and sertraline treatment beliefs. Higher scores (range = 2-14) indicate more positive beliefs about a particular treatment option. Internal consistency for the composite scores was strong for both samples (Undergraduate Sample: PE $\alpha = .95$, sertraline $\alpha = .93$; Community Sample: PE $\alpha = .97$, sertraline $\alpha = .97$).

Treatment choice—To examine treatment choice, a single question was utilized counterbalancing the order of presentation in the question regarding psychotherapy (PE), medication (sertraline), combination of PE and sertraline, and no treatment: “If you had a choice between psychotherapy, medication, both treatments, or no treatment at all to help you with trauma-related symptoms which would you choose?”

Procedure

Participants in both samples were recruited for a study about the treatment decision-making process. The trauma-exposed sample was recruited if they had experienced a traumatic event. After informed consent procedures, participants in both samples completed measures related to demographics, treatment history, PTSD, and depression. In the undergraduate sample, participants read a hypothetical “if this happened to you, what would you do” scenario, based on an “imagine self” perspective as this form of perception taking is associated with self-related cognitions (Davis et al., 2004). Given that this sample was not selected for trauma exposure, the participants were asked to imagine experiencing trauma-related symptoms due to experiencing a physical assault and now are considering treatment for these symptoms:

Please imagine that you are 25 years old. You are seeking treatment because you are experiencing symptoms related to a physical assault (mugging) that occurred six years earlier during college. You are currently having recurrent thoughts about the assault and intense emotional reactions when reminded of it. You have been persistently avoiding situations, thoughts, and feelings related to the assault, and you are only sleeping a few hours per night. You have great difficulty concentrating and are feeling on edge most of the time.

You are considering seeking help. You have narrowed your choices to three treatment options: psychotherapy (prolonged exposure therapy), medication (Zoloft), [counterbalanced] or a combined treatment of the two. In addition, you may still choose not to seek treatment.

In the trauma-exposed community sample, given that the sample was selected for trauma exposure, participants were not given this hypothetical scenario, but were asked to base their responses on their own traumatic experience when completing the study. Next, both samples were presented with counterbalanced PE or sertraline treatment rationale videos. After watching a treatment rationale video, participants completed the CS and PRS. This process was also done for the other treatment rationale, so that all participants watched both PE and sertraline videos and completed the CS and PRS after each video. Participants then selected their hypothetical treatment preference: PE, sertraline, combination treatment (PE and sertraline), or no treatment. Finally, participants were debriefed about the study's procedures and received course credit (undergraduate sample) or compensation (community sample) for their time.

Data Analytic Plan

Chi-square tests of independence were conducted between categorical variables (e.g., PTSD diagnostic category, treatment history). If the chi-square results were significant, we followed up with 2x2 chi-squares to specifically compare whether the subthreshold PTSD group significantly differed from the other groups. One-way analyses of variance (ANOVAs), with Tukey post hoc tests, were conducted for continuous (e.g., PTSD severity, depression severity) and categorical (e.g., PTSD diagnostic category) variables. If the ANOVA results were significant, we followed up with post hoc analyses, again examining whether the subthreshold PTSD group was different from the other groups. We reported respective effect sizes: Cohen's *d* for t-tests, Cramer's *V* or *phi* for chi-square tests, and eta-squared (η^2) for ANOVAs.

Results

Undergraduate Sample

Demographics—Almost half (48.1%, $n = 211$) of the participants were categorized as “no trauma exposure,” 35.8% ($n = 157$) as “trauma exposure only,” 8.9% ($n = 39$) as “subthreshold PTSD,” and 7.3% ($n = 32$) as “full PTSD.” There was an association between gender (male, female) and PTSD diagnostic category (no trauma exposure, trauma exposure only, subthreshold PTSD, full PTSD), as females were more likely than males to differ on diagnostic criteria, $\chi^2 (3, N = 436) = 11.17, p = .01$, Cramer's $V = .16$. Specifically, females (83.9%) were more likely than males (16.1%) to meet criteria for full PTSD, $\chi^2 (1, N = 436) = 8.19, p = .004, phi = .15$. There was no difference between males and females meeting for subthreshold PTSD ($p = .51$). Age, race/ethnicity, and years of education were not associated with PTSD diagnostic category ($ps = .17-.95$).

Treatment history—There was an association between prior psychotherapy treatment (yes, no) and PTSD diagnostic category, $\chi^2 (3, N = 439) = 36.40, p < .001$, Cramer's $V = .29$. Individuals with no trauma exposure were less likely to have a prior psychotherapy history (12.3%) compared to individuals in the trauma exposure only, subthreshold PTSD, and full PTSD groups (28.1%), $\chi^2 (1, N = 439) = 16.68, p < .001, phi = -.20$. Individuals with full PTSD were more likely to have a prior psychotherapy history (56.3%) compared to individuals in the no trauma exposure, trauma exposure only, and subthreshold PTSD

groups (17.7%), $\chi^2 (1, N = 439) = 24.75, p < .001, \phi = .25$. There was no association between prior psychotherapy treatment and being in the subthreshold PTSD group (yes/no) ($p = .15$).

There was an association between prior pharmacotherapy treatment (yes, no) and diagnostic category, Fisher's Exact Test = 9.71, $p = .02$, Cramer's $V = .17$. Individuals with full PTSD were more likely to have a prior pharmacotherapy history (25.8%) compared to individuals without PTSD (8.4%), $\chi^2 (1, N = 434) = 8.05, p = .01, \phi = .15$. There was no association between prior pharmacotherapy treatment and being in the subthreshold PTSD group (yes/no) ($p = .50$).

Psychopathology and impairment—Means, standard deviations, and ranges for the psychopathology measures are listed in Table 1. Individuals in the “no trauma exposure” group did not complete the rest of the PDS (symptom severity and impairment items), as they did not endorse any trauma exposure and thus were instructed to not complete the rest of the measure. As such, the “no trauma exposure” group participants were excluded for ANOVA analyses of PTSD severity and impairment.

Of the individuals with subthreshold PTSD, 59.0% reported experiencing impairment. As seen in Table 2, there were differences across diagnostic groups in PTSD severity, functional impairment, and depression. In post hoc analyses, and as expected, individuals with subthreshold PTSD reported more severe PTSD symptoms than the trauma exposure only group ($t (193) = 6.44, p < .001, d = 1.12$), but less than the full PTSD group ($t (69) = 6.92, p < .001, d = 1.63$). Individuals with subthreshold PTSD reported a higher number of areas of impaired functioning by their PTSD symptoms than the trauma exposure only group ($t (50.79) = 2.67, p = .1, d = 0.51$), but less than the full PTSD group ($t (69) = 6.42, p < .001, d = 1.52$). Individuals with subthreshold PTSD also reported more severe depression than the no trauma exposure ($t (247) = 4.57, p < .001, d = 0.73$) and trauma exposure only ($t (193) = 2.96, p = .004, d = 0.53$) groups but less than the full PTSD group ($t (69) = 2.37, p = .02, d = 0.57$).

PTSD treatment beliefs—Means, standard deviations, and ranges for treatment beliefs measures are in Tables 1 and 2. A mixed ANOVA, with a between-subjects factor of PTSD diagnostic category (no trauma exposure, trauma exposure only, subthreshold PTSD, and full PTSD) and within-subjects factor of treatment modality (PE, sertraline) on participants' treatment beliefs (PE and sertraline) was conducted. There was no main effect of diagnostic category on treatment beliefs, Wilks' Lambda = .996, $F (3, 421) = 0.52, p = .67$; however, there was a main effect for treatment modality, Wilks' Lambda = .80, $F (1, 421) = 102.38, p < .001, \eta^2 = .20$, indicating that individuals had more positive treatment beliefs about PE ($M = 10.39, SE = 0.14$) than sertraline ($M = 8.38, SE = 0.15$). There was no main effect of PTSD diagnostic categories, nor was there an interaction between diagnostic group and treatment modality.

PTSD treatment choice—There was no association between PTSD treatment choice and PTSD diagnostic category, Fisher's Exact Test = 10.25, $p = .30$. See Table 3.

Trauma-Exposed Community Sample

Demographics—For PTSD diagnostic category, 3.4% ($n = 7$) of participants were categorized as “no trauma exposure,” 40.4% ($n = 82$) as “trauma exposure only,” 16.7% ($n = 34$) as “subthreshold PTSD,” and 39.4% ($n = 80$) as “full PTSD.” As individuals in the “no trauma exposure” group, although self-reporting trauma exposure, did not endorse the DSM-IV trauma exposure items on the PDS, they were excluded from the analyses. Analyses were conducted with the remaining 196 participants in the other three PTSD diagnostic groups.

There was an association between gender (male, female) and PTSD diagnostic category (trauma exposure only, subthreshold PTSD, full PTSD), as females were more likely than males to differ on diagnostic criteria, $\chi^2 (3, N = 191) = 7.99, p = .02$, Cramer’s $V = .21$. Males (53.2%) were more likely than females (46.8%) to meet criteria for trauma exposure ($\chi^2 (1, N = 191) = 6.72, p = .01, \phi = -.20$), but females (68.8%) were more likely than males (31.3%) to meet criteria for full PTSD ($\chi^2 (1, N = 191) = 5.11, p = .02, \phi = .17$). There was no difference between males and females meeting for subthreshold PTSD ($p = .83$). Age, race/ethnicity, and years of education were not associated with PTSD diagnostic category ($ps = .34-.69$).

Treatment history—There was an association between prior psychotherapy treatment (yes, no) and PTSD diagnostic category, $\chi^2 (2, N = 192) = 15.13, p = .001$, Cramer’s $V = .28$. Individuals in the trauma exposure group were less likely to have a prior psychotherapy history (53.1%) compared to individuals in the subthreshold PTSD and full PTSD groups (77.5%), $\chi^2 (1, N = 192) = 11.56, p = .001, \phi = -.26$. Individuals with full PTSD were more likely have a prior psychotherapy history (82.1%) compared to individuals in the trauma exposure only and subthreshold PTSD groups (57.0%), $\chi^2 (1, N = 192) = 12.05, p = .001$, Cramer’s $V = .26$.

There was no association between prior psychotherapy treatment and being in the subthreshold PTSD group (yes/no) ($p = .99$). There was an association between prior pharmacotherapy treatment (yes, no) and PTSD diagnostic category, $\chi^2 (2, N = 189) = 7.64, p = .02$ Cramer’s $V = .20$. Individuals in the trauma exposure group were less likely to have a prior pharmacotherapy history (46.8%) compared to individuals not in this group (66.4%), $\chi^2 (1, N = 189) = 6.43, p = .01, \phi = -.20$. Individuals with full PTSD were more likely to have a prior pharmacotherapy history (68.4%) compared to individuals in the trauma exposure only and subthreshold PTSD groups (51.3%), $\chi^2 (1, N = 189) = 4.78, p = .03, \phi = .17$. There was no association between prior pharmacotherapy treatment and being in the subthreshold PTSD group (yes/no) ($p = .79$).

Psychopathology and impairment—Means, standard deviations, and ranges for the psychopathology measures are listed in Table 1. Of the individuals with subthreshold PTSD, 76.5% reported experiencing impairment. As seen in Table 4, there were differences across diagnostic groups in PTSD severity, functional impairment, and depression. In post hoc analyses, and as expected, individuals with subthreshold PTSD reported more severe PTSD than the trauma exposure only group ($t (105) = 2.95, p = .004, d = 0.62$), but less than the full PTSD group ($t (112) = 4.51, p < .001, d = 0.92$). Individuals in the trauma exposure only

and subthreshold PTSD groups did not significantly differ in number of areas of impaired functioning reported ($p = .56$). Individuals with subthreshold PTSD reported less number of areas of impaired functioning than the full PTSD group ($t(112) = 5.17, p < .001, d = 1.05$). Although not statistically significant, there was a trend that individuals with subthreshold PTSD reported more severe depression than the trauma exposure only group ($t(80.16) = 1.95, p = .06, d = -0.37$). Individuals with subthreshold PTSD reported less severe depression than the full PTSD group ($t(112) = 3.96, p < .001, d = 0.83$).

PTSD treatment beliefs—Means, standard deviations, and ranges for treatment beliefs measures are listed in Tables 1 and 4. A mixed ANOVA, with a between-subjects factor of PTSD diagnostic category (trauma exposure only, subthreshold PTSD, and full PTSD) and within-subjects factor of treatment modality (PE, sertraline) on participants' treatment beliefs (PE and sertraline) was conducted. There was no main effect of diagnostic category on treatment beliefs, Wilks' Lambda = .997, $F(2, 185) = 0.28, p = .76$; however, there was a main effect for treatment modality, Wilks' Lambda = .94, $F(1, 185) = 12.11, p = .001, \eta^2 = .06$, indicating that individuals had more positive treatment beliefs about PE ($M = 9.56, SE = 0.25$) than sertraline ($M = 8.52, SE = 0.27$). There was no main effect of PTSD diagnostic categories, nor was there an interaction between diagnostic group and treatment modality.

PTSD treatment choice—There was an association between PTSD treatment choice and PTSD diagnostic category, $\chi^2(6, N = 196) = 13.78, p = .03$, Cramer's $V = .19$. See Table 3. Individuals in the subthreshold PTSD group (5.9%) were less likely to select the no treatment option than individuals in the trauma exposure only group (40%), $\chi^2(1, N = 57) = 5.11, p = .02, \phi = .01$. No other post hoc analyses were significant ($ps = .07-.99$).

Discussion

Increasing evidence suggests that subthreshold PTSD not only demonstrates a similar prevalence rate to full PTSD (e.g., Stein et al., 1997; Weiss et al., 1992), but it is also associated with meaningful clinical impairment (e.g., Jakupcak et al., 2007). These factors, along with evidence of similar treatment seeking behaviors (Stein et al., 1997), suggests the growing need to better understand subthreshold PTSD. The findings of the current study provide a unique contribution to this expanding field of study, as we examined PTSD treatment preferences and beliefs among individuals with varying levels of PTSD symptom severity and associated functional impairment. Notably, this was also the first study to look at combination treatment preference among individuals with subthreshold PTSD. In the current study, individuals with subthreshold PTSD reported specific PTSD treatment preferences. In the undergraduate sample, PE was the most commonly selected treatment for individuals in the subthreshold PTSD group (61.5%), while combination treatment was the most commonly selected choice for individuals in the full PTSD group (37.5%). In the community sample, combination treatment was the most commonly selected choice for individuals in the subthreshold (47.1%) and full (51.3%) PTSD groups.

PTSD treatment preferences found for subthreshold PTSD map onto the broader PTSD treatment choice literature that indicates more positive personal reactions to and statements about for PE than sertraline (e.g., Chen et al., 2013; Feeny et al., 2009; Zoellner et al., 2003).

One important distinction of this current study is the examining subthreshold PTSD and the combination (i.e., PE *and* sertraline) treatment option. Evidence suggests that combination treatment may be a more effective option for treating certain disorders compared to medication alone (Cuijpers et al., 2014). Yet, as less is known about sequencing and combination treatment for PTSD, additional research is needed to better understand how it may impact response. Routinely starting patients on both SSRI and PE at the same time may not be the best course even if patients prefer both. For example, evidence regarding the benefits augmenting PE with psychotropic medications are mixed (Rothbaum et al., 2006; Simon et al., 2008). Given the clinical significance and potential treatment needs of individuals with subthreshold PTSD (Kornfield et al., 2012; Zlotnick et al., 2002), these results are a first step in understanding treatment choice and factors may impact this group's treatment choices.

We also examined PE and sertraline treatment beliefs across the PTSD diagnostic categories, as treatment beliefs are a strong predictor of PTSD treatment choice (e.g., Zoellner et al., 2009). Although there were no differences between individuals with subthreshold PTSD and other groups in their treatment beliefs toward PE and sertraline, undergraduates and trauma-exposed community members had more positive beliefs about PE than sertraline. This finding is consistent with previous evidence indicating that individuals report more positive reactions to PE and believe it to be more credible than sertraline. For example, although the current study did not ask participants to specify *why* they selected the treatment option they did, the perceived mechanisms underlying how or why a treatment works is commonly cited as one of the main reasons underlying treatment choices (Angelo et al., 2008). Indeed, the perception that an individual needs to talk about their traumatic experience predicts preference for PE (Angelo et al., 2008). Thus, assessing beliefs about various treatment options may also shape discussions about treatment preferences, including those with subthreshold PTSD.

We employed well-established criteria for subthreshold PTSD using the PDS (Stein et al., 1997) that mapped on with group differences on PTSD severity and impairment levels. It should be noted that the PDS is one of the few self-report PTSD measures that assesses the DSM-IV criterion for impairment (APA, 2000; Foa et al., 1997), which aside from symptom criteria is a strong criterion for establishing subthreshold diagnosis (Zlotnick et al., 2002). In line with our hypotheses, as well as prior research (e.g., Breslau et al., 2004; Grubaugh et al., 2005), a large proportion of individuals with subthreshold PTSD in each sample experienced functional impairment, though not at the same severity levels as those with full PTSD.

Though the current study used one set of well-established diagnostic criteria for subthreshold PTSD, there currently is no consistent definition of subthreshold/ subsyndromal/ subclinical/partial PTSD in the literature (Kornfield et al., 2012). Recognizing this lack of a standardized definition, four different subthreshold PTSD definitions, based on DSM-5 PTSD criteria (APA, 2013), were compared using data from the World Health Organization World Mental Health Surveys, a large cross-national epidemiological survey (McLaughlin et al., 2014). After comparison, it was recommended to define subthreshold PTSD as endorsing two or three DSM-5 PTSD Criteria B-E

(McLaughlin et al., 2014). Based on our findings, we suggest that a standardized subthreshold PTSD definition includes for both symptom and impairment language. Although we used a more conservative subthreshold PTSD definition, a majority of individuals in the subthreshold group in both samples reported functional impairment. We suggest that functional impairment should be part of a routine assessment of trauma-related symptoms, as it would help clarify the extent to which trauma-related symptoms may currently be impacting an individual's overall functioning and possible comorbid symptoms. Clinically, assessing for both symptoms and reported impairment may also help determine the extent to which treatment is warranted as well as assist collaboration with patients on treatment preferences and goals.

When interpreting our results, some limitations should be kept in mind. First, although the present study used a prospective design, data derived in regard to PTSD was not prospective and is unable to provide insights into the long-term course of symptoms and perceived need for treatment. Second, because the current study did not involve actual treatment, treatment choices provided in this study were hypothetical. However, hypothetical treatment choices often map on to actual treatment choices (Feeny et al., 2009). Third, although we did not do formal diagnostic assessment for PTSD, the PDS maps on well with interview measures (Foa et al., 1997; Spitzer et al., 1990). Finally, although we examined effective and efficacious treatment options for PTSD, PE and sertraline, we did not examine other evidence-based treatments for PTSD, such as cognitive processing therapy and paroxetine.

The present study reinforces findings from prior literature regarding impairment for individuals with subthreshold PTSD, while also providing novel insights regarding treatment beliefs and preferences for this understudied population. Consistent with previous literature, the current study indicates that individuals with subthreshold PTSD report impairment, though not at levels of those with full PTSD (Breslau et al., 2004). These findings are reinforced by a small, but growing, body of research surrounding evidence-based treatment for full PTSD to examine whether they are also effective for those with subthreshold PTSD. For example, Dickstein and colleagues (2013) found cognitive processing therapy to be effective for treating subthreshold PTSD. Naylor and colleagues (2013), in a pilot randomized controlled trial, found that paroxetine may also be a promising treatment for subthreshold PTSD. Thus, interventions targeting subthreshold PTSD appear to show potential when treatment has been indicated for individuals in.

However, it is important to make the distinction that not all individuals with subthreshold PTSD are necessarily in need of treatment, nor was this question examined in the current study. Further exploration of subthreshold PTSD may be warranted, as these potential clinically relevant symptoms may hold significant implications in broader clinical contexts. Better understanding how subthreshold PTSD impacts treatment preferences and beliefs when other disorders are primary, for example, could inform treatment planning across a range of disorders. Marshall and colleagues (2001) suggested that reported subthreshold PTSD impairment might be related to the co-occurrence of other mental health disorders, but subthreshold PTSD also exacerbate these comorbid symptoms. Additionally, in clinical settings it is important to consider the potential impact of subthreshold PTSD on overall treatment outcomes when other disorders are primary, as the impairment and distress from

an individual's traumatic experience may serve as a complicating factor in achieving optimal clinical outcomes. The reported impairment found in this study and prior literature is particularly relevant given that trauma exposure is common for adults in the United States (e.g., Kessler et al., 1995). For individuals seeking or enrolled in treatment for other primary disorders, future research should explore the extent to which subthreshold PTSD is influencing different factors in the treatment process, particularly therapeutic processes and clinical outcomes.

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Highlights

- Current study examined the role of subthreshold PTSD on treatment choice in undergraduate and community samples with a broad range of trauma exposure.
- The most commonly selected treatments for those with subthreshold PTSD were prolonged exposure for undergraduates (61.5%) and combination treatment for trauma-exposed community members (47.1%).
- Individuals with subthreshold PTSD report more depression and trauma-related functional impairment than those with no PTSD and healthy controls.
- Future directions should further explore subthreshold PTSD in broader clinical contexts, such as the extent to which it impacts treatment processes and clinical outcomes.

Table 1

Mean, Standard Deviation, Percentages, and Range for Demographic Variables, Treatment Beliefs, and Psychopathology Measures

	Undergraduate Sample (<i>N</i> = 439) <i>M</i> (<i>SD</i>) or %	Community Sample (<i>N</i> = 203) <i>M</i> (<i>SD</i>) or %
Age (Range 18-65)	19.00 (1.35)	38.92 (12.53)
Female	57.8%	57.9%
Race/Ethnicity		
Caucasian	57.0%	35.0%
African American	3.7%	55.0%
Asian or Asian American	27.9%	1.0%
Hispanic	3.7%	5.5%
Other	7.7%	3.0%
Years of education	12.80 (1.12)	13.30 (1.18)
Prior treatment history		
Psychotherapy	20.5%	65.0%
Pharmacotherapy	9.7%	55.7%
PTSD severity (PDS, Range 0-51) ^a	6.69 (8.22)	21.48 (13.71)
Impairment (PDS, Range 0-9) ^a	1.27 (2.01)	4.10 (2.93)
Depression (QIDS-SR, Range 0-27)	5.33 (3.70)	10.23 (5.89)
PE treatment beliefs (Range 2-14)	10.52 (2.06)	9.40 (3.19)
Sertraline treatment beliefs (Range 2-14)	8.46 (2.28)	8.40 (3.43)

Note. PDS = Posttraumatic Stress Diagnostic Scale; QIDS = Quick Inventory of Depressive Symptomatology; PE = Prolonged Exposure; CS = Credibility Scale; PRS = Personal Reactions Scale.

^a Analyses based on participants who completed the PDS in the undergraduate (*n* = 227) and community (*n* = 187) samples.

Table 2

Psychopathology and Treatment Belief Measures Across the PTSD Diagnostic Categories in the Undergraduate Sample (N = 439)

	No trauma exposure (<i>n</i> = 211)	Trauma exposure (<i>n</i> = 157)	Subthreshold PTSD (<i>n</i> = 39)	Full PTSD (<i>n</i> = 32)			
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>df</i>	<i>F</i>	η^2
PTSD severity (PDS) ^a	--	3.22 (5.33) _a	9.49 (5.82) _b	20.15 (7.17) _c	2, 224	122.68*	.52
Impairment (PDS) ^a	--	0.61 (1.43) _a	1.44 (1.79) _b	4.28 (1.94) _c	2, 223	179.08*	.39
Depression (QIDS-SR)	4.58 (3.09) _a	5.09 (3.88) _a	7.15 (3.87) _b	9.19 (3.28) _c	3, 433	20.20*	.12
PE treatment beliefs	10.56 (1.92)	10.61 (2.13)	10.53 (2.23)	9.88 (2.37)			
Sertraline treatment beliefs	8.45 (2.27)	8.57 (2.33)	8.16 (2.08)	8.39 (2.36)			

Note. PDS = Posttraumatic Stress Diagnostic Scale; QIDS = Quick Inventory of Depressive Symptomatology; PE = Prolonged Exposure; CS = Credibility Scale; PRS = Personal Reactions Scale.

a, b, and c are significantly different ($p < .05$).

^a Analyses based on participants ($n = 228$) who completed the PDS. Thus, participants in the no trauma exposure group were excluded from these analyses as they endorsed no traumatic experiences on the PDS and thus were instructed to not complete the rest of the measure.

* $p < .001$.

Table 3

PTSD Treatment Preference Across the Diagnostic Categories in the Undergraduate (N = 439) and Community Sample (N = 196)

PTSD Diagnostic Category	PTSD Treatment Choices			
	PE % (n)	Sertraline % (n)	Combination % (n)	No Treatment % (n)
Undergraduate				
No trauma exposure	49.0% (102)	7.2% (15)	38.0% (79)	5.8% (12)
Trauma exposure only	45.5% (71)	7.7% (12)	37.8% (59)	9.0% (14)
Subthreshold PTSD	61.5% (24)	5.1% (2)	30.8% (12)	2.6% (1)
Full PTSD	34.4% (11)	18.8% (6)	37.5% (12)	9.4% (3)
Total	47.8% (208)	8.0% (35)	37.2% (162)	6.9% (30)
Community				
Trauma exposure only	40.2% (33)	11.0% (9)	29.3% (24)	19.5% (16)
Subthreshold PTSD	35.5% (12)	14.7% (5)	47.1% (16)	2.9% (1)
Full PTSD	32.5% (26)	7.5% (6)	51.3% (41)	8.8% (7)
Total	36.2% (71)	10.2% (20)	41.3% (81)	12.2% (24)

Table 4

Results from One-Way Analyses of Variance Examining Psychopathology and Treatment Belief Measures Across the Diagnostic Categories in the Community Sample (N = 196)

	Trauma exposure only (<i>n</i> = 82)	Subthreshold PTSD (<i>n</i> = 34)	Full PTSD (<i>n</i> = 80)			
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>df</i>	<i>F</i>	η^2
PTSD severity (PDS) ^a	12.84 (12.03) _a	19.98 (10.89) _b	30.01 (10.84) _c	2, 184	44.23*	.32
Impairment (PDS) ^a	2.84 (2.87) _a	3.12 (2.50) _a	5.68 (2.39) _b	2, 184	25.67*	.22
Depression (QIDS-SR)	7.53 (5.74) _a	9.44 (4.38) _a	13.34 (4.98) _b	2, 193	25.57*	.21
PE treatment beliefs	9.14 (3.40)	9.82 (3.07)	9.62 (2.93)			
Sertraline treatment beliefs	7.87 (3.62)	9.06 (3.06)	8.67 (3.35)			

Note. PDS = Posttraumatic Stress Diagnostic Scale; QIDS = Quick Inventory of Depressive Symptomatology; PE = Prolonged Exposure; CS = Credibility Scale; PRS = Personal Reactions Scale.

a, b, and c are significantly different ($p < .05$).

^a Analyses based on participants ($n = 187$) who completed the PDS.

* $p < .001$.