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Behavioral Activation and Therapeutic Exposure: An Investigation of Relative Symptom Changes in PTSD and Depression During the Course of Integrated Behavioral Activation, Situational Exposure, and Imaginal Exposure Techniques

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Abstract

Effectiveness of exposure therapy for posttraumatic stress disorder (PTSD) may be adversely influenced by comorbid disorders. The present study investigated behavioral activation and therapeutic exposure (BA-TE), a new integrated treatment designed specifically for comorbid symptoms of PTSD and depression. Combat veterans with PTSD (*N* = 117) completed eight sessions of BA-TE that included two phases of treatment: (a) behavioral activation (BA) in which some activities involved situational exposures and (b)

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BA and situational exposures with imaginal exposures. Findings supported improvements in symptoms of PTSD, and overlapping symptoms of PTSD and depression, but not in nonoverlapping symptoms of depression. The findings also demonstrated a relatively consistent rate of change in PTSD and depression symptoms during BA-TE, despite the addition of imaginal exposures midway through the treatment. Together, these findings provide preliminary support for BA-TE as a treatment for PTSD and depression, and highlight the utility of transdiagnostic treatments in addressing comorbidity and symptom overlap.

Keywords

behavioral activation and therapeutic exposure, BA-TE, depression, PTSD, comorbidity, transdiagnostic

Posttraumatic stress disorder (PTSD) is a severe mental health condition secondary to exposure to a traumatic event. Untreated PTSD is unlikely to remit without intervention (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Exposure-based therapies are the most thoroughly investigated forms of treatment for PTSD (Gros, Tuerk, Yoder, & Acierno, 2011; Keane & Barlow, 2002), with all highly effective interventions involving therapeutic strategies that attempt to counter behavioral and cognitive avoidance, such as prolonged exposure (PE; Foa, Hembree, & Rothbaum, 2007) as well as several others (Kilpatrick & Amick, 1985; Shapiro, 1989).

Exposure treatments typically involve two primary components: situational (in vivo) exposures and imaginal exposures (Gros, Tuerk, et al., 2011; Keane & Barlow, 2002). The goal of both types of exposure is to reduce avoidance, disconfirm false beliefs, increase mastery, and promote inhibitory learning with respect to fear responding. Situational exposure refers to prolonged, repeated, and controlled encounters with avoided fear conditioned stimuli, including people, places, and things that are associated with the traumatic event or its direct sequelae. Imaginal exposure involves encouraging patients to provide repeated accounts of their traumatic experience in great detail, followed by imaginal recreations of these experiences in vivid detail. These exposure trials typically involve creating a narrative of the traumatic event (via audio recording or written story) and then revisiting the narrative repeatedly. The effectiveness of exposure therapy across a variety of trauma populations is well established (Cahill, Hembree, & Foa, 2006), with

outcomes maintained at follow-up (Resick, Nishith, Weaver, Astin, & Feuer, 2002).

Despite considerable research supporting positive treatment outcomes, the effectiveness of exposure therapy in treating PTSD may be diminished by the presence of comorbid disorders (Foa et al., 2007). This is somewhat disconcerting given the considerable rate of comorbidity in those with PTSD, with estimates ranging between 62% and 92% in population-based surveys (Keane, Brief, Pratt, & Miller, 2007; Perkonigg, Kessler, Storz, & Wittchen, 2000). However, the high degree of comorbidity between PTSD and other disorders such as depression may be a result of symptom overlap between the diagnoses (Frueh, Elhai, & Acierno, 2010; Resick & Miller, 2009; Rosen et al., 2008). Indeed, recent investigations demonstrate that the majority of veterans with PTSD also met criteria for major depressive disorder (MDD; Gros, Price, Magruder, & Frueh, 2012; Gros, Simms, & Acierno, 2010). Together, these findings suggest that treatments for PTSD should be more transdiagnostic in their scope to address symptoms of not only PTSD but also its common comorbidities, such as MDD (Gros et al., 2010).

Several large-scale clinical trials for exposure therapy for PTSD have assessed treatment response across PTSD and depression symptoms (Foa et al., 1999; Foa et al., 2005; Resick et al., 2002). Although exposure therapies for PTSD can reduce depression symptoms in addition to symptoms of PTSD (Foa et al., 1999; Foa et al., 2005; Resick et al., 2002), it is common for depression symptoms to persist even after the completion of treatment, indicating that there are some symptoms unique to MDD. More specifically, treatment studies delivering exposure therapy for PTSD have reported pre- to posttreatment reductions in Beck Depression Inventory–Second Edition (BDI-II; Beck, Steer, & Brown, 1996) mean scores ranging from 32% to 67% (Foa et al., 1999; Foa et al., 2005; Resick et al., 2002). However, many participants with comorbid MDD at pretreatment continue to meet diagnostic criteria for MDD after treatment completion (Resick et al., 2002). Furthermore, depression symptoms have been shown to be positively associated with PTSD symptoms and thus may negatively affect PTSD treatment response or endurance of treatment gains (Scott & Stradling, 1997; Shalev et al., 1998). Therefore, the effectiveness of exposure therapies may be enhanced by integrating transdiagnostic interventions that target symptoms of PTSD and depression.

Behavioral activation (BA) is a treatment showing some promise in addressing comorbid symptoms of depression in individuals with PTSD (Acierno et al., 2012; Nixon & Nearmy, 2011; Strachan, Gros, Ruggiero,

Lejuez, & Acierno, in press). BA involves identifying and scheduling values-based activities that reinforce and promote enjoyment (i.e., associated with positively reinforcing activities, such as a hobby) or reduce stress (i.e., associated with negatively reinforcing activities, such as chores; Lejuez, Hopko, LePage, Hopko, & McNeil, 2001). As mentioned, not only is BA an evidence-based treatment for reducing depression symptoms (Dimidjian et al., 2006; Gros & Haren, 2011; Lejuez et al., 2001), but preliminary findings also demonstrate that BA is effective in reducing PTSD symptoms in patients with PTSD (Jakupcak et al., 2006; Mulick & Naugle, 2004). Furthermore, BA is highly compatible with therapies that use situational exposure (Acierno et al., 2012; Nixon & Nearmy, 2011; Strachan et al., in press). Both techniques engage patients in increased activity to reduce isolation. However, limited research to date has examined the effect of a transdiagnostic treatment that combines exposure and BA for PTSD and depression symptoms.

The present study investigates a new integrated treatment, behavioral activation and therapeutic exposure (BA-TE). BA-TE is designed specifically as a transdiagnostic approach to improve treatment outcome in patients with comorbid symptoms of PTSD and depression (Strachan et al., in press). The protocol was designed with two primary phases. The first involves daily behavioral practices that incorporate BA and situational exposure strategies (e.g., to reduce situational avoidance and to increase likelihood of reinforcement). The second phase adds daily imaginal exposures to the initial behavioral practices (BA and situational exposures) to target-specific PTSD symptoms, such as trauma-related reexperiencing and intrusions. Although preliminary findings are supportive of BA-TE in reducing symptoms in participants with PTSD (Strachan et al., in press), additional research is needed to (a) investigate the effect of BA-TE on symptoms of PTSD and depression and (b) better determine whether treatment response varies across the two phases of treatment (e.g., addition of imaginal exposures to BA and situational exposure practices).

Participants in the present study were part of a larger randomized controlled trial comparing BA-TE treatment delivery via telehealth versus in-person methods (Gros, Strachan, et al., 2011). Data collected thus far revealed no significant difference on PTSD or MDD measures in terms of delivery modality (Strachan et al., in press), and patients in both treatment conditions were included in the analyses, with treatment modality investigated as a potential moderator. In the present study, we hypothesized that the second component of treatment (imaginal exposure) would lead to increased symptom improvement for PTSD, as compared with the first component of treatment (BA and

situational exposure trials). We also hypothesized that all patients receiving BA-TE would demonstrate significant improvements in symptoms of PTSD and depression.

Method

Participants

Combat veterans ($N = 117$) of Operation Iraqi Freedom, Operation Enduring Freedom, Persian Gulf War, and/or Vietnam War were recruited through referrals at a large southeastern Veterans Affairs (VA) Medical Center. Eligible participants were required to meet diagnostic criteria for combat-related PTSD ($n = 37$) or subthreshold PTSD ($n = 80$), defined as fulfillment of Criteria A (traumatic event) and Criteria B (reexperiencing), and either Criteria C (avoidance) or Criteria D (hyperarousal; Blanchard et al., 1994; Grubaugh et al., 2005). To determine eligibility, a registered psychiatric nurse administered structured psychiatric interviews for PTSD (Clinician Administered PTSD Scale [CAPS]; Blake et al., 1995) and psychiatric comorbidities (Structured Clinical Interview for *Diagnostic and Statistical Manual of Mental Disorders* [4th ed., text rev.; *DSM-IV*; American Psychiatric Association (APA), 2000]; SCID-IV; First, Spitzer, Gibbon, & Williams, 1996). Individuals who were actively psychotic, acutely suicidal, or met criteria for substance and/or alcohol dependence on the SCID were excluded from participation. To enhance generalizability of study findings, participants receiving psychotropic medication treatment were not excluded from participation. Consented participants were predominantly male (90.0%), African American (38.6%) or Caucasian (41.9%), veterans of Operation Enduring Freedom/Operation Iraqi Freedom (71.8%), Persian Gulf War (18.0%), or Vietnam War (10.3%), and had a mean age of 37.7 years ($SD = 12.9$). The majority of participants reported they were married (55.1%), followed by divorced or separated (18.9%), followed by never married (18.1%). A significant percentage of participants reported VA service connection/disability (79.1%) and met diagnostic criteria for MDD on the SCID (27.6%).

Over the duration of the study period, 35 participants withdrew from the study due to redeployment, employment, loss of transportation, or lack of interest in continuing to participate in the study (29.9% dropout rate). As such, the final treatment sample consisted of 82 participants. There was no significant difference in rates of dropout from the initial phase of treatment and the second phase of treatment, $\chi^2(1) = 0.15$, $p = .70$. The primary outcome analyses were conducted using the entire "intent-to-treat" sample. To justify

collapsing in-person and telehealth conditions into one condition for analyses, attrition and outcome were examined, and attrition rates were comparable across treatment delivery mediums. Two-variable chi-square tests revealed no group differences between completers and dropouts in sex, race, marital status, work status, treatment condition (telehealth and in-person; Gros, Strachan, et al., 2011), and disability status (χ^2s < 5.81, *p*s > .05). In addition, one-way ANOVAs failed to reveal any group differences in age, $F(5, 112) = 0.71$, $p > .05$, or any measures of baseline symptomatology (*F*s < 0.15, *p*s > .05).

Procedures

A full description of the larger study methodology involving a complete list of assessment measures, treatment protocols, and the randomization process can be found in Gros, Strachan, et al. (2011). An abbreviated presentation of the methodology that is most pertinent to the current study is presented below.

All participants received eight 90-min sessions of BA-TE administered by masters-level therapists. All therapists completed a training program on BA-TE with the BA training component led by an expert in brief behavioral activation treatment for depression (Lejuez et al., 2001), the exposure training components led by an expert in PE (Foa et al., 2007), and the integration training of the two components led by the principal investigator. All therapists were also required to shadow a senior level clinician throughout a complete course of treatment before administering BA-TE independently. Therapists met weekly with the principal investigator for supervision throughout the duration of the study. Sessions were audio-recorded and monitored by an independent rater to ensure treatment fidelity. Assessments of PTSD (PTSD Checklist [PCL]; Weathers, Litz, Herman, Huska, & Keane, 1993) and depression (BDI-II; Beck et al., 1996) were completed at baseline, midtreatment (beginning of Session 4), and posttreatment (1 week following Session 8). The assessments of PTSD symptomatology (PCL) were focused on current symptoms of combat-related PTSD. As described below in more detail, the first phase of treatment focused on BA and situational exposures (Sessions 1-3). The second phase of treatment added imaginal exposures to the BA and situational exposures (Sessions 4-8).

Telecommunications Technology

Treatment sessions for the telehealth participants were conducted using in-home videoconferencing technology as part of a larger study. Either an Internet-based instant video service (e.g., a "Skype" type program) or an analogue videophone (Viterion 500) was used at the participant's discretion.

Exposure therapy can be delivered effectively to individuals with PTSD via telehealth technologies (Germain, Marchand, Brouchard, Drouin, & Guay, 2009; Gros, Yoder, Tuerk, Lozano, & Acierno, 2011; Tuerk, Yoder, Ruggiero, Gros, & Acierno, 2010).

BA-TE

BA-TE consists of eight 90-min sessions that include BA and situational exposure practices during Sessions 1 to 3, and BA and situational exposure practices with imaginal exposure practices during Sessions 4 to 8. Prior to beginning treatment, participants were given an agenda book specifically created for use in the study. The agenda book, used to record homework exercises and plan future days according to BA and exposure principals, was small and discrete, resembling typical planners found at office supply stores; this inconspicuous format was used to assuage potential participant concerns regarding confidentiality and improve portability of skills posttreatment. Furthermore, all worksheets required to complete treatment were included in the appendices of the planner reducing the number of extraneous forms necessary for psychoeducation, skills training, and between-session exercises. For more thorough descriptions of the theory, rationale, and practices involved in BA-TE, please see Acierno et al. (2012) and Strachan et al. (in press).

Sessions 1 to 3. The first phase of BA-TE began with the introduction of psychoeducation on common reactions to traumatic events, development of PTSD and MDD, and how avoidance operates to maintain and worsen symptoms of depression, anxiety, and fear. BA and situational exposure techniques were introduced as a primary method for reducing avoidance due to PTSD and depression. In brief, these techniques focused on increasing the planning of activities that were consistent with personal values and that had the potential for reinforcement. These activities frequently were combined with planning activities that involved exposing participants to avoided/feared situations. Taken together, these activities were designed to promote reduction in symptoms of depression, anxiety, and fear, which are common in PTSD and MDD. Unlike the lighter versions of BA described in existing exposure treatments (Foa et al., 2007), BA assignments in BA-TE were not limited to activities that changed/reduced avoidance due to the trauma; rather, these assignments were more consistent with stand-alone versions of BA for depression (Lejuez et al., 2001). In addition, activities were given a "social" aspect whenever possible. For example, if a participant endorsed "reading" as an enjoyable activity, we might suggest "reading at the bookstore" as a social addition to this activity. For homework, participants scheduled multiple, daily practices

in their planners, and progress was assessed by the therapist at the beginning of each session. Examples of these assignments involved specific hour-by-hour planning of a wide range of activities, such as walking each day with one's spouse, going to a crowded setting (e.g., shopping mall), eating dinner with friends and family either at home or a crowded setting (e.g., busy restaurant), or getting together with family and friends to watch the big game at home or a crowded setting (e.g., sports bar or stadium).

Sessions 4 to 8. The second phase of BA-TE incorporated imaginal exposure practices into the existing BA and situational exposure practices. Participants created a detailed narrative (audio and/or written) of the traumatic event, consistent with imaginal exposure practices from existing exposure therapy for PTSD (Foa et al., 2007). These additional activities were designed to address recurrent intrusive and distressing traumatic memories, commonly reported in PTSD. For homework, participants added daily imaginal exposure practices to their multiple, daily practices of BA and situational exposure practices.

Measures

BDI-II. The BDI-II is a 21-item measure designed to assess the cognitive, affective, behavioral, motivational, and somatic symptoms of depression in adults and adolescents (Beck et al., 1996). Each item is rated on a 0 to 3 scale with different responses based on the targeted symptom content. The BDI-II has demonstrated excellent test–retest reliability over a 1-week interval ($r = .93$), excellent internal consistency ($\alpha s < .92$), and convergent and discriminant validity in multiple samples (Beck et al., 1996).

CAPS. The CAPS is a clinician-rated scale designed to diagnose current and lifetime PTSD (Blake et al., 1995). The CAPS targets the 17 specific PTSD symptoms from the *DSM-IV* (APA, 2000) to assess the intensity and frequency of each symptom on a 5-point Likert-type scale. Although a full assessment of past trauma was completed, active combat-related PTSD was the focus of the symptom assessments and related diagnosis. The CAPS has been shown to have adequate internal consistency (αs ranged from .73 to .95), interrater reliability on the same interview (rs ranged from .92 to .99), and test–retest reliability over a 2- to 3-day period across different interviewers (rs ranged from .77 to .98; for review, see Orsillo, 2002).

PCL–Military. The PCL is a 17-item measure designed to assess PTSD symptom severity related to military-/combat-related trauma. Respondents were presented with 17 specific symptoms of PTSD and asked to rate "how much you have been bothered by that problem in the last month" on a 5-point Likert-type scale, ranging from 1 = *not at all* to 5 = *extremely*. The PCL has

been shown to have excellent internal consistency in veterans, victims of motor vehicle accidents, and sexual assault survivors (αs > .94), and excellent test–retest reliability in veterans (r = .96). In addition, the PCL has demonstrated excellent convergent validity with alternative measures of PTSD (rs = .77 to .93; Orsillo, 2002).

SCID-IV. The SCID-IV (First et al., 1996) is a semistructured diagnostic interview designed to assess the *DSM-IV* diagnostic criteria for Axis I disorders (APA, 2000). The SCID has shown adequate interrater reliability for all disorders (rs = .69-1.0) and adequate test–retest reliability over a 1- to 3-week interval in patient samples (rs = .40-1.0; Zanarini & Frankenburg, 2001).

Data Analysis

The current hypotheses were assessed using multilevel modeling (MLM). MLM accounts for autocorrected residuals for repeated measurements and has a superior method for handling missing data than other general linear modeling procedures (Singer & Willett, 2003). MLM divides variation across multiple levels. For the present study, Level 1 contained variation attributed to intraindividual changes (i.e., change in PTSD and depression during treatment) and Level 2 contained variation attributed to interindividual differences (i.e., demographic factors, PTSD diagnosis vs. subthreshold PTSD, and treatment condition). Missing data were handled with maximum likelihood estimation (MLE), a method that has been highly recommended in the literature (Graham, 2009; Kwok et al., 2008) and has shown to provide more accurate estimates when handling missing data (Raudenbush, 1995). This approach allowed for information from all participants (N = 117) to be included in the subsequent analyses.

A series of hierarchical linear change models were fitted to the data to test the hypotheses for the current study. First, a single linear change model and a piecewise model were examined to determine which best approximated the data. Piecewise models allow for separate rates of change across distinct periods. For the current study, separate rates of change were hypothesized for the first phase of BA-TE (Sessions 1-3), in which BA and situational exposure practices were primarily used, and the second phase of BA-TE (Sessions 4-8), in which imaginal exposure practices were added. Random effects were included to assess residual repeated measures variation (Level 1) and residual individual level variation (Level 2) in pretreatment values (intercept) and the rate of change (slope).

On selecting the model that best approximated the data, a fixed effect for comorbid symptoms (PTSD/depression) was included. Such an effect

Table 1. Descriptive Statistics for PTSD and Depression Symptoms During Treatment

Variable	Baseline	Session 2	Session 4	Session 6	Posttreatment
PCL-M	58.72 (14.18)	56.73 (13.81)	53.24 (15.77)	49.39 (16.45)	49.20 (17.38)
BDI-II	25.42 (11.59)	23.52 (10.47)	21.71 (10.48)	20.38 (11.90)	21.27 (14.17)

Note: PTSD = posttraumatic stress disorder; PCL-M = Posttraumatic Checklist–Military Version; BDI-II = Beck Depression Inventory–Second Edition.
*$p < .05$. **$p < .01$.

determines the extent to which symptoms were related during the course of treatment, controlling for improvement in the dependent variable. Finally, a fixed effect for the interaction between the rate of change and PTSD/depression scores was included. A significant interaction provides support for the conditional effect of the co-occurring disorder on the rate of change in the dependent variable. For example, a significant Rate of change × Depression interaction would suggest that the rate of change in PTSD symptoms is conditional on levels of depression.

Results

Descriptive statistics for the current sample are presented in Table 1. Separate piecewise models were used to examine the rate of change in PTSD and depression scores during treatment. For PTSD symptoms, initial status was significantly elevated, $\beta_{00} = 59.21$. The rate of change from baseline to Session 3 was $\beta_{10} = -1.21$ and from Sessions 4 to 8 was $\beta_{20} = -1.39$. Both rates of change were significant (ps $< .01$). By comparison, the fixed effect for a single rate of change was $\beta_{10} = -1.30$, $p < .01$. The single rate model was selected because of (a) the small difference in rate magnitude (0.18) across both pieces as compared with prior work with piecewise models (Price, Anderson, Henrich, & Rothbaum, 2008), (b) both components were highly significant, and (c) a single slope model is more parsimonious.

For depression symptoms, initial status was significantly elevated, $\beta_{00} = 25.49$. The rates of change from the first and second portions of treatment were $\beta_{10} = -0.75$, $p < .01$, and $\beta_{20} = -0.60$, $p = .03$, respectively. Alternatively, the rate of change for the linear model was $\beta_{10} = -0.68$, $p < .01$. Following a similar rationale to that of the previous model, a single rate model was selected.

Symptoms for the co-occurring disorder (depression or PTSD) were then included as time varying predictors for the linear change models (Table 2).

Table 2. Linear Change Models for PTSD and Depression During Treatment

Fixed effect	Linear change model	Model with additional symptoms	Conditional change model
PCL-M as dependent variable			
Intercept (β_{00})	59.21** (1.25)	57.41** (0.86)	40.28** (1.97)
Slope (β_{10})	−1.30** (0.23)	−0.72** (0.14)	−1.09** (0.30)
BDI-II (β_{20})	—	0.81** (0.06)	0.76** (0.08)
BDI-II × Slope interaction ($\beta_{10} \times \beta_{20}$)	—	—	0.02 (0.01)
BDI-II as dependent variable			
Intercept (β_{00})	25.50** (1.01)	22.51** (0.63)	22.61** (0.63)
Slope (β_{10})	−0.68** (0.15)	−0.05 (0.11)	−0.54 (0.30)
PCL-M (β_{20})	—	0.52** (0.03)	0.49** (0.04)
PCL-M × Slope Interaction ($\beta_{10} \times \beta_{20}$)	—	—	0.01 (0.01)

Note: PSTD = posttraumatic stress disorder; PCL-M = Posttraumatic Checklist–Military Version; BDI-II = Beck Depression Inventory–Second Edition.
*$p < .05$. **$p < .01$.

For the PTSD linear model, depression symptoms were positively related to PTSD symptoms when controlling for time, $\beta_{20} = 0.81$, $p < .01$. Furthermore, the rate of change in PTSD symptoms was significant while controlling for depression symptoms, $\beta_{10} = -0.72$, $p < .01$. These findings suggest that PTSD symptoms and depression symptoms were positively associated during the course of treatment. In addition, PTSD symptoms declined during treatment, even after accounting for depression symptoms during the course of treatment.

For the second model, PTSD symptoms were significantly related to depression symptoms after controlling for time, $\beta_{20} = 0.52$, $p < .01$. However, the rate of change for depression was no longer significant after controlling for PTSD symptoms, $\beta_{10} = -0.05$, $p = .67$. This suggested that after controlling for PTSD symptoms, depression symptoms did not change as a result of treatment.

Finally, an interaction between the symptoms of the co-occurring disorder and the rate of change ($\beta_{10} \times \beta_{20}$) was included in the linear models for PTSD and depression. For the PTSD model, the interaction between the rate of change and depression was not significant, $\beta_{10} \times \beta_{20} = 0.01$, $p = .12$. Similar findings were obtained for the depression change model. The interaction between rate of change and PTSD symptoms was not significant, $\beta_{10} \times \beta_{20} = 0.02$, $p = .28$. These findings suggested that, although PTSD and depression

symptoms were positively related during the course of treatment, the rate of symptom improvement for each disorder was not conditional on levels of other disorders. That is, the rate of change in PTSD was independent of the levels of depression during treatment. Furthermore, the rate of change in depression was independent of levels of PTSD during the treatment.

Discussion

The present study investigated symptoms of depression and PTSD during the course of an eight-session treatment involving integrated BA, situational exposure, and imaginal exposure practices. Contrary to our hypotheses, a linear model best fit the data, suggesting that symptom improvements for PTSD and depression were roughly consistent across the two phases of treatment and that the addition of imaginal exposure to BA and situational exposures did not increase the rate of decline in PTSD symptoms. In addition, although significant improvements were observed in the symptoms of PTSD when controlling for symptoms of depression, symptoms of depression failed to demonstrate significant improvements when controlling for the symptoms of PTSD. Together, these findings have several implications for integrated and/or transdiagnostic treatments of PTSD and MDD.

First, findings supported a linear rate of change across the two primary phases of treatment, suggesting that BA and situational exposure practices alone appear to provide sufficient treatment for PTSD. Despite substantial literature suggesting that imaginal exposure is very effective in the treatment of PTSD symptoms (Cahill et al., 2006; Foa et al., 2007), the findings of the present study suggest that imaginal exposure did not substantially accelerate PTSD treatment response beyond that of BA and situational exposure practices (of course, there is no way to know whether, in the absence of imaginal exposure, observed gains would have tapered off). Furthermore, the rate of response for the initial portion of treatment was comparable with that found in participants receiving manualized PE (e.g., Yoder et al., 2012). Recent meta-analytic investigations of "bona fide" psychotherapies for PTSD have reported similar findings across treatments, suggesting that BA, situational exposures, imaginal exposures, and several other evidence-based practices produce similar outcomes (Benish, Imel, & Wampold, 2008). Together, these findings call into question existing beliefs that specific evidence-based treatment components (e.g., imaginal exposure) are needed to effectively treat specific disorders (e.g., PTSD). Additional comparative research is needed in which outcomes in participants receiving only BA and situational exposure are compared with those of participants receiving treatment that involves

imaginal exposure to determine whether imaginal exposure practice aided in maintaining treatment effects in the second phase of BA-TE. The findings would help clarify the role of imaginal exposure in the treatment of PTSD.

The present findings also investigated the relations between the symptoms of PTSD, depression, and overlapping PTSD and depression during the course of BA-TE. Although these findings demonstrated significant improvements in the symptoms of PTSD and overlapping PTSD/depression, the residual variation of depression did not improve with BA-TE. The overlapping symptoms of PTSD and MDD have received much attention in the recent literature, especially in preparation for the revision of the *DSM* (Frueh et al., 2010; Gros et al., 2010; Gros et al., 2012; Resick & Miller, 2009; Rosen et al., 2008). These studies have highlighted the problematic boundaries between PTSD and MDD, with a particular emphasis of the symptoms of dysphoria and numbing (Gros et al., 2010) and the significance of how traumatic events are defined (Frueh et al., 2010; Gros et al., 2012). Additional research is needed to improve our understanding regarding the match between specific treatments (e.g., BA, situational exposures, imaginal exposures) and specific symptoms of PTSD (e.g., intrusions, avoidance, dysphoria, numbing, and arousal) and depression. Together, the present findings may suggest that additional treatment components may be needed in exposure therapy to address nonoverlapping symptoms of MDD, potentially with other treatment components common in MDD treatments, such as cognitive treatments or acceptance-based therapy.

Although the BA-TE findings are only preliminary and require replication, they contribute to the growing literature in support of integrating BA techniques into exposure therapy to potentially improve the ability of PTSD treatments to address comorbidity (Acierno et al., 2012; Nixon & Nearmy, 2011). However, unfortunately, comorbidity and symptom overlap are not limited to PTSD and depression, as similar concerns have been raised for panic disorder and other anxiety disorders (Gros, Frueh, & Magruder, 2011). Thus, fully transdiagnostic approaches to psychotherapy may be needed to better address these comorbidities by simultaneously addressing the symptoms common among various mood and anxiety disorders (Barlow, Allen, & Choate, 2004; Barlow et al., 2010; Norton, 2009). Transdiagnostic treatments for mood and anxiety disorders include various evidence-based treatment components and focus on treating overall symptom impairment, rather than requiring specific sets of treatments for specific disorders. Recently, several examples of transdiagnostic treatments have been supported in the literature (Farchione et al., in press; Norton, in press; Schmidt et al., in press). With

continued support and replication, these transdiagnostic approaches may represent an important step in addressing comorbidity and symptom overlap in the mood and anxiety disorders.

The present study included several limitations. The sample was restricted to veterans with combat-related PTSD or subthreshold PTSD, which may limit the generalizability of these findings. To further investigate the transdiagnostic nature of BA-TE, future studies should include patients with various mood and anxiety disorder diagnoses in veteran and nonveteran samples. In addition, the rate of treatment discontinuation was higher than expected in trials for exposure therapy for PTSD. Another limitation of the study was the short duration of BA-TE. Although significant improvements were observed in both outcome measures, these improvements were small. It is possible that more sessions of BA-TE, as typical of several evidence-based psychotherapies (e.g., Foa et al., 2007), could have influenced the present findings. A lack of a comparison group(s) and/or randomization of medication use also limited the interpretation of the findings. Finally, the study did not include measures of unique and common symptoms of PTSD and depression and relied solely on self-report outcome measures.

The present study investigated the efficacy of BA-TE in the treatment of the symptoms of PTSD and depression in veterans with PTSD. These preliminary findings supported improvements in the symptoms of PTSD, and overlapping PTSD and depression, but not in nonoverlapping symptoms of depression. The findings also demonstrated a relatively consistent rate of change in these symptoms during the course of BA-TE, despite the addition of imaginal exposure practices midway through the treatment. Together, these preliminary findings support the use of BA-TE as a treatment for PTSD and related symptoms of depression. These findings also provide support for the growing literature of integrated behavior therapies of PTSD and depression (Acierno et al., 2012; Nixon & Nearmy, 2011) and more fully transdiagnostic therapies for the mood and anxiety disorders (Farchione et al., in press; Norton, in press; Schmidt et al., in press).

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