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RESEARCH ARTICLE

BPD Compass: Using a dimensional model of psychopathology to treat co-occurring borderline personality disorder and posttraumatic stress symptoms

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Abstract

BPD Compass is a transdiagnostic psychotherapy that includes cognitive, behavioral, and mindfulness skills targeting the personality dimensions of negative affectivity, disinhibition, and antagonism. Given considerable symptom comorbidity and overlap in etiology between borderline personality disorder (BPD) and posttraumatic stress disorder (PTSD), this study investigated whether BPD Compass holds promise as an integrated approach to simultaneously treating co-occurring BPD features and PTSD symptoms. Participants included 84 trauma-exposed adults who participated in a two-phase clinical trial (Phase 1: randomized controlled trial of BPD Compass vs. waitlist [$n = 43$]; Phase 2: open trial of BPD Compass [$n = 41$]). Compared to waitlist, BPD Compass led to medium-to-large–sized, significant improvements in BPD features, βs $= -.57$ $-.44$, and facets of neuroticism, βs $< -.55$––.73, as well as small, nonsignificant improvements in self-reported, $\beta = -.20$, and clinician-rated PTSD symptom severity, $\beta = -.19$. During treatment, within-person improvements in PTSD symptoms predicted subsequent improvements in BPD features, $\beta = .13$, but not vice versa, $\beta = .07$. Within-person PTSD symptom reduction also predicted subsequent improvement in all personality dimensions, whereas only within-person improvement in despondence, $\beta = .12$, affective dysregulation, $\beta = .11$, and dissociative tendencies, $\beta = .12$, predicted PTSD symptom reductions. Findings offer preliminary support for the potential of BPD Compass to target BPD features and aspects of neuroticism and agreeableness among trauma-exposed adults. Moreover, PTSD symptom change predicting subsequent improvement in BPD features runs counter to current stage-based treatment models that emphasize BPD feature stabilization before engaging in trauma-focused therapy.

Most people with borderline personality disorder (BPD) have a trauma history, and many experience co-occurring posttraumatic stress disorder (PTSD) symptoms (Jowett et al., 2020). Rates of PTSD and BPD co-occurrence range from 25% to 58% in treatment-seeking samples (Clarke et al., 2008; Zanarini et al., 2011). Relative to people with either disorder alone, those with PTSD and BPD have been found to have higher levels of symptom severity, more comorbidity with other psychiatric disorders, increased suicidality, higher rates of health care utilization, poorer quality of life, and higher degrees of functional impairment (Pagura et al., 2010; Scheiderer et al., 2015). Extant recommendations suggest combining and sequentially delivering BPD treatment followed by PTSD treatment (i.e., a stage-based approach), which has been shown to be more efficacious than using either of these treatments alone among trauma-exposed patients with co-occurring PTSD and BPD (Zeifman et al., 2021). Yet, stage-based treatments are time- and resource-intensive, often limiting their utility in real-world settings.

Approaching the PTSD and BPD co-occurrence among trauma-exposed individuals from a dimensional psychopathology perspective, such as the Alternative Model of Personality Disorders (AMPD; American Psychiatric Association [APA], 2013) or the Hierarchical Taxonomy of Psychopathology (HiTOP; Kotov et al., 2017), may represent an efficient treatment approach to addressing these disorders' commonalities. Both AMPD and HiTOP strongly resemble the five-factor personality model, and overlap among the broad domains of these three models has been supported empirically (Kotov et al., 2021; Widiger & McCabe, 2020). In these models, BPD features are chiefly represented by negative affectivity (i.e., high neuroticism), disinhibition (i.e., low conscientiousness), and antagonism (i.e., low agreeableness). Like BPD, PTSD is categorized within the internalizing spectra of HiTOP and is predominantly marked by negative affectivity. PTSD symptoms have also been associated with disinhibition and antagonism, as well as psychoticism (i.e., high openness; Hawn et al., 2022; Jakšić et al., 2012; Kotov et al., 2010; Maples-Keller et al., 2021; Stone et al., 2023; Thomas et al., 2014). The dimensional psychopathology approach may not only provide clarity regarding the shared and distinct features of PTSD and BPD but also potentially inform possible cognitive behavioral treatment targets (Sauer-Zavala et al., 2022).

Emerging research supports the efficacy of BPD Compass—a novel 18-session transdiagnostic psychotherapy protocol that includes cognitive, behavioral, and mindfulness skills—for reducing BPD features by specifically targeting the personality dimensions of negative affectivity, disinhibition, and antagonism (Sauer-Zavala, Southward, Fruhbauerova, et al., 2023; Sauer-Zavala, Southward, Hood, et al., 2023). In addition to PTSD demonstrating associations with the aforementioned personality dimensions, both BPD and PTSD have been classified as emotional disorders, which are characterized by frequent and intense negative emotions and followed by efforts to avoid or suppress the negative emotional experience (Bullis et al., 2019; Sauer-Zavala et al., 2017). Thus, BPD Compass may be an efficacious intervention for treating trauma-exposed individuals who present with both PTSD symptoms and BPD features. Moreover, BPD Compass shares aspects of first-line cognitive behavioral treatments for PTSD (Management of Posttraumatic Stress Disorder and Acute Stress Disorder Work Group, 2023), including addressing maladaptive cognitive schemas and encouraging exposure to trauma-related reminders that may provoke strong emotions, hinder relationships, and contribute to impulses. Transdiagnostic treatment approaches have demonstrated preliminary efficacy for PTSD and BPD independently (Hood et al., 2021; Sauer-Zavala et al., 2016; Sauer-Zavala, Southward, Fruhbauerova, et al., 2023), yet their use in a trauma-exposed sample presenting with PTSD symptoms and BPD features has yet to be evaluated.

The overall aim of the present study was to examine whether BPD Compass benefits trauma-exposed individuals. First, we evaluated the efficacy of BPD Compass using secondary data from our randomized waitlist control trial (Sauer-Zavala, Southward, Fruhbauerova, et al., 2023). We expected that among trauma-exposed participants, BPD Compass would produce significant score reductions on measures of PTSD symptom severity, BPD features, and personality dimensions relative to the waitlist condition. Second, we conducted an exploratory evaluation of the reciprocal relations among session-to-session changes in PTSD symptoms, BPD features, and personality dimensions. Because these reciprocal relations characterize changes over time rather than stable individual differences, we specifically explored these effects at the within-person level.

METHOD

Participants

A total of 99 treatment-seeking adults were recruited from the community. Participants were eligible if they were at least 18 years old, met the diagnostic criteria for BPD, were not participating in concurrent psychotherapy, and maintained a stable dose of psychotropic medication throughout the study (if applicable). Participants were excluded if they reported difficulties that would warrant prioritizing alternative care, such as uncontrolled bipolar I disorder

or psychotic/delusional symptoms, acute suicidal intent requiring immediate hospitalization, or an untreated substance use disorder that would be better addressed with supervised detoxification and/or medication management.

In the present study, we included the subsample of participants who endorsed exposure to a Criterion A traumatic event, as defined in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; APA, 2013), during the diagnostic assessments administered at intake ($n = 84$, 84.8% of the full sample). As depicted in Supplementary Table S1, these participants were, on average, 28 years old ($M = 28.49$, $SD = 9.18$), with pluralities identifying as women ($n = 61$, 74.4%), White ($n = 74$; 90.2%), and not heterosexual ($n = 42$, 51.2%). On average, participants endorsed three or four concurrent diagnoses at baseline. Nearly two thirds of the sample met the criteria for subclinical ($n = 24$, 28.6%) or clinical ($n = 29$, 34.5%) PTSD, as measured by diagnostic clinical severity ratings of 2 and 3 or higher, respectively, on the Diagnostic Interview for Anxiety, Mood, and Obsessive-Compulsive and Related Neuropsychiatric Disorders (DIAMOND; Tolin et al., 2018). The most frequently endorsed index traumatic events included forced unwanted sexual contact ($n = 33$, 41.4%); another experience not listed on the Trauma History Questionnaire ($n = 17$, 21.3%; THQ; Hooper et al., 2011); and serious illness, injury, or the death of a loved one ($n = 9$, 11.3%).

Procedure

The parent study used a two-stage sequential analysis (Lakens, 2022). Phase 1 involved a randomized controlled trial (RCT) to establish the initial efficacy of BPD Compass (Sauer-Zavala, Southward, Fruhbauerova, et al., 2023). Once the predetermined sample size was obtained to detect the primary effect of interest (i.e., changes in BPD features), the open trial (Phase 2) was initiated.

Study advertisements were posted on various online platforms. Interested individuals completed the McLean Screening Instrument for BPD (Zanarini et al., 2003) along with questions to assess preliminary exclusion criteria during a telephone screening. Individuals who met the initial eligibility criteria were invited to complete an intake assessment. Assessors administered diagnostic assessments to confirm eligibility, after which participants completed a battery of self-report measures. Eligible participants enrolled during the RCT phase were randomized to one of two conditions: BPD Compass or an 18-week waitlist control (WLC) condition; those enrolled during the open trial phase were scheduled for their first BPD Compass session. During treatment, therapists emailed a link to complete self-report measures no more than 24 hr before each session. In the WLC condition, study staff emailed a link to complete self-report measures at Weeks 4, 8, 12, and 16 during the waitlist period. Participants assigned to the WLC condition received BPD Compass after the waitlist period. Immediately following the end of each study condition (i.e., posttreatment for BPD Compass and Week 18 and again at posttreatment for WLC), participants completed a subset of the diagnostic assessments and self-report questionnaires. All study procedures were approved by the University of Kentucky's Institutional Review Board, and all participants provided informed consent before research activities began.

Study phases

In the parent study, 50 participants were randomized in a 1:1 ratio to the BPD Compass or WLC conditions (Phase 1). Of these 50 participants, 43 reported a history of trauma exposure (BPD Compass: $n = 22$, WLC: $= 21$). In the WLC condition, five participants dropped out before the end of the 18-week waiting period. In the BPD Compass condition, nine participants dropped out before the end of treatment. Further details regarding recruitment and dropout are detailed elsewhere for the RCT of BPD Compass (Sauer-Zavala, Southward, Fruhbauerova, et al., 2023). In the open trial of the parent study (Phase 2), an additional 49 participants were directly enrolled in BPD Compass. Of these, 41 reported a history of trauma exposure, and 13 participants dropped out before the end of treatment.

Treatment

BPD Compass is an 18-session cognitive behavioral intervention designed to engage the three AMPD personality dimensions relevant to BPD (e.g., negative affectivity/high neuroticism, disinhibition/low conscientiousness, and antagonism/low agreeableness). BPD Compass includes modules for identifying and approaching values, cognitive flexibility, alternative actions and exposures, and mindfulness and acceptance. A detailed description of BPD Compass can be found in Sauer-Zavala, Southward, Hood, et al. (2023). The first session provides psychoeducation about BPD and offers an overview of treatment. Next, two sessions are dedicated to identifying patients' values and self-monitoring behavior to determine whether patients' actions align with their values. Four sessions are then dedicated to practicing cognitive flexibility around emotion-provoking situations, maladaptive schemas about relationships, and beliefs about the ability to manage impulsive urges. The next six sessions encourage patients

to identify unhelpful emotional, relationship-related, and impulsive actions and practice new behaviors (i.e., alternative actions and exposures) that bring patients closer to their values. Four sessions involve mindfulness training to cultivate present-focused, nonjudgmental awareness of patients' thoughts, sensations, and behavioral urges that arise from emotion-provoking situations, relationship conflicts, and triggers for impulsive actions. The last session focuses on relapse prevention.

Weekly 50-min individual therapy sessions were delivered virtually by 14 therapists trained in the treatment protocol. All sessions were video-recorded, and 20% were randomly selected and evaluated for competence (i.e., therapeutic skill, such as time management and empathy) by the treatment developers (Sauer-Zavala, Southward, Fruhbauerova, et al., 2023). Average adherence was high (97.3%, $SD = 11.4$), and average competence, rated on a 5-point scale, was adequate to good ($M = 3.61$, $SD = 0.99$).

Measures

Clinician-administered assessments

Clinician-administered instruments were completed at intake and posttreatment for participants in the BPD Compass condition. For individuals in the WLC condition, these assessments were conducted during the intake, after the 18-week waiting period, and at posttreatment.

PTSD, exclusion criteria, and comorbid diagnoses

The DIAMOND (Tolin et al., 2018) was used to evaluate Criterion A trauma exposure, PTSD, exclusion criteria, and comorbid *DSM-5* diagnoses. Assessors provided clinical severity ratings (CSRs) of the subjective distress and degree of functional impairment related to each disorder on a scale of 1 (*no distress or impairment*) to 7 (*extreme distress and impairment*). For all disorders, CSR a score of 1 indicates no symptoms, a score of 2 indicates subthreshold symptoms, and a score of 3 or higher indicates the presence and severity of a disorder. Diagnostic interviews were audio recorded, and 20% were rated by an independent coder masked to the original ratings and randomization condition. Assessors demonstrated excellent agreement on categorical diagnostic ratings, Krippendorff's $\alpha = 1.00$, and good agreement on CSRs of each disorder, Krippendorff's $\alpha = .89$. The DIAMOND has demonstrated very good–to-excellent test–retest reliability and strong convergent validity (Tolin et al., 2018).

BPD diagnosis

The BPD module of the Structured Clinical Interview for *DSM-5* Personality Disorders (SCID-5-PD; First et al., 2015) was used to evaluate the presence of BPD. Assessors demonstrated excellent agreement on BPD diagnoses, Krippendorff's $\alpha = 1.00$. The *DSM-IV* version of the SCID that is used to assess personality disorders has demonstrated good psychometric properties and adequate convergent, discriminant, and predictive validity (Ryder et al., 2007); psychometric properties of the *DSM-5* version have yet to be established.

BPD feature severity

The clinician-report version of the Zanarini Rating Scale for BPD (ZAN-BPD-CR; Zanarini, 2003) is a nine-item structured interview designed to assess the severity of past-week BPD features. Each item is rated using unique anchors ranging from 0 (*no symptoms*) to 4 (*severe symptoms*), then summed to create a continuous total score. The ZAN-BPD-CR has evidenced strong convergent and discriminant validity as well as good-to-excellent test–retest reliability (Zanarini, 2003). In the present study, assessors demonstrated excellent agreement on ZAN-BPD-CR total scores, Krippendorff's $\alpha = .99$.

Self-report measures

Self-report measures were administered at the baseline, postwaitlist/pretreatment, and posttreatment assessments as well as before each treatment session.

BPD-related personality dimensions

The Five-Factor Borderline Inventory–Short Form (FFBI-SF; DeShong et al., 2016) is a 48-item self-report measure designed to assess 12 facets of the personality dimensions most strongly associated with BPD. These facets represent neuroticism (anxious uncertainty, dysregulated anger, despondence, self-disturbance, behavioral dysregulation, affective dysregulation, and fragility), openness (dissociative tendencies), agreeableness (distrustfulness, manipulativeness, and oppositionality), and conscientiousness (rashness). Each facet is composed of four items, which are rated on a 5-point scale ranging from 0 (*disagree strongly*) to 4 (*agree strongly*) and summed to create a score for each facet. The FFBI-SF has demonstrated strong convergent and discriminant validity (DeShong et al., 2016). In the present study, within-person Cronbach's alpha values for FFBI-SF items ranged from .49 to .81, and between-person values ranged from .78 to .98.

Trauma history

Participants' exposure to traumatic events was assessed at intake using the THQ (Hooper et al., 2011), a 24-item self-report index of potentially traumatic events, such as natural and manmade disasters, accidents, crime-related

experiences, and physical or sexual victimization. Participants were asked to identify their worst or most distressing (i.e., "index") traumatic event and report the age at which this event occurred. The THQ has demonstrated fair-to-excellent test–retest reliability as well as strong construct and cultural validity (Hooper et al., 2011).

PTSD symptom severity

The eight-item, self-report version of the PTSD Checklist for *DSM-5* (PCL-SF; Price et al., 2016; Weathers et al., 2013) was used to assess the severity of past-week PTSD symptoms in response to the index traumatic event identified on the THQ. Each item is rated on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*) and summed to create a total score. Scores of 13 or higher have demonstrated optimal sensitivity (.96–.99), specificity (.69–.83), and efficiency (87.3) for predicting probable PTSD in community samples (Geier et al., 2020; Martínez-Levy et al., 2021). The PCL-SF has demonstrated adequate convergent validity when compared to the gold-standard clinician-administered assessment of PTSD symptoms (Martínez-Levy et al., 2021). In the present study, PCL-SF items demonstrated excellent internal consistency between persons at each observation, Cronbach's αs = .92–.95. Because modeling within-person internal consistencies led to model nonconvergence, we only report the range of between-person values across observations here.

BPD feature severity

The self-report version of the ZAN-BPD (ZAN-BPD-SR; Zanarini et al., 2015) is a nine-item continuous measure designed to assess past-week BPD severity. Each item is rated using unique anchors ranging from 0 (*no symptoms*) to 4 (*severe symptoms*) and summed to create a total score. The ZAN-BPD-SR has evidenced excellent test–retest reliability and strong convergent validity with clinician-rated assessments of BPD (Zanarini et al., 2015). In the present study, ZAN-BPD-SR items demonstrated acceptable within-person internal consistency, Cronbach's $\alpha = .75$, and excellent between-person internal consistency, Cronbach's $\alpha = .91$, across all observations.

Data analysis

Preliminary analyses

We first compared the demographic and clinical characteristics of patients with and without exposure to a Criterion A traumatic event reported on the DIAMOND (APA, 2013; Tolin et al., 2018). We then compared trauma characteristics, along with demographic and clinical variables, across study conditions among trauma-exposed patients. We used independent samples *t* tests to evaluate group differences in age and the number of trauma types endorsed. Chi-squared goodness of fit tests, applying Fisher's exact test to address small cell sizes, were used to compare group differences in gender identity, sexual orientation, racial/ethnic background, educational attainment, marital status, and index trauma type. We also used independent samples *t* tests to compare groups on each of our outcome variables of interest at pre-treatment.

Efficacy of BPD Compass

To test the effect of condition on PTSD, BPD, and personality outcomes, we conducted a series of *t* tests and multiple regressions using SPSS (Version 29; IBM Corp, 2022). We first used paired-samples *t* tests to examine the difference between pre- and posttreatment scores on each clinical outcome (i.e., clinician-rated PTSD symptom severity, PCL-SF, ZAN-BPD-CR, ZAN-BPD-SR, and FFBI subscales) for participants in the BPD Compass condition and the difference between Week 0 and Week 18 scores on each clinical outcome for those in the WLC condition. We calculated Hedges' *g* to estimate the size of each effect because it involves a correction for smaller samples. Finally, we regressed posttreatment scores onto a dummy-coded variable representing treatment condition (WLC = 0, BPD Compass = 1) and the corresponding pre-treatment score. Because of these multiple tests, we applied the Benjamini–Hochberg method using a false discovery rate of 5% to evaluate the significance of each result within each family of tests (i.e., BPD Compass paired *t* tests, WLC paired *t* tests, and regression models). With the exception of PTSD CSRs, we imputed missing data for all outcome measures using a fully conditional specification with 10 iterations and predictive mean matching based on the five closest predictions, pooling across five imputations using the *multiple imputation* procedure in SPSS. Using multiple imputation for PTSD CSRs created uninterpretable data points.

PTSD, BPD, and personality change

To test the reciprocal effects of PTSD symptoms with BPD features and personality dimensions on subsequent changes in each other, we conducted a series of multilevel structural equation models (MSEMs) using M*plus* (Version 8.10; Muthén & Muthén, 1998–2017). Because all participants ($N = 84$) received BPD Compass at some point, we used all available session data to simultaneously regress (a) PTSD symptoms at session t+1 on both PTSD symptoms and either BPD features or one FFBI subscale at session *t* and (b) either BPD features or one FFBI subscale

at session *t*+1 on both the ZAN-BPD-SR or that subscale of the FFBI and PTSD symptoms at session *t*. M*plus* disaggregates each variable into between- and within-person variability. Between-person scores represent the average of each variable across all time points for each participant; within-person scores represent the difference between each patient's score at a given time point and their average score across all time points. Although we simultaneously tested both previously described regression models at both between- and within-person levels, we only present the within-person results herein because our hypotheses only pertain to this level. We repeated these models for each FFBI subscale and examined the standardized results to ease interpretation. Because of these multiple tests, we applied the Benjamini–Hochberg method using a false discovery rate of 5% to evaluate the significance of the within-person effects.

RESULTS

Preliminary analyses

Demographic characteristics, clinical characteristics, and outcome variables of interest at baseline were not significantly different when comparing participants who did (n = 84) and did not (n = 14) endorse Criterion A trauma exposure, ps = .085–923. Demographic, clinical, and trauma characteristics, as well as the pretreatment outcomes of interest, were also not significantly different between treatment conditions for trauma-exposed participants, ps = .089–.986, except for OCD (see Supplementary Table S1). Participants in the open trial were more frequently diagnosed with OCD compared to those in the RCT conditions, $p < .001$.

Phase 1: BPD Compass efficacy relative to WLC for participants with a history of trauma exposure

BPD Compass led to medium-to-large, significant reductions in BPD features, anxious uncertainty, despondence, self-disturbance, behavioral dysregulation, affective dysregulation, and distrustfulness, $g = -.77$–-1.59, $p < .001$–$p = .010$ (Table 1). BPD Compass led to small, nonsignificant reductions in clinician-rated PTSD severity, $t(3) = 1.10$, $p = .353$, $g = -.40$, 95% confidence interval (CI) [−1.14,.40], and self-reported PTSD symptoms, $t(11) = 1.27$, $p = .230$, $g = -.41$, 95% CI [−.83,.01]. In contrast, participants in the WLC condition reported small-to-medium, nonsignificant changes in all variables, gs = −.61–−.06, ps = .050–.985 (Table 1).

Adjusting for corresponding pretreatment scores, BPD Compass produced significantly larger reductions than WLC in BPD features, βs: −.57–−.44, $p < .01$ – $p = .010$, as well as anxious uncertainty, despondence, behavioral dysregulation, and affective dysregulation, βs < −.55–−.73, $p < .001$–$p = .010$ (Supplementary Table S2). Compared to waitlist, BPD Compass produced small, nonsignificant reductions in clinician-rated, $\beta = -.19$, $p = .390$, and self-reported PTSD symptoms, $\beta = -.20$, $p = .347$ (Supplementary Table S2).

Phase 2: Reciprocal effects of PTSD and personality

PTSD symptoms, BPD features, and personality dimensions were all significantly positively correlated within-persons, rs = .15–.61, $p < .001$–$p = .010$, and all but one between-person correlation (i.e., PTSD symptoms and affective dysregulation) were significant, rs = .19–.90, $p < .001$–$p = .081$ (Table 2). PTSD symptoms demonstrated small-to-medium within-person, rs = .15–.41, $p < .001$–$p = .010$, and between-person, rs = .19–.50, $p < .001$–$p = .081$, correlations with BPD features and all personality dimensions (Table 2).

Because we did not impose any restrictions on the MSEMs, all models were saturated. After applying the Benjamini–Hochberg method, within-person improvements in PTSD symptoms significantly predicted subsequent session-to-session reductions in BPD features, $\beta = .13$, $SE = .05$, $p = .006$, 95% CI [.04,.22]; but within-person changes in BPD features did not significantly predict subsequent session-to-session changes in PTSD symptoms, $\beta = .07$, $SE = .05$, $p = .196$, 95% CI [−.03,.16] (Supplementary Table S3). Finally, within-person improvements in self-reported PTSD symptoms significantly predicted subsequent session-to-session reductions in all personality dimensions, $p < .001$ – $p = .030$ (Supplementary Table S3). In contrast, only improvements in despondence, $\beta = .12$, $SE = .05$, $p = .010$, 95% CI [.03,.21], and affective dysregulation, $\beta = .11$, $SE = .05$, $p = .026$, 95% CI [.01,.20], in the neuroticism dimension, and dissociative tendencies, $\beta = .12$, $SE = .05$, $p = .008$, 95% CI [.03,.21], in the openness dimension predicted subsequent reductions in PTSD symptoms (Supplementary Table S3).

DISCUSSION

This is the first study to examine whether BPD Compass—a novel 18-session transdiagnostic psychotherapy protocol based on a dimensional model of psychopathology—reduces PTSD symptoms, BPD features, and personality

TABLE 1 Means, standard deviations, and effect sizes for outcome variables as a function of treatment condition

	BPD Compass						Waitlist					
	Pretreatment ($n = 22$)		Posttreatment ($n = 22$)		Effect size		Week 0 ($n = 21$)		Week 18 ($n = 19$)		Effect size	
Clinical outcome	*M*	*SD*	*M*	*SD*	Hedges' *g*[a]	95% CI	*M*	*SD*	*M*	*SD*	Hedges'*g*[a]	95% CI
ZAN-BPD-CR	16.09	1.46	8.22	1.17	−1.05*	[−1.74, −0.34]	15.57	5.84	13.02	6.78[b]	−0.27	[−0.68, 0.16]
ZAN-BPD-SR	18.59	1.74	7.31	0.97	−1.33*	[−1.89, −0.75]	18.32	6.34[c]	13.69	7.29	−0.61	[−1.07, −0.13]
PTSD CSR[d]	3.50	1.92	2.50	1.29	−.40	[−1.14, 0.40]	3.40	1.58	3.10	1.85	−0.26	[−0.83, 0.33]
PCL-SF	15.30	10.24	10.40	9.30	−.41	[−0.83, 0.01]	18.00	9.15	14.54	10.63[c]	−0.40	[−0.82, 0.04]
N: Anxious uncertainty	17.68	2.92	11.45	3.95	−1.24*	[−1.78, −0.68]	18.95	1.03	17.95	1.30	−0.31	[−0.75, 0.13]
N: Dysregulated anger	15.64	4.83	12.42	5.00	−.54	[−0.97, −0.09]	16.11	3.40	13.79	4.80	−0.59	[−1.05, −0.11]
N: Despondence	16.64	2.85	9.75	5.03	−1.10*	[−1.62, −0.57]	17.89	2.88	15.82	4.68	−0.50	[−0.95, −0.03]
N: Self-disturbance	17.52	3.39	11.25	4.47	−1.09*	[−1.62, −0.55]	17.32	2.71	15.87	4.17	−0.37	[−0.82, 0.08]
N: Behavioral dysregulation	16.14	2.88	10.72	4.54	−1.01*	[−1.51, −0.50]	15.50	3.31[c]	15.22	3.66[c]	−0.09	[−0.53, 0.35]
N: Affective dysregulation	18.00	2.14	10.28	4.45	−1.59*	[−2.21, −0.96]	18.94	1.51	16.29	5.13	−0.49	[−0.96, −0.02]
N: Fragility	14.64	2.40	11.49	4.66	−.64	[−1.08, −0.18]	15.21	3.61	13.78	4.80	−0.43	[−0.87, 0.03]
O: Dissociative tendencies	14.77	5.36	11.37	4.59	−.83	[−1.31, −0.34]	14.42	5.26	14.15	5.16	−0.06	[−0.49, 0.37]
A: Distrustfulness	15.91	3.78	11.67	4.95	−.77*	[−1.23, −0.30]	16.47	3.85	14.65	4.47	−0.43	[−0.88, 0.03]
A: Manipulativeness	13.32	4.44	11.11	4.66	−.39	[−0.82, 0.05]	12.42	4.32	11.65	4.86	−0.22	[−0.66, 0.22]
A: Oppositional	13.00	4.13	12.11	4.50	−.17	[−0.58, 0.24]	12.79	3.22	12.18	4.10	−0.15	[−0.59, 0.28]
C: Rashness	15.27	3.93	11.02	4.71	−.76	[−1.22, −0.28]	14.39	4.05[c]	13.90	4.60[c]	−0.14	[−0.58, 0.31]

Note. ZAN-BPD-CR = Zanarini Rating Scale for Borderline Personality Disorder–Clinician-Rated; ZAN-BPD-SR = ZAN-BPD–Self-Report; PCL-SF = eight-item PTSD Checklist for *DSM-5*; CSR = Clinical Severity Rating; N = neuroticism; O = openness; A = agreeableness; C = conscientiousness; CI = confidence interval.
[a]Within-condition Hedges' *g* values calculated by subtracting Time 1 scores from Time 2 scores.
[b]$n = 21$
[c]$n = 18$
[d]Multiple imputation was not used for missing data on the PTSD CSR, thus BPD Compass: $n = 4$, waitlist: $n = 10$.
*$p < .01$ (Benjamini–Hochberg correction applied).

TABLE 2 Correlations Among posttraumatic stress disorder (PTSD), borderline personality disorder (BPD), and personality dimensions

Variable[a]	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. PTSD symptoms		.50**	.39**	.27**	.36**	.35**	.35*	.19	.38**	.26*	.41**	.33**	.33**	.39**
2. BPD features	.41**		.50**	.50**	.37**	.63**	.60**	.60**	.51**	.58**	.56**	.47**	.49**	.51**
3. N: Anxious uncertainty	.31**	.42**		.47**	.30**	.47**	.46**	.62**	.38**	.40**	.52**	.47**	.55**	.48**
4. N: Dysregulated anger	.18**	.41**	.47**		.40**	.48**	.68**	.72**	.53**	.39**	.49**	.58**	.80**	.62**
5. N: Despondence	.35**	.45**	.55**	.44**		.54**	.53**	.47**	.75**	.53**	.58**	.40**	.36**	.42**
6. N: Self-disturbance	.26**	.42**	.54**	.48**	.50**		.55**	.48**	.59**	.64**	.65**	.46**	.54**	.43**
7. N: Behavioral Dysregulation	.19**	.34**	.45**	.49**	.38**	.49**		.62**	.67**	.57**	.51**	.77**	.62**	.90**
8. N: Affective Dysregulation	.33**	.47**	.61**	.56**	.60**	.58**	.53**		.57**	.50**	.61**	.56**	.68**	.54**
9. N: Fragility	.35**	.47**	.49**	.45**	.59**	.42**	.44**	.61**		.72**	.60**	.64**	.59**	.58**
10. O: Dissociative tendencies	.28**	.37**	.39**	.35**	.47**	.48**	.31**	.44**	.41**		.54**	.54**	.49**	.54**
11. A: Distrustfulness	.26**	.34**	.50**	.36**	.43**	.48**	.39**	.46**	.41**	.43**		.48**	.54**	.38**
12. A: Manipulativeness	.16**	.24**	.30**	.36**	.32**	.35**	.41**	.36**	.43**	.33**	.36**		.73**	.77**
13. A: Oppositional	.21**	.37**	.35**	.55**	.37**	.39**	.42**	.46**	.44**	.31**	.32**	.49**		.68**
14. C: Rashness	.15**	.28**	.40**	.44**	.37**	.42**	.60**	.44**	.43**	.26**	.33**	.49**	.47**	
ICC	.70	.60	.65	.79	.73	.73	.74	.57	.73	.80	.77	.84	.81	.81

Notes: Within-person correlations are presented below the diagonal. Between-person correlations are presented above the diagonal. N = neuroticism; O = openness; A = agreeableness; C = conscientiousness; ICC = intraclass correlation coefficient.
[a]PTSD symptoms were measured using the PTSD Checklist-Short Form. BPD Features were measured using the Zanarini Rating Scale for BPD – Self-report version. Personality dimensions were measured using the Five-Factor Borderline Inventory–Short Form.
*$p < .05$. **$p < .01$.

dimensions among trauma-exposed individuals with BPD. In addition to evaluating the initial efficacy of BPD Compass using data from our randomized waitlist control trial, we also conducted an exploratory evaluation of the reciprocal session-to-session effects of changes in PTSD symptoms, BPD features, and personality dimensions.

BPD Compass led to significant, medium-to-large reductions in BPD features, as well as aspects of neuroticism (anxious uncertainty, despondence, self-disturbance, behavioral dysregulation, affective dysregulation) and agreeableness (distrustfulness) from pre- to posttreatment. The small, nonsignificant reductions in clinician-rated and self-reported PTSD were likely due to few participants completing the posttreatment assessment and self-report questionnaires. Participants' scores on our outcomes of interest did not change significantly during the waitlist period. After adjusting for baseline scores, participants in the BPD Compass condition experienced significantly larger reductions in clinician-rated and self-reported BPD features than those in the WLC condition. Although reductions in clinician-rated and self-reported PTSD symptoms were not significant for individuals in the BPD Compass condition relative to those in the WLC condition, effect sizes were small in magnitude and were in the expected direction (i.e., improvement). Our findings are consistent with and expand upon results from the initial RCT of BPD Compass (Sauer-Zavala, Southward, Fruhbauerova, et al., 2023) and suggest that—pending replication with a larger sample—this treatment package may be efficacious for improving BPD features, as well as aspects of neuroticism and agreeableness, among trauma-exposed individuals with BPD.

Trauma-exposed participants who received BPD Compass experienced significantly larger reductions in several aspects of neuroticism (i.e., anxious uncertainty, despondence, affective and behavioral dysregulation)—but not others (i.e., dysregulated anger, self-disturbance, and fragility)—relative to those in the WLC condition. Prior research suggests that negative affectivity is a risk factor for the development of PTSD following trauma exposure (Ogle et al., 2017) and that this personality dimension is amenable to change during cognitive behavioral therapy (Sauer-Zavala et al., 2021). Conversely, treatment condition was not significantly associated with change in the personality dimensions of openness (dissociative tendencies), agreeableness (distrustfulness, manipulativeness, oppositionality), or conscientiousness (rashness). This finding is consistent with results from the initial efficacy trial of BPD Compass and may be due, in part, to participants in the full sample more frequently reporting elevations in neuroticism than deficits in agreeableness and conscientiousness (Sauer-Zavala, Southward, Fruhbauerova, et al., 2023). Future research is needed to test BPD Compass within a sample specifically recruited to have substantial deficits in openness, agreeableness, and conscientiousness along with elevations in neuroticism.

We evaluated the reciprocal relations among within-person changes in PTSD symptoms, BPD features, and personality dimensions using data from all participants in the RCT and open trial who received BPD Compass. Within-person reductions (i.e., lower than one's personal average) in PTSD symptoms significantly predicted subsequent session-to-session reductions in BPD features and all personality dimensions. In contrast, within-person reductions in BPD features did not significantly predict subsequent session-to-session reductions in PTSD symptoms. Our results suggest PTSD symptom reduction precedes BPD symptom reduction among trauma-exposed patients receiving BPD Compass. There is a dearth of research evaluating the bidirectional association between PTSD symptoms and BPD features in the context of psychotherapy, and our findings challenge the current assumption that PTSD treatment should only be offered after stabilization is achieved during BPD treatment (Zeifman et al., 2021). Moreover, our results provide initial support for using an integrated, rather than stage-based, approach that may simultaneously address PTSD and BPD among trauma-exposed individuals. BPD Compass shares aspects of first-line cognitive behavioral treatments for PTSD, and these trauma-focused enhancements (i.e., addressing maladaptive cognitive schemas and encouraging exposure to trauma-related reminders) may facilitate symptom reduction among trauma-exposed patients with BPD features.

Our results suggest bidirectional effects between within-person PTSD symptom change and facets of two personality dimensions: neuroticism (despondence and affective dysregulation) and openness (dissociative tendencies). The effect sizes were slightly larger for having a PTSD symptom score lower than one's average predicting session-to-session reductions in despondence (β = .16), affective dysregulation (β = .14), and dissociative tendencies (β = .14), compared to the reverse relations (βs = .12,.11,.12, respectively). Our results align with Gilman and colleagues (2012), who found that improvements in hope—the opposite of despondence—during trauma-focused cognitive therapy were a better predictor of subsequent reductions in PTSD symptoms than vice versa, providing initial evidence for the temporal precedence of change among these variables. Conversely, our results run counter to Coyne et al.'s (2023), who evaluated the temporal relations among emotion regulation—the opposite of affective dysregulation—and PTSD symptoms during an exposure-based trauma-focused treatment. The researchers observed that reductions in PTSD symptoms were a better predictor of subsequent improvements in emotion regulation than the reverse association. Although

both hope and emotion regulation have been purported to be transdiagnostic mechanisms of change in first-line cognitive behavioral treatments for PTSD (Gallagher, 2017), continued research is needed to establish the temporality of the association between PTSD symptoms and these personality facets within the context of BPD Compass. Prior research suggests cognitive behavioral therapy leads to reductions in both PTSD and dissociation (Atchley & Bedford, 2021), yet there is a paucity of research examining the temporal nature of these associations. Dissociation may function as an avoidance strategy, preventing people from engaging with strong emotions in general and trauma-related emotions specifically, thus maintaining or exacerbating PTSD symptoms over time. Researchers should consider specifically recruiting individuals with the dissociative subtype of PTSD to explore the role of dissociation in PTSD symptom reduction during BPD Compass.

Our findings should be considered within the context of the study's limitations. We prioritized reducing participant burden by using the DIAMOND to assess clinician-rated PTSD presence and severity at intake rather than the gold-standard Clinician-Administered PTSD Scale for *DSM-5* (Weathers, Blake, et al., 2013). Similarly, we used the eight-item version of the PTSD Checklist for *DSM-5* to evaluate self-reported PTSD rather than the full 20-item scale that assesses each PTSD symptom criteria (Weathers, Litz, et al., 2013). Using the DIAMOND and PCL-SF precluded our ability to evaluate change in PTSD for each *DSM-5* PTSD symptom cluster (i.e., intrusions, avoidance, negative alterations in cognition and mood, and alterations in arousal and reactivity) as a function of treatment condition and in relation to BPD features and personality dimensions. Future research should consider using gold-standard and full-scale measures to assess PTSD symptoms so that comparisons can be made with effects from previously published treatment studies. We also used an assessment of personality dimensions that are directly related to BPD (i.e., FFBI-SF; DeShong et al., 2016) rather than a general measure of personality dimensions (Bagby & Widiger, 2018). Future researchers may expand upon the present study's findings by evaluating dimensional psychopathology using other more comprehensive measures mapping onto HiTOP domains. Given that participants in our sample predominantly identified as women and White, future studies evaluating the efficacy and effectiveness of BPD Compass would be strengthened by prioritizing the recruitment of people of color and individuals who identify as men. Further considerations for future research include assessing symptom reduction longitudinally after the treatment window ends and promoting engagement strategies to reduce dropout.

Our findings offer preliminary support for the potential of BPD Compass to simultaneously target improvements in BPD features and aspects of neuroticism and agreeableness among trauma-exposed adults. Moreover, PTSD symptom change predicting subsequent improvement in BPD features runs counter to current stage-based models that emphasize the stabilization of BPD features before engaging in trauma-focused therapy. Although promising, our results warrant replication in a larger trial to establish the efficacy of BPD Compass among trauma-exposed individuals with co-occurring BPD and PTSD symptoms.

OPEN PRACTICES STATEMENT

The secondary analyses reported herein were not formally preregistered. Neither the data nor the materials have been made available on a third-party archive; requests for the data or materials should be sent to the lead author senior author at ssz@uky.edu.

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SUPPORTING INFORMATION

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