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Highlights

- The interpersonal behavior of military couples with and without PTSD was compared.
- Within couples, the behavior of partners was very similar.
- Couples with PTSD displayed more interpersonal hostility and control.
- Couples with PTSD exhibited more sulking, blaming, and controlling behavior.
- Couples with PTSD exhibited less affirming and connecting behavior.

Abstract

This study evaluated interpersonal behavior differences among male military service members with and without PTSD and their female partners. Couples (*N* = 64) completed a 17-minute videotaped conflict discussion, and their interaction behavior was coded using the circumplex-based Structural Analysis of Social Behavior model (SASB; Benjamin, 1979, 1987, 2000). Within couples, the behavior of partners was very similar. Compared to military couples without PTSD, couples with PTSD displayed more interpersonal hostility and control. Couples with PTSD also exhibited more sulking, blaming, and controlling behavior, and less affirming and connecting behavior, than couples without PTSD. Results advance our understanding of the relational impacts of PTSD on military service members and their partners, and underscore the value of couple-based interventions for PTSD in the context of relationship distress.

Keywords

Couples; PTSD; military; interpersonal behavior; Structural Analysis of Social Behavior

Over 2.5 million active and reserve component troops have been deployed since the United States went to war in Afghanistan in 2001 and Iraq in 2003 (Adams, 2013). Upon returning home from deployment, up to 25% of military service members show signs of posttraumatic stress disorder (PTSD; Seal et al., 2009). PTSD is a psychological disorder caused by exposure to a traumatic event that triggers symptoms such as reexperiencing, avoidance, negative cognitions and mood, arousal, and detachment from loved ones (American Psychiatric Association, 2013).

PTSD exacts a heavy toll on both military service members and their intimate partners. PTSD in service members has been linked to a variety of psychological and physical problems, including aggression, alcohol use problems, and heightened physiological stress responses (Taft et al., 2007). Spouses of service members with PTSD also suffer from elevated levels of distress, including symptoms of anxiety and depression, caregiving burden, and increased physiological reactivity to couple conflict (Caska and Renshaw, 2011, Caska et al., 2014, Lambert et al., 2012).

Because many PTSD symptoms specifically reference deficits in interpersonal functioning—for example, persistent and distorted blame of others or self for the trauma or its aftermath, restricted range of affect (e.g., inability to have loving feelings), irritable or aggressive behavior, and alienation from others (APA, 2013), it is unsurprising that PTSD is associated with relationship distress among couples (Lambert et al., 2012, Taft et al., 2011). Couples with PTSD evidence higher levels of physical and psychological aggression (Taft et al., 2011), greater risk for intimate partner violence (Orcutt et al., 2003, Taft et al., 2009), and elevated divorce rates (Riggs, Byrne, Weathers, & Litz, 1998).

Conceptual models of PTSD suggest maladaptive behaviors, cognitions, emotions, and biological symptoms of both partners interact to affect intimacy, satisfaction, cohesion, and consensus within the dyad (Monson et al., 2010, Nelson Goff and Smith, 2005). For example, hyperarousal may impair the ability to respond to one's partner in positive, connecting ways (Hanley, Leifker, Blandon, & Marshall, 2013), and the emotional numbing cluster of PTSD symptoms may be linked with loss of intimacy and withdrawal (Galovski & Lyons, 2004; for review, see Campbell & Renshaw, 2016).

Interpersonal behavior can be differentiated into two broad categories—other-focused and self-focused (Benjamin, 1979, Benjamin, 1987, Benjamin, 2000)—and both domains appear to be affected by PTSD. *Other-focused behavior*, or behavior directed at one's partner, includes actions like affirming, protecting, blaming, and rejecting. Combat veterans suffering from PTSD symptoms report enacting more hostile behavior of this type, including negative escalation and invalidation (Allen, Rhoades, Stanley, & Markman, 2010). In contrast, *self-focused* behavior is responsive to one's partner, and includes reactions such as disclosing, relying, deferring, or distancing. Combat veterans with PTSD symptoms also report difficulties in this domain, including impaired self-disclosure and intimacy (Cook et al., 2004, Henry et al., 2011, Solomon et al., 2008), and deficits in the ability to enjoy social closeness and connection with others (Miller et al., 2003, Wolf et al., 2012).

However, as scholars have pointed out (e.g., Miller et al., 2013, Taft et al., 2011), this research has employed self and/or partner reports of relationship procesess or conflict behaviors, which are subject to reporting bias and the inflation of associations due to common method variance. We could locate only two studies (one conducted with military couples) that directly observed the interactional processes of couples suffering from PTSD symptoms. Hanley et al. (2013) found that civilian men with elevated levels of PTSD symptoms (but not women) displayed fewer supportive behaviors (i.e., expressions of understanding, validation, and caring) when discussing problems in the relationship. Miller and colleagues (2013) observed that PTSD symptoms in both military veterans and their partners were associated with higher levels of hostility, less humor, less acceptance, and more distress-maintaining attributions (i.e., those that maintained or exacerbated the conflict).

Given these findings, an essential next step is to conduct a comprehensive, theory-driven assessment of interpersonal behavior, with the goal of identifying interactional correlates of PTSD in military couples. Consistent with scholars' call for a multimethod approach to the evaluation of couples (Snyder, Heyman, & Haynes, 2005), observational assessment of couples' behavior is necessary to understand the behavioral risk factors associated with PTSD, as well as enhance the efficacy of couple-based interventions for PTSD and relationship distress (e.g., Monson et al., 2012). Directly exploring the interpersonal processes—potentially modifiable by conjoint psychotherapy—that may account for the links between relationship dysfunction and PTSD among military couples is particularly important.

Study overview and hypotheses

This study was designed to evaluate whether differences in interpersonal conflict behavior distinguish military couples with and without PTSD. Extending work by Miller et al. (2013) and Hanley et al. (2013), we investigated service members (including those on active duty) deployed to Iraq and/or Afghanistan theaters since 2001, focused exclusively on military-specific trauma, and examined PTSD at a diagnostic level of clinical severity. We measured interpersonal behavior broadly, using the circumplex-based Structural Analysis of Social Behavior model (SASB; Benjamin, 1979, Benjamin, 1987, Benjamin, 2000),

which has demonstrated utility for detecting the interpersonal correlates of psychopathology in couples (e.g., Knobloch-Fedders, Knobloch, Durbin, Rosen, & Critchfield, 2013). SASB-based behavioral assessments of couple interaction indicate that both hostility and control are associated with relationship dysfunction (Cundiff et al., 2015, Knobloch-Fedders et al., 2013).

We investigated two primary hypotheses (*H*s) that evaluated whether the presence of PTSD is associated with differences in couples' conflict behavior. *H1* suggested that military couples with PTSD express more hostility than couples without PTSD (Miller et al., 2013). *H2* predicted that military couples with PTSD exhibit more controlling behavior than couples without PTSD (Taft et al., 2011).

In exploratory follow-up analyses, we also sought to determine whether couples with and without PTSD exhibit interactional differences based on the focus of behavior (e.g., on self or on other). Given the lack of empirical work in this area, no directional predictions were advanced. Instead, we posed two research questions (*RQ*s): Do couples with and without PTSD differ in their other-focused (*RQ1*) or self-focused (*RQ2*) behavior?

Method

Participants

This study was conducted as part of a larger investigation of PTSD and the emotional and cardiovascular responses to conflict among military couples (see Caska et al., 2014). Couples were recruited from the Salt Lake City VA Medical Center (VAMC), post-deployment workshops, and state-sponsored programs for service members and their families. Couples completed written, informed consent prior to participating, and received $100 ($50 per individual) as an incentive for participation.

Couples were excluded if either the service member or partner had a history of cardiovascular disease, or reported suicidal or homicidal ideation, mania, psychosis, and/or alcohol or substance dependence within the past 3 months. Couples were also excluded if partners of service members met criteria for current PTSD related to their own trauma history. However, given evidence that combat deployment is related to secondary traumatic stress in partners (Caska & Renshaw, 2011), we included two couples in which partners met criteria for PTSD themselves for trauma related solely to the service member's military experience (described below).

The sample of military service members had deployed an average of 1.5 times (*SD* = 0.64) to Iraq and/or Afghanistan theaters since 2001. With respect to military branch, 78% of service members served in the Army, 1.7% in the Navy, 10.2% in the Air Force, and 10.2% in the Marines. A total of 31% of service members were on active duty, 54.5% were in the National Guard, and 14.5% were in the reserves.

In the PTSD couple group (*n* = 32), all service members met at least subclinical criteria for PTSD based on semistructured interviews (described below). Service members in the group of control couples (*n* = 32) did not meet criteria for any Axis I psychiatric diagnosis according to DSM-IV-TR (APA, 2000).

PTSD Couple Group

Couples in the PTSD group included 27 married couples (marriage length *M* = 6.6 years, *SD* = 5.6), and 5 unmarried but cohabiting couples (living together *M* = 2.3 years, *SD* = 2.4). This subsample of participants ranged in age from 19 to 53 years old (*M* = 31.89, *SD* = 7.88). With regard to race and ethnicity, 88.9% of participants were Caucasian, 6.3% biracial/multiracial, and 3.2% Asian/Asian

American; 7.1% of participants were Hispanic/Latino. The median household income per couple was $25,000 – $49,000.

Control Couples

A total of 32 couples (all married) met criteria for the non-PTSD control group (marriage length *M* = 8.78 years, *SD* = 7.24). In this subsample, individuals ranged in age from 21 to 49 years old (*M* = 33.22, *SD* = 7.83). Participants were 95.3% Caucasian, 3.1% biracial/multiracial, and 1.6% Asian/Asian American; 6.9% were Hispanic/Latino. Couples' median household income was $25,000 – $49,000.

Measures

Clinician Administered PTSD Scale

To evaluate the presence of PTSD, the Clinician Administered PTSD Scale (CAPS; Blake et al., 1995) was employed. The CAPS is a 30-item structured interview that evaluates the 17 symptoms of PTSD according to the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV-TR; American Psychiatric Association, 2000). It has been shown to discriminate PTSD in a variety of samples (Weathers, Keane, & Davidson, 2001).

PTSD diagnosis was determined using a symptom frequency cutoff on the CAPS of at least 1, and a symptom intensity of at least 2, combined with the DSM-IV-TR criteria requiring a Criterion A index trauma (which, for the purposes of this study, was required to be military-related), as well as one Cluster B, three Cluster C, and two Cluster D symptoms, in addition to general distress and impairment requirements. For service members in the PTSD group, 28 (87.5%) reached threshold for a clinical diagnosis of PTSD, and 4 (12.5%) endorsed subthreshold levels of PTSD (these participants were either one point below the intensity requirement for one symptom, or missing one required symptom in a cluster). For the two partners in the PTSD group who themselves met criteria for PTSD for trauma associated with the service member's PTSD, one partner's Criterion A event related to the service member's combat experience, and the other partner's index trauma involved aggression displayed by the service member during a flashback.[1]

Trained graduate students conducted audiotaped CAPS interviews with service members; a licensed clinical psychologist supervised their work. To assess reliability, 20% of the audiotaped interviews were randomly selected and rated independently by a second interviewer. Interrater reliability for the presence vs. absence of PTSD was good (kappa = .83).

Structured Clinical Interview for DSM-IV-TR, Research Edition

To assess current psychopathology, the Structured Clinical Interview for DSM-IV-TR Axis I Disorders (SCID; First & Gibbon, 2004) was administered to service members and their partners by trained graduate student interviewers. Service members with PTSD completed the patient version of the SCID, and all other participants completed the nonpatient version. To assess reliability, 20% of SCID interviews were independently rerated; kappa reliability estimates calculated for agreement among disorder categories ranged from .74 – .100.

In addition to their PTSD diagnoses, 50% of the service members in the PTSD group met SCID criteria for at least one comorbid Axis I diagnosis, including mood disorders (37.5%) or another anxiety disorder (21.9%). A total of 62.5% of partners of PTSD service members met criteria for at least one Axis I disorder, including mood (29%) or anxiety disorders (35.5%). As required by the study's inclusion

criteria, no control group service members met criteria for an Axis I diagnosis. For control group partners, 21.2% met criteria for at least one Axis I disorder, including anxiety disorders (15.2%) and mood disorders (6.1%).

PTSD Checklist–Military Version

The military version of the PTSD Checklist (PCL-M; Weathers et al., 1993) was used as a second inclusion criterion to distinguish between the PTSD and non-PTSD groups. The PCL-M is a 17-item Likert self-report measure of the DSM-IV symptom criteria for PTSD, and shows excellent psychometric properties (Keane, Street, & Stafford, 2004). Service members completed the PCL-M by reporting on their symptoms over the past month related to their stressful military experiences (a = .98).[2] To be included in the PTSD group, service members were required to meet PTSD diagnostic criteria as assessed by the CAPS, and endorse a PCL-M cutoff score of > 35 (Bliese et al., 2008; *range* = 37 – 77, M = 55.47, SD = 11.71). Service members in the control group were required to score < 29 on the PCL-M (*range* 17 – 27, M = 19.59, SD = 2.77).

Depression Anxiety and Stress Scales

As an additional measure of psychological distress, both service members and partners completed the Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995), a well-validated, 42-item self-report measure of psychological symptoms (Antony, Bieling, Cox, Enns, & Swinson, 1998). Participants rated their symptoms over the past week; internal consistency was very good (for service members, a = .92 for anxiety and a = .97 for depression; for partners, a = .90 for anxiety and a = .96 for depression). Service members with PTSD scored in the clinical range (Antony et al., 1998) on both depression (M = 18.39, SD = 10.59) and anxiety (M = 13.71, SD = 6.66) symptoms, although service members from the control group (depression M = .78, SD = 1.36; anxiety M = .81, SD = .86), partners of PTSD service members (depression M = 8.89, SD = 10.07; anxiety M = 5.09, SD = 7.05), and partners from the control group (depression M = 1.59, SD = 2.38; anxiety M = 1.50, SD = 2.08) all scored within the normal range. However, as previously reported by Caska et al. (2014), in this sample both service members with PTSD and their partners endorsed higher levels of depression and anxiety symptoms than members of the control group.

Marital Satisfaction Inventory–Revised (MSI-R)

Relationship quality was assessed using the global distress subscale of the revised Marital Satisfaction Inventory (MSI-R; Snyder, 1997). This subscale contains 22 true/false items; sample items include "I believe our relationship is reasonably happy" and "The good things about our relationship far outweigh the bad." The subscale displays strong internal consistency, test-retest reliability, convergent validity, and discriminant validity (Snyder & Aikman, 1999). Means for both service members (M = 5.81, SD = 6.79, range 0 – 22, a = .95) and partners (M = 6.27, SD = 6.61, range 0 – 21, a = .95) displayed moderate levels of relationship distress (Snyder, 1997).

Areas of Disagreement Questionnaire (ADQ)

The Areas of Disagreement Questionnaire (ADQ; Margolin, 1983) was used to generate topics for the conflict discussion task. Participants used the ADQ to rate their level of disagreement on 13 topics. The four most commonly discussed topics included money, household responsibilities, children, and communication.

Impact Message Inventory–Circumplex (IMI-C)

After the conflict discussion task, individuals rated their partner's behavior using the 32-item IMI-C (Kiesler, Schmidt, & Wagner, 1997). The IMI-C measures behavior along the two dimensions defined by the interpersonal circumplex: hostility versus friendliness and control versus submission (Wiggins, 1996). Overall scores for these two dimensions are computed via weighted combinations of subscales. The IMI-C displays excellent psychometric properties and circumplex structure (Kiesler & Schmidt, 2006). Internal consistency was comparable to that found in similar contexts (Kiesler & Schmidt, 2006); for service members, α = .92 for affiliation and .60 for control; for partners, α = .90 for affiliation and .71 for control.

Procedure

Couples completed screening questionnaires or telephone interviews to determine their eligibility for enrollment. For PTSD couples recruited through the VAMC, medical chart review of the service member's initial PTSD evaluation was also conducted. Participants completed a battery of self-report measures (including a demographics questionnaire, the PCL, MSI-R, and ADQ). Next, couples participated in a 2–4 hour laboratory session, which included the CAPS (for service members), a 17-minute videotaped discussion of a recent and ongoing relationship problem, and the IMI-C and SCID (for all participants).

Conflict Discussion Task

Conflict topics with the highest combined level of disagreement on the ADQ were suggested for discussion by the experimenter. Couples were asked to choose a topic representing a current issue they could discuss together for the full 17-minute interaction period. An experimenter read a script of instructions before the discussion task began; during the discussion, audiotaped instructions guided the couple through the protocol. Although couples were alone in the room during the discussion task, the experimenter and a licensed clinician observed their interaction from an adjoining suite via a one-way mirror.

The interaction was divided into three different segments. During the initial 6-minute period, couples engaged in unstructured conversation about the conflict topic. In the second, 8-minute segment, audiotaped instructions directed the couple through 80-second speaking turns; speaking order was counterbalanced across couples. In the last segment, couples participated in unstructured conversation about the topic for the final 3 minutes.

Clinical Interviews and Debriefing

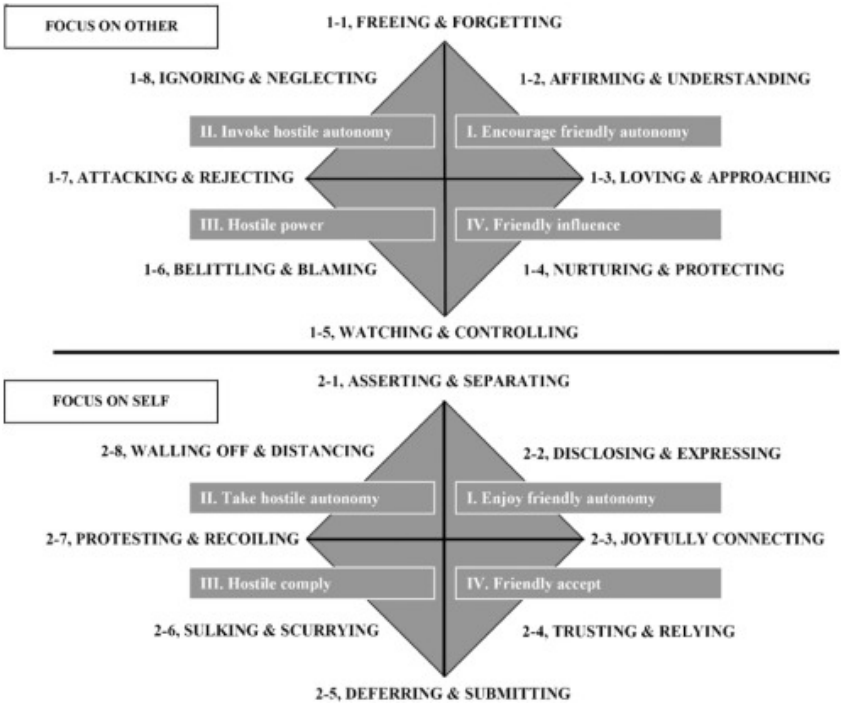
Following the discussion task, all participants completed the IMI-C and SCID; service members also completed the CAPS. Next, participants were individually debriefed, assessed for safety, and, if interested, provided with referral information for mental health services. One participant expressed concerns about suicidality, and an on-call psychologist conducted a full risk assessment before this participant was judged safe to return home.

Observational Assessment of Couples' Conflict Behavior

Couples' interactions were assessed using SASB (Benjamin, 1979, Benjamin, 1987, Benjamin, 2000), a theoretically derived, empirically validated, circumplex-based model for measuring interpersonal behavior. SASB operationalizes healthy interpersonal behavior and departures from it (e.g., Pincus,

Dickinson, Schut, Castonguay, & Bedics, 1999), and measures behavior with the specificity necessary for clinical assessment and treatment planning (Benjamin, 1994a).
SASB (see Figure 1) evaluates interpersonal behavior according to its degree of affiliation (vs. hostility) and degree of autonomy (vs. enmeshment). Because these dimensions are orthogonal, they can be used to create circumplex ("circular") classification systems of behavior. SASB posits two such interpersonal circumplexes.[3] One categorizes other-focused behavior (top circumplex of Figure 1), describing transitive behavior done to, for, or about another person (e.g., "he controls her" or "she protects him"). The second represents self-focused behavior (bottom circumplex of Figure 1), comprising intransitive behavior done to, for, or about the self in relation to the other person (e.g., "she submits to him" or "he relies on her").

Figure 1. Structural Analysis of Social Behavior (SASB).



Note. The two-word, eight cluster version used for the SASB coding in this study is from Benjamin (1987), copyright Guilford Press. The quadrant version is from Benjamin (1979), copyright William Alanson White Psychiatric Foundation. The combination of the quadrant and cluster version reprinted here is from Benjamin (2000), copyright University of Utah, with permission. Reprinted here with permission.

Along the horizontal dimension of each circumplex, *affiliation* (AF) measures degrees of hostility to friendliness, and ranges from hate (direct attack of another; fearful recoil from another's attack) to love (active love; reactive love). Along the vertical dimension, *autonomy* (AU) ranges from extremes of differentiation (give autonomy; be separate) to enmeshment (control; submit).

Through the combination of behavioral focus, affiliation, and autonomy, SASB measures the full array of interpersonal behavior and includes mild, moderate, and extreme displays of affiliation, hostility, enmeshment, and differentiation. Specific behaviors representing combinations of the underlying interpersonal dimensions are represented on the SASB model as *clusters*. Descriptive labels for each behavioral cluster are shown in Figure 1.

Coding procedure

The 17-minute videotaped discussions were coded by a team of 12 undergraduate- and graduate-level research assistants. All coders completed at least 50 hours of formal training under the supervision of the first author; this included didactic instruction, practice assignments, and reliability checks using pilot data coded by the first author. Following training guidelines recommended by Benjamin and Cushing (2000), coders were required to achieve Cohen's weighted kappa $\geq$ .70 on pilot material before coding study data.

Coding followed the steps outlined in the SASB coding manual (Benjamin & Cushing, 2000). Written transcripts of couples' interactions were separated into segments of behavior defined by independent clauses or sentences. Using transcripts and videotapes, pairs of coders rated the behavior of both partners, attending to both verbal and nonverbal cues. First, coders identified the focus of each behavior (either self or other). Next, they categorized each behavior with respect to affiliation (friendly, neutral, or hostile) and autonomy (autonomous, neutral, or enmeshed). These ratings were used to position each behavior within the SASB model. For example, if the husband said, "You're a horrible driver," he would be judged as other-focused, hostile, and controlling, and categorized within the Belittling and Blaming cluster (top circumplex of Figure 1). If the wife said, "I love that our relationship is so easy," she would be rated as self-focused, friendly, and moderately autonomy-taking, and classified in the Disclosing and Expressing cluster (bottom circumplex of Figure 1). If, without much concern, the husband said to his wife, "You can renovate our kitchen in whatever way you choose," he would be coded as other-focused, neutral in affiliation, and allowing autonomy, and would be coded in the Freeing and Forgetting cluster (apex of the top circumplex of Figure 1).

Coders assigned behavior into more than one cluster if necessary to capture its full meaning. For example, if a husband said to his wife, "If you don't make a decision right now, I will," he would be coded as both Watching and Controlling and Asserting and Separating. For analytic purposes, all behaviors assigned to more than one cluster were treated as if each component was a separate behavior. Coding disagreements were resolved by discussion to consensus. To prevent drift, all coders met weekly as a group supervised by the first author.

Coding reliability

Although study data represent a consensus between pairs of coders, we measured reliability based on two coders working separately to ensure conservative estimates. Two coders independently classified the first 50 behaviors for each interaction, and reliability indices were calculated before the pair met to develop consensus ratings. As recommended by Benjamin and Cushing (2000), reliability was computed using an intraclass correlation statistic reflecting the average of two coders (i.e., ICC [1,2] per Shrout & Fleiss, 1979). ICCs for men's and women's affiliation and autonomy behavior were very good, ranging from .77 to .88.

Derivation of SASB dimensional scores from behavioral coding

For each person rated, the SASB scoring software developed by Benjamin (2000) calculates bipolar affiliation and autonomy scores (AF and AU). Computed separately for other-focused and self-focused behavior, AF and AU are derived using weighted combinations of behavior calculated as a proportion of total codes given. AF ranges from hostility (negative scores) to friendliness (positive scores). AU measures the amount of autonomy-granting (positive scores) to control (negative scores) for behavior focused on the other (see top circumplex of Figure 1), and the degree of autonomy-taking (positive

scores) to submission (negative scores) for behavior focused on the self (see bottom circumplex of Figure 1).

Analytic strategy

Hypotheses were evaluated using multilevel modeling conducted in SPSS version 22.0 to accommodate the dependence inherent in dyadic data. As an initial step, following recommendations (Kenny, Kashy, & Cook, 2006), we used maximum likelihood estimation to evaluate whether dyads should be treated as empirically distinguishable in our hypothesis tests. *Empirical distinguishability* (Ackerman, Donnellan, & Kashy, 2011) refers to the assumption that the population of scores on the dependent variable (e.g., means, variances, and covariances) differs between dyad members who are conceptually distinct (in our study, service members vs. partners). Results of these omnibus tests for distinguishability supported the null hypothesis that the behavior of service members and partners was not empirically distinguishable. Thus, the more parsimonious model for indistinguishable dyads was estimated to increase the precision of estimates and statistical power (Kashy & Donnellan, 2012).

Multilevel models were constructed such that individuals were nested within couples, the method of estimation was restricted maximum likelihood, and the covariance structure was compound symmetry (Kenny et al., 2006). Standardized coefficients (betas) are presented as effect size estimates. For all models, we evaluated potential moderators such as age, marital status, length of marriage, total number of deployments, military branch (Army vs. Navy/Air Force/Marines), and military status (active duty vs. reserves/National Guard). Because all results remained stable, and no significant effects emerged for these covariates, they were omitted from final models.

Results

Table 1 displays the means and standard deviations for the SASB variables. Bivariate correlations among the SASB dimensional scores, MSI-R global distress subscale scores, PTSD couple status, and IMI-C ratings for males, for females, and within couples are presented in Table 2. SASB dimensional scores were strongly correlated within couples (all *p*'s < .01).

Table 1. Descriptive Statistics for SASB Dimensional and Cluster Scores

	Min	***Max***	***M***	***SD***
SASB Dimensional Scores				
Affiliation (other-focused)	- 14.800	31.600	16.673	8.038
Autonomy (other-focused)	- 51.300	15.700	- 17.538	12.855
Affiliation (self-focused)	- 5.900	36.000	13.972	8.353
Autonomy (self-focused)	- 8.500	63.500	21.639	12.316
Focus on Other Behaviors				
Freeing and Forgetting	.000	.040	.004	.007
Affirming and Understanding	.000	.400	.104	.073

	Min	*Max*	*M*	*SD*
Loving and Approaching	.000	.060	.007	.012
Nurturing and Protecting	.020	.520	.204	.091
Watching and Controlling	.000	.400	.113	.098
Belittling and Blaming	.000	.300	.024	.046
Attacking and Rejecting	.000	.010	.000	.002
Ignoring and Neglecting	.000	.020	.001	.004
Focus on Self Behaviors				
Asserting and Separating	.000	.680	.255	.104
Disclosing and Expressing	.000	.320	.088	.077
Joyfully Connecting	.000	.310	.059	.054
Trusting and Relying	.000	.330	.086	.064
Deferring and Submitting	.000	.150	.023	.029
Sulking and Scurrying	.000	.230	.025	.044
Protesting and Recoiling	.000	.0100	.000	.000
Walling Off and Distancing	.000	.070	.003	.010

Note. *N* = 128 individuals in 64 dyads (64 male service members and 64 female partners). SASB dimensional scores are calculated as weighted combinations of behavior computed as a proportion of total codes given for each person rated. Focus on Other and Focus on Self behaviors are calculated as the proportion of total behaviors in that cluster, divided by the total number of behaviors exhibited per circumplex.

Table 2. Bivariate Correlations Among SASB Dimensional Scores, MSI-R Global Distress Subscale Scores, PTSD Couple Status, and Impact Message Inventory – Circumplex Weighted Dimensional Scores for Males, for Females, and Within Couples

	V1	**V2**	**V3**	**V4**	**V5**	**V6**	**V7**	**V8**
V1: Affiliation (other-focused)	.552***	.341**	.245	-.019	-.381**	-.299*	.433***	-.258*
V2: Autonomy (other-focused)	.334**	.368**	.477***	.216	-.460***	-.362**	.444***	-.538***
V3: Affiliation (self-focused)	.464***	.539***	.627***	-.059	-.454***	-.367**	.336**	-.349**

	V1	V2	V3	V4	V5	V6	V7	V8
V4: Autonomy (self-focused)	.106	.085	-.074	.555***	-.041	-.069	.151	-.101
V5: MSI-global distress	-.467***	-.244	-.460***	-.139	.750***	.487***	-.599***	.380**
V6: PTSD couple status	-.430***	-.280*	-.305*	-.068	.573***	1.000	-.538**	.183**
V7: IMI affiliation	.510***	.235	.476***	.076	-.695***	-.552***	.673***	-.476***
V8: IMI control	-.314*	-.542***	-.399***	.017	.245	.302*	-.395***	.103

Note. n = 64 males, females, or couples. Correlations for males appear above the diagonal; correlations for females appear below the diagonal. Within-couple correlations appear on the diagonal and are underlined. PTSD couple status was coded such that 1 = PTSD present, 0 = PTSD absent. IMI affiliation and IMI control values indicate partners' ratings of actors' behavior.

* $p < .05$. ** $p < .01$. *** $p < .001$.

In preliminary analyses, independent samples t-tests were conducted to test for demographic differences between the PTSD and control groups. Although couples with PTSD were more likely to be married, $t(62) = 2.40$, $p = .02$, the groups did not differ in length of marriage, age, race, ethnicity, or household income. With respect to relationship quality, as reported in Caska et al. (2014), both service members with PTSD and their partners reported significantly higher MSI-R global distress subscale scores than control group members. Further, both service members with PTSD, χ^2 (1) = 15.15, $p < .001$, and their partners, χ^2 (1) = 14.72, $p < .001$, were more likely to score in the high distress range ($\geq$ 9 for men, and $\geq$ 11 for women) on the MSI-R global distress subscale (Snyder, 1997) compared to members of couples without PTSD (service members: 50% vs. 6.3%; partners: 43.8% vs. 3.1%).

Affiliation (*h1*)

The first hypothesis predicted that military couples with PTSD express more hostility than couples without PTSD. To test this hypothesis, two multilevel models were constructed using other-focused and self-focused AF scores as dependent variables. Each model contained one Level 2 predictor, PTSD couple status (1 = couples with PTSD, 0 = control group couples); one Level 1 predictor, role (1 = service members, -1 = partners); and one cross-level interaction (PTSD couple status × role). Accordingly, the models estimated the intercept, three fixed effects (the slopes for PTSD couple status, role, and their interaction), and two random effects (variance in the intercepts and error variance).

Results of multilevel models (see Table 3) revealed support for *H1*: couples with PTSD exhibited more interpersonal hostility, both other-focused, $\beta = -.72$, $t(62) = 3.54$, $p = .001$, and self-focused, $\beta = -.67$, $t(62) = 3.17$, $p = .002$. No significant effects emerged for role, or for the interaction of PTSD couple status and role.

Table 3. Multilevel Models Predicting Differences in Affiliation and Autonomy by PTSD Couple Status

	Focus on Other Behavior		**Focus on Self Behavior**	
	Affiliation	**Autonomy**	**Affiliation**	**Autonomy**
Fixed Effects				
Intercept	19.55 *** (1.15)	- 13.47*** (1.77)	16.77*** (1.25)	22.47*** (1.92)
PTSD couple status	-.72*** (.20)	-.63** (.19)	-.67** (.21)	-.13 (.22)
Role	.03 (.08)	.06 (.10)	-.04 (.08)	.13 (.08)
PTSD couple status*Role	.09 (.12)	-.04 (.14)	-.09 (.11)	-.01 (.12)
Random Parameters				
CS diagonal offset	.46*** (.08)	.63*** (.11)	.38*** (.07)	.45*** (.08)
CS covariance	.43*** (.12)	.29*(.12)	.52*** (.13)	.55*** (.15)

Note. *N* = 128 scores (2 individuals nested within 64 couples). Intercept values are based on unstandardized slopes. For fixed effects, cell entries are standardized slopes; values in parentheses are standard errors of the standardized slopes. For random parameters, cell entries are standardized covariance estimates; values in parentheses are standard errors of the standardized covariance estimates. Couple PTSD status coded such that 1 = couples with PTSD, 0 = couples without PTSD. Role was coded such that 1 = male service members, -1 = female partners.

* $p < .05$. ** $p < .01$. ***$p < .001$.

Autonomy (*h2)*

The second hypothesis predicted that military couples with PTSD exhibit more control than couples without PTSD. Following tests of *H1*, two multilevel models were constructed, this time employing other-focused and self-focused AU scores as dependent variables.

As predicted by *H2*, results of multilevel models (see Table 3) revealed that couples with PTSD exhibited more controlling behavior than those without PTSD, β = -.63, $t(62) = 3.26$, $p = .002$. No differences in submissive behavior between couples with and without PTSD were detected, β = -.13, $t(62) = 0.61$, $p = .544$. Finally, no significant effects emerged for role, or for the interaction of PTSD couple status and role, in either model.

Interpersonal differences by focus of behavior (*rq1, rq2*)

Given that *H1* and *H2* revealed differences between couples with and without PTSD along the dimensions of affiliation and autonomy, we conducted follow-up analyses investigating whether couples with and without PTSD differed in self-focused or other-focused behavior. We took two steps to reduce the risk of Type I error in these exploratory analyses. First, we capitalized on SASB's hierarchical construction, which nests its eight behavioral clusters per circumplex within the dimensions used to derive them (see Figure 1). Accordingly, we limited our follow-up analyses to the specific SASB clusters that, based on the results of our dimensional analyses in *H1* or *H2*, showed significant differences

between couple groups. Second, to maintain a familywise error rate of .05, we used the Bonferroni correction to reduce alpha to .00625 (.05/8) for tests of *RQ1* and *RQ2*. Uncorrected alphas are reported below, but we interpreted only effects that reached the corrected significance level.

Focus on other behaviors (*rq1*)

We began by investigating whether military couples with PTSD differ from those without in their behavior focused on the other (*RQ1*). These behaviors are operationalized by the eight clusters depicted in SASB's top circumplex (see Figure 1). Given that analyses for *H1* and *H2* revealed differences along both the affiliation and autonomy dimension on this circumplex, we constructed eight multilevel models, each employing one of the SASB behavioral clusters as the dependent variable. Predictors in the models were set identically to those in tests of *H1* and *H2*. Each model contained one Level 2 predictor, PTSD couple status (1 = couples with PTSD, 0 = control group couples); one Level 1 predictor, role (1 = service members, -1 = partners); and one cross-level interaction (PTSD couple status × role). The models estimated the intercept, three fixed effects (the slopes for PTSD couple status, role, and their interaction), and two random effects (variance in the intercepts and error variance).

Results of analyses for *RQ1* (see Table 4) showed that couples with and without PTSD differed in three of the eight behavioral categories comprising SASB's focus on other circumplex. Specifically, couples with PTSD exhibited more watching and controlling behavior, β = .58, $t(62) = 2.96$, $p = .004$, and more belittling and blaming behavior, β = .58, $t(62) = 2.93$, $p = .005$. They also enacted less affirming and understanding behavior, $\beta = -.63$, $t(62) = 3.08$, $p = .003$. Finally, the interaction between PTSD couple status and role reached significance for freeing and forgetting behavior, β = .52, $t(62) = 3.14$, $p = .003$. Analysis of simple main effects revealed that, compared to both their partners and control group service members, service members with PTSD were more likely to display freeing and forgetting behavior. However, neither the behavior of control group service members and their partners, nor the behavior of partners of service members with and without PTSD, differed.

Table 4. Multilevel Models Predicting Differences in Focus on Other Behaviors by PTSD Couple Status

	Freeing and Forgetting	**Affirming and Understanding**	**Loving and Approaching**	**Nurturing and Protecting**	**Watching and Controlling**	**Belittling and Blaming**	**Attacking and Rejecting**	**Ignoring and Neglecting**
Fixed Effects								
Intercept	.00** (.00)	.13*** (.01)	.01*** (.00)	.22*** (.01)	.08*** (.01)	.01 (.01)	.00 (.00)	.00 (.00)
PTSD couple status	.35 (.17)	-.63** (.20)	-.29 (.20)	-.24 (.20)	.58** (.20)	.58** (.20)	.31 (.17)	.31 (.18)
Role	-.22 (.12)	-.01 (.09)	.22* (.10)	-.02 (.11)	-.07 (.10)	-.07 (.10)	.00 (.13)	.08 (.12)
PTSD couple status*Role	.52** (.17)	.09 (.13)	.00 (.13)	.15 (.15)	.02 (.14)	.13 (.14)	.10 (.18)	.16 (.16)
Random Parameters								
CS diagonal offset	.90*** (.16)	.52*** (.09)	.58*** (.10)	.74*** (.13)	.65*** (.12)	.62*** (.11)	1.04*** (.19)	.86*** (.15)
CS covariance	.02 (.12)	.40** (.13)	.37** (.13)	.26 (.13)	.29 (.12)	.31 (.12)	-.04 (.13)	.11 (.00)

Note. *N* = 128 scores (2 individuals nested within 64 couples). Intercept values are based on unstandardized slopes. For fixed effects, cell entries are standardized slopes; values in parentheses are standard errors of the standardized slopes. For random parameters, cell entries are standardized covariance estimates; values in parentheses are standard errors of the standardized covariance estimates. Couple PTSD status coded such that 1 = couples with PTSD, 0 = couples without PTSD. Role was coded such that 1 = male service members, -1 = female partners.

** $p < .00625$. ***$p < .001$.

Focus on self behaviors (*rq2*)

Finally, we examined whether couples with and without PTSD can be distinguished by their behavior focused on the self (*RQ2*), which is operationalized by the eight clusters shown in SASB's bottom circumplex (see Figure 1). Given that analyses for *H1* and *H2* revealed behavioral differences along the affiliation dimension on this circumplex, we constructed eight multilevel models following the procedures described in *RQ1*, each employing one of the SASB behavioral clusters as the dependent variable.

Analyses for *RQ2* (see Table 5) showed that couples with and without PTSD differed in two of the eight behavioral categories comprising SASB's focus on self circumplex. Couples with PTSD displayed more sulking and scurrying behavior, β = .63, $t(62) = 3.08$, $p = .003$, and less joyfully connecting behavior, β = -.65, $t(62) = 3.10$, $p = .003$. No significant cross-level interactions were detected.

Table 5. Multilevel Models Predicting Differences in Focus on Self Behaviors by PTSD Couple Status

	Asserting and Separating	**Disclosing and Expressing**	**Joyfully Connecting**	**Trusting and Relying**	**Deferring and Submitting**	**Sulking and Scurrying**	**Protesting and Recoiling**	**Walling off and Distancing**
Fixed Effects								
Intercept	.26*** (.02)	.08*** (.01)	.08*** (.01)	.09*** (.01)	.02*** (.00)	.01 (.01)	.00 (.00)	.00 (.00)
PTSD couple status	-.10 (.22)	.08 (.23)	-.65** (.21)	-.23 (.20)	.15 (.20)	.63** (.21)	.18 (.18)	.38 (.19)
Role	.14 (.08)	.05 (.08)	-.16 (.08)	.07 (.11)	.02 (.11)	-.09 (.08)	.00 (.13)	.02 (.11)
PTSD couple status*Role	-.05 (.12)	-.18 (.11)	.12 (.11)	-.22 (.15)	-.08 (.16)	-.06 (.12)	.18 (.18)	.10 (.16)
Random Parameters								
CS diagonal offset	.46*** (.08)	.38*** (.07)	.38*** (.07)	.71*** (.13)	.79*** (.14)	.45*** (.08)	1.00*** (.18)	.84*** (.15)
CS covariance	.55*** (.15)	.63*** (.15)	.52*** (.13)	.29 (.13)	.23 (.13)	.45*** (.13)	.00 (.13)	.14 (.13)

Note. *N* = 128 scores (2 individuals nested within 64 couples). Intercept values are based on unstandardized slopes. For fixed effects, cell entries are standardized slopes; values in parentheses are standard errors of the standardized slopes. For random parameters, cell entries are standardized covariance estimates; values in parentheses are standard errors of the standardized covariance estimates. Couple PTSD status coded such that 1 = couples with PTSD, 0 = couples without PTSD. Role was coded such that 1 = male service members, -1 = female partners.

** $p < .00625$. ***$p < .001$.

Discussion

Given the strong links between PTSD and intimate relationship dysfunction (for review, see MacDermid Wadsworth, 2010, Taft et al., 2011), evaluating the extent to which military-related PTSD is associated with interpersonal behavior dysfunction among couples is an important next step. Responding to scholars' call for microanalytic, observational assessment of couples' behavior (Hanley et al., 2013), this study was designed to identify specific interactional processes that distinguish the presence of PTSD among military couples.

We found that individuals' behavior within couples was remarkably similar, such that couple members tended to mirror each other in reciprocal ways. This suggests that both service members and their partners contribute to the behavioral differences detected between couples with and without PTSD (Miller et al., 2013), and underscores the importance of dyad-level investigations into the interpersonal context of PTSD within couples.

Interpersonal correlates of PTSD in military couples

Healthy interpersonal behavior, or *secure attachment relating* (Benjamin, Rothweiler, & Critchfield, 2006), involves a baseline of friendly, affiliative behavior, and a balance between connection and autonomy. Departures from these relational patterns are associated with a wide range of individual and relational psychopathology (Benjamin, 1996, Benjamin, 2006) and, consistent with this evidence, we found that PTSD in couples is marked by behavioral dysfunction in these domains.

The overall pattern of results indicated that couples with PTSD exhibit increased hostility and control, with corresponding deficits in their ability to display affirmation and positive connection. In contrast, we found no evidence that couples with PTSD enact more hostile distancing behaviors (such as ignoring and walling off). Thus, it appears couples with PTSD are highly engaged in conflict, rather than withdrawn or disengaged (as might be implied by PTSD symptoms such as avoidance and emotional numbing; APA, 2013).

With respect to affiliation behavior, couples with PTSD displayed more interpersonal hostility focused on self and other. *Other-focused* hostility, directed at one's partner, includes "action-type" behavior such as belittling, rejecting, and neglecting. *Self-focused* hostility is exhibited in response to the partner, and includes "reaction-type" behavior like sulking, protesting, or distancing. Couples with PTSD showed more of both types of hostility, converging with a wealth of evidence suggesting links between psychopathology and hostile interaction (Rehman, Gollan, & Mortimer, 2008). We found that both members of the couple contribute to this hostile dynamic. Due to problems modulating anger or hyperarousal, individuals with PTSD may have difficulty connecting with their partner in positive ways (Hanley et al., 2013), and partners have been found to express even more hostility and distress-maintaining attributions in the context of PTSD than military service members do (Miller et al., 2013).

We also differentiated *autonomy* behaviors (allowing the partner to be separate, or taking one's own independence) from *enmeshment* (controlling or submitting behaviors), and found that couples with PTSD enacted more control. This adds PTSD to a growing body of research suggesting that couple dysfunction in the context of physical and mental health problems is marked by "power struggles" for control and autonomy (Knobloch-Fedders et al., 2013, Knobloch-Fedders et al., 2014, Smith et al., 2011).

Finally, we explored whether couples with and without PTSD exhibit interactional differences based on the focus of behavior (e.g., on self or other). PTSD was associated with discrepancy in both domains. With respect to behavior focused on the other, couples with PTSD showed more controlling behavior, more blaming behavior, and less affirming and understanding behavior. These results partially replicate those found by Hanley and colleagues (2013), who found that men with PTSD (but not women) express less understanding, validation, and caring during discussions of relationship problems.[4]

Compared to both their partners and service members without PTSD, service members with PTSD displayed more autonomy-granting (i.e., freeing and forgetting) behavior, which results in less connection between partners. Ample evidence indicates that emotional numbing symptoms account for much, if not all, of the significant associations between PTSD symptoms and relationship problems (Cook et al., 2004, Renshaw and Campbell, 2011, Riggs et al., 1998, Taft et al., 2008). Although the emotional numbing cluster of PTSD symptoms may be linked with loss of intimacy and withdrawal (Galovski & Lyons, 2004), it is also possible that the greater amounts of freeing and forgetting behavior we found among service members with PTSD reflects behavioral avoidance. However, further research is needed to determine whether this finding replicates in other samples.

With respect to behavior focused on the self in relation to the partner, couples with PTSD exhibited more sulking behavior, and less joyfully connecting behavior, cohering with other lines of research demonstrating that PTSD symptoms are associated with intimacy deficits and increased avoidance (Henry et al., 2011). These results suggest the expression of hostile submission (i.e., sulking behavior) and the absence of affiliative bonding (i.e., joyfully connecting behavior) as two possible behavioral mechanisms by which the link between PTSD and impaired intimacy may occur.

Clinical implications

Given that both service members with PTSD and their partners contributed to the interpersonal dysfunction we detected, our findings provide compelling evidence to support conjoint treatments for PTSD (e.g., Monson et al., 2012). Exclusively targeting the service member's PTSD symptoms within individual therapy may not be enough to alleviate couple distress, because this approach often fails to address the partner's contribution to the relationship dysfunction or their responses to PTSD symptomatology (Monson, Taft, & Fredman, 2009). Further, given evidence that the associations between PTSD symptoms and interaction behavior may be equivalent for veterans and their spouses (Miller et al., 2013), interventions should be designed to address psychopathology in both couple members.

Current evidence-based conjoint treatments for PTSD (e.g., Monson et al., 2012) emphasize decreasing couple-level avoidance of feared situations and emotions, restructuring cognitions that maintain PTSD and relationship problems, and teaching interpersonal, communication, and conflict resolution skills. Our findings underscore the need for future studies to examine whether the maladaptive interaction behaviors we found change in response to treatment. Specifically, our results suggest the importance of investigating the efficacy of couple interventions that emphasize (a) decreasing hostility; (b) decreasing control; (c) decreasing blaming and sulking behavior; (d) increasing couples' ability to express affirmation and understanding of each other's perspective; and (e) increasing positive connection and intimacy. Given that these behaviors also confer risk for many other forms of psychopathology and physical health problems (Rehman et al., 2008), efforts to improve these types of couple interactions may also result in positive health outcomes beyond PTSD.

Finally, this study highlights SASB's utility in measuring interpersonal behavior within research and clinical contexts. SASB was developed for clinicians to use at the *N* = 1 level (Benjamin, 1994b), and is particularly useful as a tool to guide clinical assessment, case formulation, and treatment planning (Benjamin, 1994a, Benjamin, 1996, Benjamin, 2006).

Limitations and directions for future research

One limitation of this study is that its cross-sectional design prevented us from testing causal hypotheses about the directions of effects. Although preliminary evidence suggests that PTSD influences couple dysfunction, rather than the opposite (Fredman et al., 2017), longitudinal investigations of the links between interpersonal behavior, relationship distress, and PTSD remain important. Because PTSD may generate, exacerbate, or itself be sustained by interpersonal processes, future work must be designed to tease apart causal and temporal effects.

A second limitation is that because the PTSD couple group suffered from higher levels of relationship distress than the control group, the associations between PTSD and interpersonal behavior cannot be completely disentangled from relationship distress. Studies comparing distressed couples with and without PTSD are needed to fully differentiate the links between PTSD, relationship distress, and interpersonal behavior in couples.

Finally, our sample of military couples was small, racial and ethnic minorities were underrepresented, and we focused solely on heterosexual, male service member/female partner couples. More work is required to better understand the associations between PTSD, relationship distress, and interpersonal behavior among diverse groups of couples.

Despite these limitations, our study highlights several important areas for future research. First, our results suggest it would be fruitful for scholars to employ circumplex assessment to evaluate how larger and more heterogeneous samples of military couples interact in the context of PTSD and relationship distress. Second, given the high degree of comorbidity between PTSD and other psychological disorders including depression, anxiety, and substance abuse (for review, see Nemeroff et al., 2006), we encourage future investigations designed to tease apart the differential associations between couples' interpersonal behavior, PTSD, and related forms of psychopathology. This is particularly relevant given evidence that PTSD and depression show differing patterns of behavior in couples (Miller et al., 2013). Finally, with respect to treatment, we suggest evaluating couples' conflict behavior pre- and posttherapy to investigate whether decreased hostility and control, increased expressions of support and understanding, and greater positive connection are associated with therapy process or outcome.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

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