

A DAILY DIARY STUDY OF PTSD AND INTERPERSONAL PROCESSES

by

Sarah Burns Campbell  
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Committee:

\_\_\_\_\_ Director  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ Department Chairperson  
\_\_\_\_\_ Program Director  
\_\_\_\_\_ Dean, College of Humanities and Social  
Sciences

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Fairfax, VA

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A Dissertation submitted in partial fulfillment of the requirements for the degree of  
Doctor of Philosophy at George Mason University

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Sarah Burns Campbell  
Master of Arts  
George Mason University, 2012

Director: Keith D. Renshaw, Professor  
Department of Psychology

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## TABLE OF CONTENTS

	Page
List of Tables .....	vi
List of Figures .....	vii
Abstract .....	viii
Introduction .....	1
Method .....	6
Participants .....	6
Procedure .....	6
Measures .....	10
Analytic Plan .....	12
Results .....	17
Cross-lagged autoregressive models .....	19
Discussion .....	23
Strengths and Limitations .....	26
Appendix .....	29
Mechanisms of the association of PTSD and romantic relationship functioning: A conceptual review .....	29
Abstract .....	29
Introduction .....	30
Method .....	32
A Deficit/Excess Model of PTSD-Related Relationship Functioning .....	33
Deficits .....	35
Excesses .....	41
Additional Studies .....	47
Other Mechanisms .....	50
Survivors' Cognitions .....	50
Partners' Cognitions and Behaviors .....	51

Communication about Traumatic Event .....	55
Summary .....	56
Conclusion .....	58
Recommendations for Future Research .....	60
Clinical Implications .....	63
Appendix References .....	66
Main References .....	82

## LIST OF TABLES

	Page
Table	
Table 1 .....	18
Table 2 .....	20

## LIST OF FIGURES

Figure	Page
Figure 1 .....	14
Figure 2 .....	15

## **ABSTRACT**

### **A DAILY DIARY STUDY OF PTSD AND INTERPERSONAL PROCESSES**

Sarah Burns Campbell, Ph.D.

George Mason University, 2015

Dissertation Director: Dr. Keith D. Renshaw

Posttraumatic stress disorder (PTSD) is associated with changes in relationship functioning, which are in turn hypothesized to influence the trajectory of PTSD symptoms. One focus of recent research is romantic partners' accommodation of trauma survivors' symptoms. In the context of PTSD, such accommodation may involve restricting noise to avoid provoking a startle response, limiting social engagements if survivors are nervous when in public, and/or limiting difficult discussions to avoid arguments or emotionally laden topics. Emerging research shows that partners' accommodation may interfere with survivors' response to treatment for PTSD, and it is associated with psychological and relationship distress in partners. To date, however, no studies have explored the transactional associations of PTSD symptoms and accommodation across multiple time points to determine the precise direction of effects. The current study used a daily diary format to explore daily associations of PTSD symptoms with partner symptom accommodation over a 2-week period. Daily diaries

involve repeated quantitative assessment of the same phenomena across a specified period of time. In addition to allowing for tests of directionality in associations, daily diary studies greatly reduce retrospective bias on self-report measures.

In the current study, participants were 64 male military service members who had deployed at least once since September 11, 2001, and their female civilian romantic partners. Service members had subclinical or clinical levels of PTSD, and all couples were cohabiting. Cross-lagged autoregressive path analyses assessed the stability of both service members' PTSD and partners' accommodation across the 14 days, as well as the prospective associations of earlier PTSD with later accommodation and of earlier accommodation with later PTSD (i.e., cross-lag paths). After exploring these associations using total PTSD symptom severity, I also conducted four additional models evaluating each PTSD symptom cluster (intrusion, situational avoidance, emotional numbing, and hyperarousal) independently, instead of total PTSD. I used Bayesian estimation to obtain point estimates as well as Bayesian Credible Intervals (CIs) for paths of interest. In all models, total PTSD and individual PTSD clusters were highly stable across time. Accommodation was also highly stable across time, albeit less so than PTSD. In all models, earlier total PTSD and PTSD clusters were significantly and positively associated with later accommodation. However, earlier accommodation was not significantly associated with later PTSD or clusters, with one exception. The model assessing associations of situational avoidance with accommodation suggested a bidirectional effect, with significant positive associations from earlier situational avoidance to later accommodation and vice versa. Collectively, the results suggest that

PTSD symptoms may lead to greater accommodating behaviors in romantic partners. However, partner accommodation seems to contribute only to greater future situational avoidance symptoms in trauma survivors. Broadly, the findings reinforce the notion that PTSD symptoms and relationship behaviors are associated over time, and that accommodation may act to sustain avoidant behaviors in particular over time. Clinicians should attend to romantic partners' accommodating behaviors in assessing the interpersonal environment and planning exposures for survivors.

## INTRODUCTION

Posttraumatic stress disorder (PTSD) is a psychological disorder that occurs in some individuals following traumatic events. The disorder is characterized by intrusive reminders of trauma (i.e., intrusion), avoidance of trauma-related thoughts and places (i.e., situational avoidance), constricted affect and diminished interest in activities (i.e., emotional numbing), and alterations in arousal and reactivity (i.e., hyperarousal).

Although several individual treatments for PTSD have been shown to be effective (review by Ponniah & Hollon, 2009), roughly 46% of patients are classified as treatment non-responders (Bradley, Greene, Russ, Dutra, & Westen, 2005; Schottenbauer, Glass, Arnkoff, Tendrick, & Gray, 2008). Thus, additional knowledge about the factors that influence the development and maintenance of PTSD is needed.

Though a significant amount of research exists on such factors at the intrapersonal level, comparatively less research has explored interpersonal factors. There are several reasons, however, to consider such factors in our understanding of PTSD. For instance, about 20-25% of veterans entering PTSD treatment list relationship concerns as a primary treatment goal (Rosen, Adler, & Tiet, 2013). Moreover, positive relationships are associated with reduced symptoms in survivors (Cigrang et al., 2014; Kaniasty & Norris, 2008), and negative relationships can exacerbate or maintain symptoms (Evans, Cowlshaw, Forbes, Parslow, & Lewis, 2010; Evans, Cowlshaw, & Hopwood, 2009).

The longitudinal associations of PTSD with poor romantic relationship quality and vice versa (e.g., Evans et al., 2009, 2010) have led some researchers to hypothesize a cycle of distress in relationships in which one member has PTSD (Campbell & Renshaw, in press; Monson, Taft, & Fredman, 2009). Thus, attention to interpersonal factors appears warranted.

Studies exploring behaviors of romantic partners of survivors with PTSD symptoms have focused mostly on explicitly negative partner behaviors, such as hostility (e.g., Glenn, et al., 2002). Some of partners' more seemingly benign or positive behaviors, however, may also be associated with survivors' symptoms. One such behavior that has been increasingly discussed in the context of PTSD is *accommodation*, or partners' behavioral adjustments in response to symptoms that attempt to minimize relationship conflict and patient distress.

Romantic partner accommodation has been studied in a variety of psychiatric disorders. In depression, partner accommodation may include joining with or permitting the depressed individual to avoid social gatherings or other previously enjoyed activities (e.g., Cohen, O'Leary, & Foran, 2010; Baucom, Sher, Boeding, & Paprocki, in press; Vaugn & Leff, 1976). Partner accommodation in agoraphobia (Craske, Burton, & Barlow, 1989) and social anxiety (Rapee, Peters, Carpenter, & Gaston, 2015) involves encouraging avoidance of people or places that cause anxiety in the patient, while partner accommodation in obsessive compulsive disorder (OCD) occurs when partners participate in patients' rituals, provide excessive reassurance regarding obsessions, and facilitate avoidance of anxiety-provoking stimuli (Abramowitz et al., 2013; Boeding et

al., 2013). In treatment studies, pre-treatment levels of social anxiety were associated with both concurrent and post-treatment levels of partner accommodation (Rapee et al., 2015), and post-treatment levels of partner accommodation were associated with fewer treatment gains in patients with OCD and agoraphobia (Abramowitz et al., 2013; Boeding et al., 2013; Craske et al., 1989).

In the context of PTSD, accommodation may include accommodating intrusion (e.g., sleeping in separate beds in case of trauma-related nightmares), situational avoidance (e.g., avoiding going places or doing things with the survivor that make him/her uncomfortable), emotional numbing (e.g., avoiding physical contact with the survivor because he/she finds it uncomfortable), and arousal symptoms (e.g., “tiptoeing” around the survivor so as not to anger him/her). Anecdotal reports of partner accommodation in PTSD have been made in the literature for the last few decades (e.g., Figley, 1989; Maloney, 1988, Verbosky & Ryan, 1988), but only one recent empirical study explored the association of partner accommodation with trauma survivors’ PTSD symptom severity. Fredman, Vorstenbosch, Wagner, Macdonald, and Monson (2014) created a measure of partner accommodation of PTSD and found that scores on this measure were strongly associated with partners’ perceptions of patients’ PTSD symptom severity and marginally significantly associated with both patient and clinician ratings of patients’ symptoms.

It is possible that partners’ accommodation plays a role in the reciprocal association of survivors’ PTSD symptoms and relationship processes. For instance, survivors who are extremely anxious when out in public or hostile when discussing

trauma may prompt accommodating behaviors in partners. On the other hand, if partners avoid certain topics of discussion in order to not upset survivors, survivors are denied opportunities to practice distress tolerance and work on managing their arousal. Moreover, if partners take on additional household tasks that may be anxiety provoking for survivors (e.g., grocery shopping if stores are likely to provoke flashbacks), then survivor are denied opportunities for exposure and fail to learn over time that stores are largely safe and need not be avoided. In sum, partners may be more likely to accommodate PTSD symptoms when they are more severe and pronounced, and symptoms may be more likely to remain severe and pronounced without opportunities to diminish through exposure. Preliminary support for this notion comes from one recent study (Fredman et al., under review) showing that the effectiveness of cognitive-behavioral conjoint therapy (CBCT) for PTSD relative to a wait-list control condition was most pronounced when partners had high levels of accommodation.

The present study explicitly tests the directionality of associations between romantic partners' behavioral accommodation and survivors' PTSD symptoms. Because partner accommodation has been shown to be associated with additional distress in romantic partners (Fredman et al., 2014) and interfere with natural symptom remission (Fredman et al., under review), such information could influence treatment recommendations and guide clinical practice. To expand on the emerging research in this area (Fredman et al., 2014, 2015), we used a 2-week, daily diary design to better understand the directional associations of daily levels of accommodation and PTSD symptom severity. Daily diary studies allow evaluation of directionality of effects among

variables and enable more sophisticated analyses of constructs that are expected to be dynamic, such as moods and symptoms, over several time points (Laurenceau & Bolger, 2005). Although a small number of studies have examined PTSD through diary studies (e.g., Kashdan, Breen, & Julian, 2010; Kaysen et al., 2014; Tarrier, Sommerfield, Reynolds, & Pilgrim, 1999), this study is the first such study of trauma survivors and their partners. Based on prior research linking partner accommodation with psychiatric symptoms, we expect earlier overall PTSD to be positively associated with later partner accommodation, and earlier accommodation to be positively associated with later PTSD.

In addition, to understand which PTSD symptoms are *most* likely to be associated with partner accommodation, we evaluated associations of accommodation with each specific PTSD cluster. In line with prior research of accommodation of PTSD symptoms (Fredman et al., 2014), we hypothesized that all symptom clusters (particularly situational avoidance, given the link between accommodation and reduced opportunities for exposure) would be positively associated with subsequent partner accommodation, and vice versa.

## **METHOD**

### **Participants**

The sample included 64 couples composed of male service members/veterans (SMs) and female spouses/partners (partners). SMs had a mean age of 34.94 years ( $SD = 7.53$ ), and most were white (84.4%), with approximately 58% of the sample having completed at least some college. SMs had an average of 2.3 OIF/OEF deployments ( $SD = 1.18$ ) and were mostly members of the Army (81.3%). Active duty SMs comprised 35.9% of the sample, with 17.2% of the sample reporting National Guard/Reserves (NG/R) status, and 46.9% reporting veteran status. Partners had a mean age of 34.14 years ( $SD = 7.48$ ) and most were white (84.4%), with 42% having completed at least some college. Approximately 94% of couples reported that they were married, with a mean relationship length of 9.45 years ( $SD = 5.86$ ). Nearly half (48.4%) of the sample had an annual household income of less than \$50,000.

### **Procedure**

All procedures were approved by the George Mason University IRB, as well as the NIH Office of Human Subjects Research Protections. Recruitment occurred primarily via notices in online military community and social media sites, Family Readiness Groups, military psychology listservs, and blog and social media posts by military/veteran research organizations. Recruitment materials directed potential

participants to the study website, which described the purpose of the study and provided an overview of the procedures. This basic information was followed by a link to a list of resources and referrals for those needing support for relationship, family, or individual mental health issues (both military and civilian resources), and study staff contact information. All individuals who visited the site received this information, regardless of whether they chose to participate or were eligible.

After participants received the list of resources, they were presented with a series of screening and eligibility questions. To be included in the study, both members of the couple needed to be in a committed romantic relationship for a minimum of 6 months, currently cohabitating, minimum age of 18 years, fluent in English, and able to access the Internet daily. Additional inclusion criteria for SMs were male sex, current or former military status, at least one deployment since 9/11/2001, and score on the PTSD Checklist (see below) of at least 35, which is above the cut-off scores used to identify SMs with a clinical diagnosis of PTSD in primary care settings (Bliese et al., 2008). Partners were required to be female and to have no current or prior military service. Participants who failed either of two English grammar comprehension questions, or reported other characteristics that did not meet eligibility criteria (e.g., no partner who would be interested in participating) received “not eligible” messages after the screening questions and were prevented from providing consent.

Individuals whose responses to the screening questions indicated that they were potentially eligible were directed to a page with the consent form, which was followed by a series of consent comprehension questions. Any person who indicated that they did not

agree to the conditions stipulated in the consent or who failed the consent form comprehension questions was directed to a page that provided them with contact information for the research team for any questions. No identifying information beyond IP addresses was collected to this point, thus preserving anonymity. Respondents who provided consent but had IP addresses from unanticipated locations (e.g., Argentina) received additional email contact from study staff to confirm their permanent location and reason for unanticipated location (N = 6). Additionally, study staff reviewed IP addresses in order to identify any participants who received a message indicating ineligibility but then passed the screen again with altered responses (N = 9).

Upon consenting, SM participants were required to respond to a series of questions about their military service (e.g., permanent duty station, UIC code, military occupation specialty) to later verify military status. The information was reviewed by study staff (including two active-duty SMs) to ensure that participants' responses were consistent and logical. After SMs recorded their military information, they completed the PTSD Checklist – Military version (PCL-M).

Each member of eligible couples received an email with a unique link to their own baseline questionnaire. Couples were compensated \$25 for completing baseline questionnaires. After both members of the couple completed baseline questionnaires, each partner then received an email with instructions for beginning the daily diary portion of the study. Participants completed the daily diary measures each evening for 14 consecutive nights, with instructions to complete the survey within the hour before going to bed, to capture as much of the day as possible. Study staff analyzed time stamps each

day and communicated with participants following missing days of diary data or inappropriately time-stamped entries, in order to encourage better compliance and answer procedural questions. Couples were paid \$70 for completing the diary, and were rewarded with financial bonuses of \$15 per participant for completing at least 5 diary days for each week of the diary.

**Attrition and Compliance.** In total, 670 individuals clicked on the study link. Of those individuals, 226 partners and 156 SMs completed the eligibility and consent screen without being ruled out based on screening eligibility criteria. Twenty-three SMs had appropriate military information but reported PCL-M scores below 35. From the remaining individuals, we matched and identified 96 eligible couples who were invited to participate. Of these matched couples, 78 partners and 72 SMs completed baseline questionnaires, with 70 couples who had baseline questionnaire data from both partners. These 70 couples were subsequently invited into the daily diary portion of the study. Six couples opted to withdraw from the study after failing to complete a sufficient number of entries, leaving a final sample of 64 couples. Participants who completed only baseline questionnaires and those who completed baseline questionnaires and the daily diary did not differ on any demographic variable or variable of interest tested, including age, race, number of deployments, SM PTSD, or partner accommodation (all  $ps > .10$ ).

Of these 64 couples, 88% of SMs and 89% of partners completed at least 10 of 14 entries, with 34% of SMs and 30% of partners completing all 14 diary entries. Based on correspondence with numerous SMs who indicated that their insomnia led them to “go to bed” in the late morning, we classified any diaries completed after noon as the same

“psychological day” and any entries completed prior to noon as the previous “psychological day” (Nezlek, 2012). If participants completed multiple entries on the same day, we retained the first entry if all entries were complete; otherwise we retained the most complete entry. In total, SMs provided 785 days of diary data, while partners provided 792 days of diary data, for a total of 1,577 days of data.

## **Measures**

**PTSD Checklist – Military Version (PCL-M; Weathers, Litz, Herman, Huska, & Keane, 1993).** The PCL-M is a 17-item, self-report, Likert-type scale that measures the degree to which participants have been bothered by military-related PTSD symptoms in the past month from 1 (*not at all*) to 5 (*extremely*). Each scale item is derived from a criterion symptom of PTSD as defined by the DSM-IV (American Psychiatric Association, 1994). Respondents receive an overall PTSD severity score, which is the sum total of all item responses. In addition, respondents can receive individual symptom cluster scores, which are calculated by summing the item responses for each cluster. Based on a 4-cluster emotional numbing model, the intrusion, emotional numbing, and hyperarousal subscales are all 5 items, with total subscale scores ranging from 5 to 25. The situational avoidance subscale is two items, with the subscale score ranging from 2 to 10. Suggested cut-off scores for estimating a clinical diagnosis of PTSD range from 30-34 for SMs seen in primary care settings (Bliese et al., 2008) to 50 for large-scale military prevalence studies (Weathers et al., 1993). Consistent with our inclusion criteria ( $\geq 35$ ), our sample’s mean PCL-M total score suggested a highly

symptomatic sample (see Table 1 for details). Internal consistency in the present sample was high for the total scale ( $\alpha = .93$ ), as well as for the individual cluster scales of intrusion ( $\alpha = .88$ ), situational avoidance ( $\alpha = .79$ ), emotional numbing ( $\alpha = .87$ ), and hyperarousal ( $\alpha = .84$ ).

We assessed daily PTSD symptoms over the previous 24 hours using a version of the PCL-M modified for daily use, in line with Naragon-Gainey et al.'s (2012) use of a daily version of the PCL-C. The measure retains the items and response scale used in the monthly retrospective PCL, with instructions amended to refer to the current day. Various authors (e.g., Bolger & Laurenceau, 2013; Shrout & Lane, 2012) have recommended reporting both within-person ( $R_C$ ) and between-person ( $R_{IF}$ ) reliability for intensive longitudinal measures. Consistent with the reliability of the PCL-C in Naragon-Gainey et al.'s (2012) sample, the daily version of the PCL-M in our sample demonstrated acceptable to good  $R_C$  and good to excellent  $R_{IF}$  for the total scale (.88, .98), as well as for the cluster subscales of intrusion (.79, .95), situational avoidance (.61, .91), emotional numbing (.72, .95), and hyperarousal (.74, .94).

**Significant Others' Responses to Trauma Scale (SORTS; Fredman, et al., 2014).** The SORTS is a 14-item measure of partners' accommodation of survivors' PTSD symptoms. Each item consists of two questions. First, respondents indicate how often they have performed a particular behavior over the past month from 0 (*Not at all*) to 4 (*Daily*). Second, they indicate how distressed they are by engaging in the behavior from 0 (*Not at all*) to 4 (*Extremely*), or how much effort they exerted on the behavior from 0 (*None*) to 4 (*An extreme amount*). Items are summed to provide a total score, a frequency

score, and an intensity score. Our sample demonstrated levels of accommodation comparable to or higher than those of Fredman et al.'s (2014) normative sample (see Table 1). Internal consistency in the present study was high ( $\alpha = .95$  for total score, .92 for frequency, .90 for intensity).

We selected 8 items from the SORTS to assess frequency of daily accommodation behaviors in partners, to reduce overall participation burden for partners. The 8 items selected were those with the highest item-total correlations with the full measure in the development study (personal communication, S. Fredman, February 27, 2014). Reliabilities for this adapted measure were excellent ( $R_C = .90$ ;  $R_{IF} = .88$ ). We also tested the convergent validity of the amended daily SORTS measure with the full baseline SORTS by conducting a two-level multilevel model, in which partners' trait-level accommodation was a Level-2 predictor of their daily accommodation. Results indicated that the daily version of the SORTS was strongly associated with the full version (converted  $r = .57$ ). Of note, the baseline SORTS frequency score is based on 14 items, while the daily SORTS frequency score is based on 8 items. Thus, the maximum possible *baseline* SORTS frequency is 56, while the maximum possible *daily* SORTS frequency is 32.

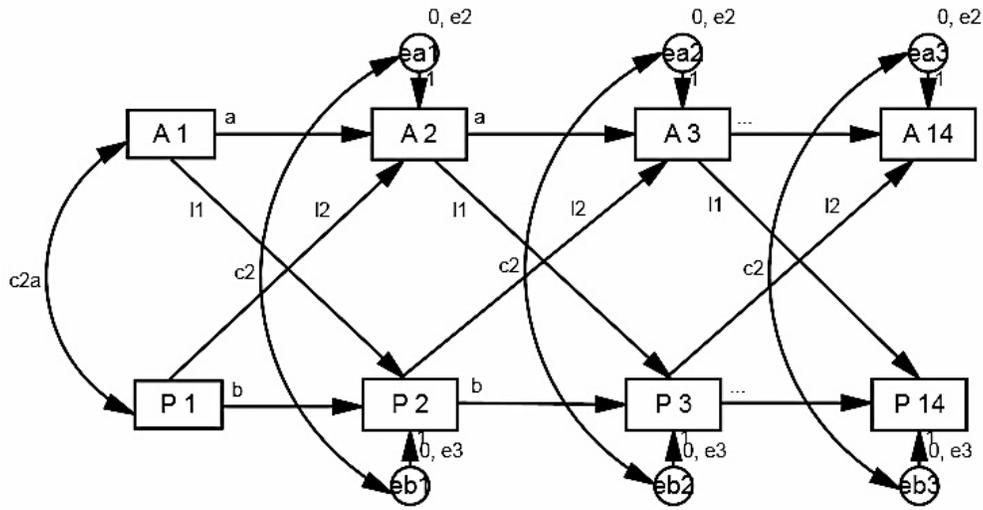
### **Analytic Plan**

We first calculated descriptive statistics to characterize our sample. Subsequently, we explored the associations of SM PTSD symptoms with partner accommodating behaviors using path analysis in Amos 19.0 (Arbuckle, 2010). To explore the temporal

precedence of SM PTSD symptoms and partner accommodation, we used a cross-lagged autoregressive model. Cross-lagged autoregressive models include three major components: stability paths, covariances, and cross-lagged paths. Stability paths allow each variable to be predicted by the same variable at the prior time point (e.g., SMs' PTSD symptoms on Day 2 predicted by SMs' PTSD on the Day 1, etc.). Stability paths for PTSD were constrained to be equal across all time intervals. Stability paths also were drawn for partners' accommodation and constrained to be equal across intervals. Covariances were modeled between PTSD symptoms and accommodation at each time point to account for same-day associations between those variables. As Day 1 variables are exogenous, the covariance between Day 1 PTSD and Day 1 accommodation was not constrained to be equal to subsequent covariances, but all subsequent covariances between the error terms of PTSD and accommodation were constrained to be equal across time points.

Finally, our primary hypotheses were addressed by evaluating models with cross-lagged paths between PTSD and accommodation. For a given day, PTSD was predicted by accommodation on the previous day, and accommodation was predicted by previous day PTSD (see Figure 1). All cross-lagged paths from PTSD to accommodation were constrained to be equal to one another, and all cross-lagged paths from accommodation to PTSD were also constrained to be equal to one another. We first conducted a model with total PTSD symptoms leading to later accommodation and vice versa. We then conducted a series of four additional models, which substituted each individual PTSD cluster

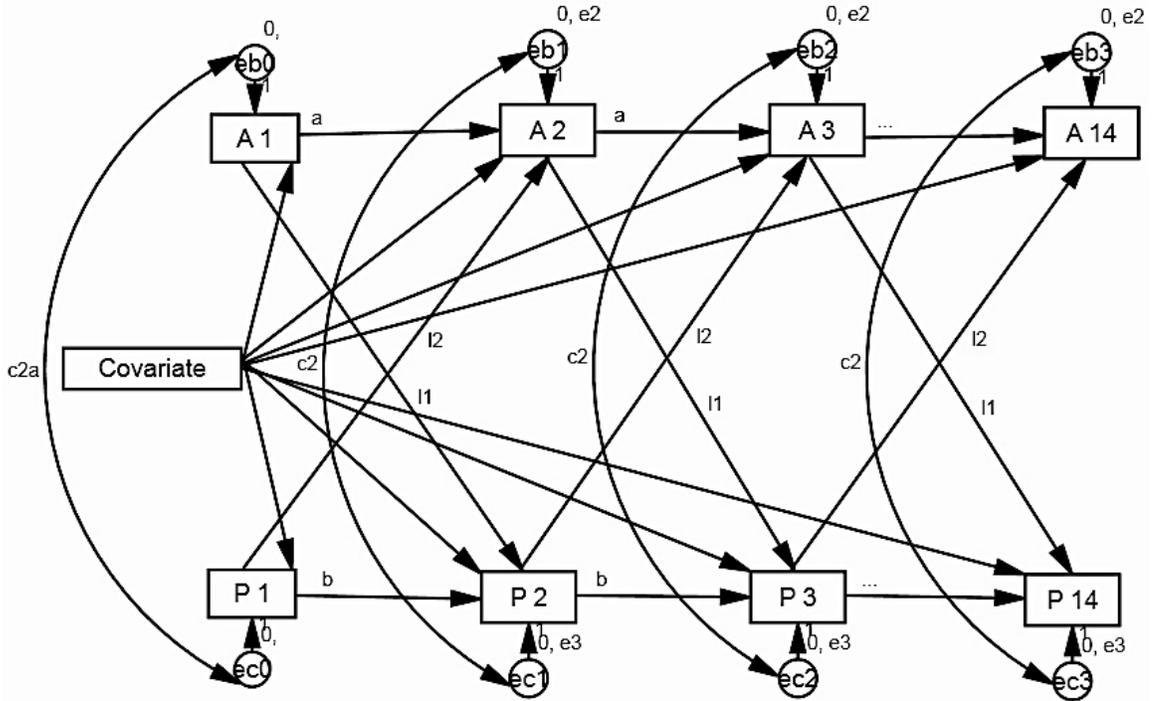
(intrusion, situational avoidance, emotional numbing, hyperarousal) for the total PTSD score in our baseline model.



**Figure 1**  
*Cross-lagged Autoregressive Model*

To conservatively test our results, we re-analyzed each model while controlling for duty status (with separate models for active duty, veteran, or NG/R status), military branch, number of deployments, SM race, partner race, relationship length, and income (each variable was controlled in a different model, to allow for model convergence). See Figure 2 for a representation of this model. In most cases, controlling for a demographic covariate did not change the patterns of significance for the cross-lag paths. Any such differences are noted in the Results.<sup>1</sup>

<sup>1</sup> Results of these additional models controlling for covariates are available from the first author upon request.



**Figure 2**  
*Cross-lagged Autoregressive Model with Covariate Control*

We used Bayesian estimation to obtain point estimates and credible intervals (CIs) for our parameter estimates. Of note, a 95% CI in Bayesian estimation connotes a 95% probability that the population value falls within the limits of the interval selected. We treated paths in which the 95% CI did not contain 0 as significant. Bayesian estimation is advantageous for non-normal data and small sample sizes (Ozechowski, 2014; van de Schoot, et al., 2015), and it emphasizes “predictive accuracy, rather than ‘up or down’ significance testing” (van de Schoot et al., 2014, p. 856). We used uninformed priors with flat distributions. Finally, we used the posterior predictive  $p$  as an indicator of

model fit, with values close to .50 representing good-fitting models (van de Schoot et al., 2014).

## RESULTS

Table 1 provides means and standard deviations of all baseline and daily measures. Notably, baseline levels of SMs' PTSD symptoms and partners' accommodation were somewhat higher than their respective daily levels (even after accounting for differences in the number of items on baseline and daily SORTS). This pattern that is consistent with prior studies assessing daily PTSD (e.g., Naragon-Gainey et al., 2012). Also, accommodation frequency may be higher in retrospective than daily reports due to the nature of reporting on specific behaviors, which are more accurately captured on a daily level (cf. Gilmore, Leigh, Hoppe, & Morrison, 2010; Margraf, Taylor, Ehlers, Roth, & Agras, 1987; McAuliffe, DiFranceisco, & Reed, 2007). Of note, SMs' PTSD and partners' accommodation were correlated on both the baseline ( $r = .60, p < .00$ ) and daily (e.g.,  $r = .39, p < .01$  for first day) measures.

**Table 1***Means and Standard Deviations of Baseline and Daily PTSD and SORTS measures*

	Baseline	Daily
Scale	<i>M (SD)</i>	<i>M (SD)</i>
PCL-M (Baseline)		
Total	63.55 (13.07)	52.29 (17.36)
Intrusion	17.95 (4.33)	13.28 (6.01)
Situational Avoidance	7.68 (1.88)	6.23 (2.81)
Emotional Numbing	17.41 (5.31)	14.88 (6.05)
Hyperarousal	20.51 (4.01)	17.84 (5.25)
SORTS		
Total	43.20 (22.43)	N/A
Frequency	21.77 (12.18)	7.16 (6.54)
Intensity	20.98 (11.43)	N/A

*Note:* PCLM = PTSD Checklist – Military Version; SORTS = Significant Others’ Responses to Trauma Scale. The baseline version of the SORTS frequency scale uses 14 items, while the daily version of the SORTS frequency scale uses 8 items.

### **Cross-lagged autoregressive models**

The overarching model is shown in Figure 1. Posterior predictive  $p$  was .50 for all models reported below, indicating excellent fit. Table 2 contains all point estimates, standard deviations, and 95% CIs for all base models.

**Table 2**  
*Point Estimates and CIs for Autoregressive Cross-lagged Models*

Parameters	Model 1: Total PTSD		Model 2: Intrusion		Model 3: Situational Avoidance		Model 4: Emotional Numbing		Model 5: Hyperarousal	
	Estimate (SD)	95% CI	Estimate (SD)	95% CI	Estimate (SD)	95% CI	Estimate (SD)	95% CI	Estimate (SD)	95% CI
Accommodation Stability	0.48 (0.03)	0.40 - 0.54	0.48 (0.04)	0.41 - 0.54	0.49 (0.03)	0.42 - 0.55	0.48 (0.03)	0.42 - 0.54	0.47 (0.03)	0.41 - 0.53
PTSD stability	0.91 (0.02)	0.88 - 0.95	0.91 (0.02)	0.88 - 0.94	0.85 (0.02)	0.81 - 0.88	0.91 (0.02)	0.88 - 0.94	0.84 (0.02)	0.80 - 0.88
Accom→PTSD	-0.02 (0.05)	-0.11 - 0.07	-0.02 (0.05)	-0.11 - 0.06	0.02 (0.01)	0.00 - 0.04	0.00 (0.02)	-0.03 - 0.03	-0.01 (0.02)	-0.04 - 0.03
PTSD→Accom	0.04 (0.01)	0.02 - 0.07	0.04 (0.01)	0.02 - 0.06	0.24 (0.08)	0.09 - 0.38	0.11 (0.03)	0.05-0.17	0.12 (0.04)	0.05 - 0.19

*Note:* CIs = Bayesian credible intervals; PTSD = Posttraumatic stress disorder; Accom = partner accommodation.

**Total PTSD.** Both accommodation and PTSD were highly stable across time. The cross-lagged path from earlier total PTSD to later accommodation was positive and significant, while the cross-lagged path from earlier accommodation to later total PTSD was non-significant.

**Intrusion.** Both accommodation and intrusion were highly stable across time. As with total PTSD, the cross-lagged path from earlier intrusion to later accommodation was positive and significant, while the cross-lagged path from earlier accommodation to later intrusion was non-significant. Of note, the path from earlier intrusion to later accommodation became nonsignificant in models controlling for veteran status ( $b = 0.07$  [ $SD = 0.04$ ]; 95%CI = -0.00 to 0.15), active duty status ( $b = 0.07$  [ $SD = 0.04$ ]; 95%CI = -0.00 to 0.14), and partner race ( $b = 0.07$  [ $SD = 0.04$ ]; 95%CI = -0.00 to 0.14). The wider range of CIs in the models controlling for these covariates suggests that the increased complexity of the model added greater instability to our confidence in the estimate.

**Situational Avoidance.** The cross-lagged model linking earlier situational avoidance to later accommodation and vice versa demonstrated a different pattern of results from previous models. Similar to earlier models, accommodation and situational avoidance were highly stable across time, and the cross-lagged path from earlier situational avoidance to later accommodation was positive and significant. Of note, the coefficient for this path was much stronger. Moreover, the path from earlier accommodation to later situational avoidance was *also* positive and significant. This pattern was maintained in models controlling for number of deployments and relationship length. However, the path from earlier accommodation to later situational avoidance

became nonsignificant in models controlling for veteran status ( $b = 0.02$  [ $SD = 0.01$ ]; 95%CI = -0.00 to 0.03), active duty status ( $b = 0.01$  [ $SD = 0.01$ ]; 95%CI = -0.00 to 0.03), NG/R status ( $b = 0.01$  [ $SD = 0.01$ ]; 95%CI = -0.00 to 0.03), income ( $b = 0.02$  [ $SD = 0.01$ ]; 95%CI = -0.00 to 0.03), branch ( $b = 0.02$  [ $SD = 0.01$ ]; 95%CI = -0.00 to 0.03), SM race ( $b = 0.02$  [ $SD = 0.01$ ]; 95%CI = -0.00 to 0.03) and partner race ( $b = 0.02$  [ $SD = 0.01$ ]; 95%CI = -0.00 to 0.04). Given the general lack of change in the size of the coefficient estimate, the slightly wider range of CIs in the models controlling for these covariates again suggests that the increased complexity of the model added greater instability to our confidence in the estimate.

**Emotional Numbing.** In the model isolating emotional numbing, both accommodation and emotional numbing were highly stable across time. The cross-lagged path from earlier numbing to later accommodation was positive and significant, while the cross-lagged path from earlier accommodation to later numbing was non-significant. No changes to this pattern emerged in models controlling for covariates.

**Hyperarousal.** Finally, in the model isolating hyperarousal symptoms, both accommodation and hyperarousal were highly stable across time. As with intrusion, the cross-lagged path from earlier hyperarousal to later accommodation was positive and significant, while the cross-lagged path from earlier accommodation to later hyperarousal was non-significant. Again, models controlling for covariates did not deviate from this pattern.

## DISCUSSION

The current study is the first to assess the associations of PTSD symptoms and partner behaviors on a daily level in a sample of military couples. Specifically, we analyzed associations of SMs' daily PTSD symptoms and partners' daily levels of accommodation across a 14-day period. For total PTSD symptoms and three of four specific symptom clusters (intrusion, emotional numbing, hyperarousal), SMs' symptoms predicted subsequent (next-day) levels of accommodation in partners, but partners' accommodation did not predict future (next-day) levels of PTSD in SMs. In contrast, for situational avoidance, not only did SMs' symptoms predict subsequent levels of accommodation in partners, but partners' accommodation was also associated with modest increases in SMs' subsequent avoidance.

When interpreting these results, one must consider that PTSD symptoms (total and individual symptom clusters) were highly stable across time, which may have resulted in limited variance to be explained by daily accommodation. However, the overall pattern of results suggests that PTSD symptoms are likely to prompt accommodating behaviors in partners, as hypothesized by Fredman and colleagues (2014). Given that partner accommodation is linked with greater distress in both patients and partners (e.g., Fredman et al., 2014; Fredman et al., under review), which in turn predicts worse outcome for those with PTSD (e.g., Evans et al., 2009), understanding

what motivates partners to accommodate and then addressing those concerns in treatment is important. For instance, partners may believe that “protecting” survivors from intrusion triggers is critical to mental health. These beliefs about accommodation would likely provoke a strongly negative response to trauma-focused treatments, which are among the most empirically supported treatments for PTSD. Other partners may feel that doing distressing tasks for survivors demonstrates caring or is “the least they could do.” These partners may be hesitant to give up such behaviors without knowing how else they may be able to support survivors, particularly when survivors may encourage and express appreciation for accommodation, if they believe it is helpful to them in the short term. In these cases, conjoint treatments that clearly lay out a treatment rationale for both couple members and provide partners with alternative ways of supporting survivors would be most useful. Even in the case of individual treatments for PTSD, providing partners with psychoeducation about PTSD symptoms, the rationale behind the particular individual treatment being implemented, and potential support strategies the partner can use all seem indicated to curtail accommodating behaviors.

It is also quite possible that some partners may accommodate symptoms out of a desire to minimize or avoid conflict. In such cases, conjoint treatments that incorporate traditional conflict-management strategies (e.g. communication training, active listening, relaxation strategies) may be helpful. Additionally, other partners may accommodate symptoms out of feelings of helplessness or a lack of understanding of the symptoms. When this occurs, conjoint treatments that provide psychoeducation for the partner and alternative support strategies (as above) would likely be important.

In spite of the stability of PTSD, we did find that earlier accommodation was also associated with modest increases in later situational avoidance. These findings, though preliminary, suggest that accommodating behaviors may be implicated in the perpetuation of avoidance in particular. This possibility is consistent with prior research on accommodation in a number of anxiety disorders that are characterized in large part by direct avoidance of feared stimuli (e.g., Boeding et al., 2013; Craske et al., 1989; Rapee et al., 2015). The foundation of many empirically supported treatments for anxiety disorders is exposure to feared stimuli (e.g., Deacon & Abramowitz, 2004), and most of the primary empirically supported treatments for PTSD incorporate significant elements of exposure, as well (e.g., Foa, Hembree, & Rothbaum, 2007; Resick & Schnicke, 1993). By allowing or even encouraging SMs to avoid situations that are anticipated to cause distress, romantic partners may inadvertently interfere with the natural learning that occurs when feared stimuli are confronted, thus perpetuating avoidance.

Awareness of these associations is important for clinicians conducting both individual and couple therapy for PTSD. Indeed, assessment of romantic partners' responses to PTSD symptoms may be a revealing component of treatment planning that could aid in facilitating in vivo exposures. For instance, if partners express doubt in the effectiveness or safety of exposure therapies, or even encourage survivors to avoid upcoming exposure assignments, survivors are less likely to engage in treatment. Moreover, even if survivors do engage in exposure-based treatment for PTSD, partners who are not aware of the negative effects of accommodation may be likely to continue to accommodate avoidance to simplify their daily lives, potentially interfering with the full

effects of treatment. In recent years, conjoint therapies for PTSD have emerged, such as cognitive behavioral conjoint therapy for PTSD (Monson & Fredman, 2012) and structured approach therapy (Sautter, Glynn, Arseneau, Cretu, & Yufik, 2014). These therapies do much to intervene in this process by incorporating partners directly into treatment. Partners who are trained to serve as “coaches” in exposures may be more likely to aid survivors in completing exposure assignments and treatment in general. Thus, an understanding the reciprocal associations of situational avoidance and partner accommodation is useful in explaining the treatment rationale to partners and enhancing the effectiveness of empirically-supported treatments for PTSD.

In contrast to situational avoidance, our findings suggest that intrusion, numbing, and hyperarousal symptoms are largely maintained by intrapersonal processes and less affected by partner accommodation. Some of the mechanisms posited to maintain these specific symptoms include survivors’ dysfunctional interpretations of intrusions or numbing, thought suppression, and deliberate activation of contrasting emotions such as anger or arousal (Steil & Ehlers, 2000). Though reduction of these symptoms is possible in conjoint interventions (cf Blount, Fredman, Pukay-Martin, Macdonald, & Monson, 2014; Pukay-Martin et al., 2015; Monson & Fredman, 2012), their presence and maintenance may not be as related to partner accommodation as the presence of situational avoidance. However, this speculation has yet to be explored empirically.

### **Strengths and Limitations**

This study has important limitations to consider. First, though all SMs had a score of at least 35 on the PCL-M, we did not use a gold-standard assessment (e.g., Clinician

Administered PTSD scale) to establish diagnosis. Though prior research has demonstrated moderate concordance between clinician-rated diagnoses and the PCL-M (e.g., Macdonald, Greene, Torres, Frueh, & Morland, 2013; Macdonald, Monson, Doron-Lamarca, Resick, & Palfai, 2011), clinician-rated PTSD diagnoses would provide enhanced confidence in symptom levels. Second, the sample was largely White and consisted solely of heterosexual, male SM/female partner couples. It is critical to extend this type of research to other racial/ethnic groups, female survivor/male partner couples, and same-sex couples, in order to determine whether or not these findings can be replicated in such couples. Finally, although we obtained a large number of overall data points, the sample size was relatively small. The use of Bayesian estimation helps address some of the problems with a small sample size, but a larger sample of couples would be preferable to have greater confidence in the results.

These limitations notwithstanding, the current study is the first to gather data at several time points from both members of military couples and to explore hypothesized directional associations of PTSD symptoms with relational processes. This design capitalized on the perspective of each member in the couple to more fully capture dyad-level processes. Moreover, by using a daily diary format, we minimized retrospective recall and captured a more accurate estimate of phenomena, while also allowing for evaluation of directionality in associations. By using Bayesian estimation of our models, we were able to avoid problems with potentially reduced power and gain more confidence that our estimates are “true” estimates (de Schoot et al., 2014). Our results

suggest that romantic partners' PTSD symptom accommodation is an important mechanism of the progression of trauma survivors' PTSD symptoms over time.

## APPENDIX

### Mechanisms of the association of PTSD and romantic relationship functioning: A conceptual review

#### **Abstract**

Posttraumatic stress disorder (PTSD) is associated with negative changes in relationship functioning. An abundance of research has demonstrated this basic link, with some exploration of the mechanisms of the association. The present paper reviews and synthesizes existing literature by characterizing many of the mechanisms as deficits or excesses of affect, behavior, relationship functioning, and physiology. This model complements similar research in both the interpersonal and intrapsychic literatures. Additional mechanisms identified include cognitions or behaviors (in the survivor or partner), and trauma sharing. Some existing research is complicated by potentially tautological associations of predictors, mechanisms, and outcomes, but overall, identified PTSD-related deficits appear to account for greater variance in relationship functioning, relative to excesses. Based on the literature reviewed, recommendations for future research and clinical practice are discussed.

## INTRODUCTION

PTSD is a multifaceted disorder resulting from intense and/or life-threatening trauma (Diagnostic and Statistical Manual of Mental Disorders – 5th edition [DSM-5]; American Psychiatric Association [APA], 2013). In addition to the substantial individual psychological distress associated with the disorder, the presence of PTSD in romantic relationships is frequently associated with relationship distress in one or both partners. Two recent meta-analyses have confirmed small ( $r = .24$ ; Lambert, Engh, Hasbun & Holzer, 2012) to medium ( $\rho = .38$ ; Taft Watkins, Stafford, Street, & Monson, 2011) effect sizes for the simple associations of PTSD with poor romantic relationship functioning (RF) in numerous military and civilian samples. Moreover, several studies of a wide and seemingly disparate collection of potential interpersonally-based mechanisms have been published. A substantial number of reviews have also focused on the basic associations of PTSD with RF, with some exploration of the mechanisms of that distress (Campbell & Renshaw, in press; Carroll, Cannon, Foy, & Zwiher, 1991; De Burgh, White, Fear, & Iversen, 2011; Dekel & Monson, 2010; Galovski & Lyons, 2004; Isovaara, Arman, & Rehnsfeldt 2006; Link & Palinkas, 2013; Monson, et al., 2010; Monson, Taft & Fredman, 2009; Monson, Fredman, & Taft, 2011; Nelson Goff & Smith, 2005; Renshaw et al., 2011; Solomon, 1988). However, there is a need to synthesize the knowledge about mechanisms that exacerbate interpersonal stress in the context of PTSD

in a coherent way that can inform treatment recommendations and guide future research. To this end, we review and integrate existing research that identifies, measures, and tests potential mechanisms of the link between PTSD and RF, using a novel conceptual model to organize many of the findings.

## **METHOD**

Relevant search terms were entered into PsycInfo and Google Scholar through April 3, 2015. Within each database, we searched for a combination of the keyword “PTSD” with each of the following: “relationship distress,” “relationship satisfaction,” “relationship quality,” “relationship adjustment,” “marital distress,” “marital satisfaction,” “marital quality,” “marital adjustment” and “mechanisms.” The reference sections of all relevant publications were also reviewed for additional citations, and further searches were performed for additional works by first authors of relevant publications. We restricted our search to peer-reviewed articles and chapters in English-language publications, excluding unpublished dissertations and conference abstracts. We included all articles that met the following criteria: 1) explicit assessment of PTSD in trauma survivors (either for inclusion in the study or included in model tested), 2) use of quantitative methodology, and 3) explicit proposal or testing of a potential mechanism of the association of PTSD and RF.

## **A DEFICIT/EXCESS MODEL OF PTSD-RELATED RELATIONSHIP FUNCTIONING**

Research on romantic RF is often framed in terms of the presence or absence of relationship satisfaction. However, RF is a multidimensional construct comprised of both positive elements such as supportive behaviors, *and* negative elements, such as aggression or conflict behaviors (Pierce, Sarason, & Sarason, 1991). In line with this notion, much research on RF has shown that a *deficit* of positive affect/behavior, perhaps more than an *excess* of negative affect/behavior, is most influential in overall relationship quality (e.g., Gottman & Levenson, 2000; Laurenceau, Troy, & Carver, 2005; Pasch & Bradbury, 1998).

This distinction between deficits and excesses is seen in broader characterizations of intrapsychic functioning, as well. For instance, at its most basic level, reinforcement sensitivity theory (RST; Gray, 1971) posits that individuals are governed by the behavioral activation system (BAS), which guides individuals to approach rewarding situations, and the behavioral inhibition system (BIS), which regulates the BAS and also influences the desire to escape or avoid threatening/punishing stimuli. More specifically, PTSD also is defined as a multidimensional disorder, with multiple symptom clusters that reflect deficits and excesses. The DSM-IV (APA, 1994) diagnostic criteria included 3 such clusters. The intrusion (persistent re-experiencing of the event via flashbacks, nightmares, or memories) and arousal (hypervigilance, irritability, and difficulty

concentrating and sleeping) clusters reflect excesses of trauma reminders, reckless behavior/impulsivity, and physiological reactivity. Accordingly, these clusters have been linked with a dysregulated BAS (e.g., Casada & Roache, 2005). In contrast, the avoidance (of trauma-related thoughts, emotions, people, or places) cluster reflects deficits of behavior and emotion, which have been associated with a dysregulated BIS (e.g., Contractor, Elhai, Ractliffe, & Forbes, 2013; Pickett, Bardeen, & Orcutt, 2011). An alternative 4-factor DSM-IV model of PTSD (King, Leskin, King, & Weathers, 1998) divided the avoidance cluster into situational avoidance (SA), which included trauma-specific behavioral deficits, and emotional numbing (EN), which included broader emotional and behavioral deficits. This model somewhat resembles the recent DSM-5 model that also includes an intrusion cluster, arousal cluster, situational avoidance cluster, and a negative alterations in cognitions and mood cluster, which is comprised of EN and other deficits of emotional and social engagement.

Based on these broader characterizations of both RF and PTSD, there may be benefits to viewing the variety of findings regarding potential mechanisms of the link between PTSD and poor RF from a deficit/excess perspective. Many of the mechanisms that have been examined can be broadly organized into deficits and excesses in several domains, namely symptom-based/affective, physiological, behavioral, and interpersonal. Such a perspective may provide a more cohesive understanding of the current state of knowledge and more clearly identify issues that should be addressed in future research. Below, we review the studies we identified from this broader framework, including a

small number of studies of constructs that combined deficit- and excess-based mechanisms.

## **Deficits**

**Symptom- or affective-based deficits.** As noted above, avoidance and EN are PTSD symptom clusters that represent deficits in emotion and behavior. One of the most prominent themes to emerge in the literature regarding PTSD symptom clusters in the context of romantic relationships is that avoidance symptoms (using the DSM-IV 3-cluster model) or EN (using a 4-cluster model) are the clusters most typically associated with poor RF. In studies using the 3-cluster model to evaluate the simultaneous associations of PTSD clusters with RF, the avoidance cluster was most strongly associated with RF in cross-sectional, longitudinal, and dyadic research, with small to medium effects (Evans, Cowlshaw, Forbes, Parslow, & Lewis 2010; Evans, Cowlshaw, & Hopwood, 2009; Evans, McHugh, Hopwood, & Watt, 2003; Solomon, Debby-Aharon, Zerach, & Horesh, 2011; Solomon, Dekel, & Zerach, 2008; but see Hamilton, Nelson Goff, Crow, & Riesbig, 2009; Hendrix, Erdmann, & Briggs, 1998). When cross-sectional, longitudinal, and dyadic studies have used the 4-cluster numbering model, the EN cluster is significantly, negatively associated with RF, whereas SA is typically nonsignificant (Beck, Grant, Clapp, & Palyo, 2009; Cook et al., 2004; Erbes et al., 2012; Lunney & Schnurr, 2007; Riggs et al., 1998; Taft et al., 2008, but see Erbes et al., 2011). Of note, the consistent lack of association of SA with RF in empirical studies contradicts the speculation about this link that is frequently noted in clinical literature (e.g., Brown-Bowers, Fredman, Wanklyn, & Monson, 2012; Glynn et al., 1999; Makin-

Byrd, Gifford, McCutcheon, & Glynn, 2011; Monson et al., 2010; Sautter, Armelia, Glynn, & Wielt, 2011; Sherman, Zanotti, & Jones, 2005).

By definition, EN symptoms have substantial overlap with symptoms of depression, including reduced feelings of connection to others, a loss of interest in previously enjoyed activities, and difficulty feeling positive emotions. Individuals suffering from PTSD are commonly diagnosed with comorbid depression (e.g., Galatzer-Levy, Nickerson, Litz, & Marmar, 2013; Spinhoven, Penninx, van Hemert, de Rooij, & Elzinga, 2014). The link between depression and relationship discord is also well established (e.g., Whisman, 2007). Three studies have explicitly evaluated survivors' depression as a mechanism of the association of PTSD with RF. Two of those studies showed that depression either mediated the association of avoidance symptoms with RF (Evans et al., 2003) or explained more variance in RF than PTSD symptoms (Beck et al., 2009). In contrast, other research (Nelson Goff et al., 2007) failed to show that depression is associated with RF after controlling for PTSD symptoms. The potential overlap in the constructs of depression and avoidance/EN, both of which are deficit-based symptoms, may explain some of the conflicting results. Taken together, the results may indicate that research attempting to parse these constructs is unnecessary, given their degree of conceptual similarity.

Thus, the vast majority of studies reinforce the notion that affective deficits are associated with poorer RF in both survivors and partners, even when controlling for other PTSD symptoms. Notably, within PTSD-related affective deficits, it is the more ambiguous EN symptoms, rather than the overtly trauma-specific symptoms of SA, that

are related to poorer RF. Whether this difference in specificity and explicit connection to trauma contributes to the more negative associations of RF with EN compared to SA is a potential focus for future research.

**Behavioral deficits.** By both survivor and partner self-report, trauma survivors exhibit deficits in self-disclosure (e.g., Al-Turkait & Ohaeri, 2008; Carroll et al., 1985; Solomon, et al., 1991), particularly when they experience higher levels of avoidance/EN symptoms (e.g., Hendrix et al., 1998). Additionally, as evidenced by both partner report and objective coding, survivors with PTSD demonstrate deficits in expressiveness, humor, and constructive problem solving compared to survivors without PTSD (e.g., Carroll et al., 1985; Miller, et al., 2013; Solomon, Waysman, Avitzur, & Enoch, 1991; Westerink & Giarratano, 1999). There is also some suggestion that partners may evidence similar deficits (e.g., Solomon et al., 1991; Westerink & Giarratano, 1999). Moreover, in a study of community couples in which at least one partner had elevated PTSD symptoms (Hanley, Leifker, Blandon, & Marshall, 2013), individuals' PTSD symptom severity was associated with reductions in their own (objectively coded) support provision during negative discussions, more so for men than women.

Some research has also found that these behavioral deficits amplify or account for some or all of the association of PTSD with RF. For instance, Dekel (2010) found that the association of veterans' PTSD with wives' RF was diminished after accounting for wives' self-reported withdrawal and perspective taking during conflict. Similarly, veterans' social avoidance strategies (defined as passive coping and avoidance of social tension) partially mediated the association of veterans' PTSD with their RF (Tsai,

Harpaz-Rotem, Pietrzak, & Southwick, 2012). Findings from several cross-sectional and longitudinal mediation studies suggest that reduced self-disclosure in both veterans *and* their partners partially or fully mediated the association of veterans' PTSD with veterans' and partners' RF (Campbell & Renshaw, 2013; Dekel et al., 2008; Solomon, Dekel, & Zerach, 2008). An additional study found that, when accounting for veterans' PTSD symptoms and spouses' self-reported self-disclosure to veterans simultaneously, the effect of symptoms on spouses' RF was less than 1/3 of the size of the effect of spouses' self-disclosure (Dekel & Solomon, 2006a). Finally, in one of the only analyses of moderation, Solomon and colleagues (2011) found that veterans' self-reported emotional sharing did *not* moderate the association of their PTSD symptoms with their RF.

In sum, the existing research suggests that survivors' PTSD symptoms can be associated with behavioral deficits in communication styles, coping styles, and self-disclosure for *both* couple members. Of note, the overlap of behavioral deficits with the deficits represented by EN symptoms raises the question of whether some of these findings are tautological. Moreover, some results are complicated by potential shared method variance (e.g., more variance in spouses' report of RF being accounted for by spouses' report of communication than by SMs' report of PTSD). Having both partners provide reports, using objective coding of couple members' communication behaviors (as in Hanley et al., 2013 and Miller et al., 2013), and identifying conceptually distinct behavioral mechanisms would add validity to the results of future studies exploring the role of behavioral deficits as a mechanism of the PTSD-RF link.

**Relationship-based deficits.** Some constructs contain both emotional and

behavioral deficits that are specific to the experience of the relationship. For instance, cross-sectional research has revealed deficits in self-reported intimacy in veterans with PTSD (e.g., Cook et al., 2004; Riggs et al., 1998; Roberts et al., 1982; Solomon, Mikulincer, Freid, & Wosner, 1987; Solomon, Waysman, Avitzur, & Enoch, 1991) and in partners of survivors with PTSD (e.g., Riggs et al., 1998). Similarly, a number of studies have demonstrated an association between PTSD and deficits in sexual satisfaction and functioning in veteran and civilian samples (Becker & Skinner, 1983; Becker, Skinner, Abel, & Cichon, 1986; Becker, Skinner, Abel, & Treacy, 1982; Bhugra, 2002; Cosgrove et al., 2002; Dekel & Solomon 2006b; Hirsch, 2009; Hosain et al., 2013; Kaplan, 1989; Letourneau, Schewe, & Frueh, 1997; McGuire & Wagner, 1978; Nunnink et al., 2010), with two studies revealing that the EN symptom cluster is the only cluster to be uniquely associated with deficits in veterans' sexual functioning (Badour, Gros, Szafranski, & Acierno, 2015; Nunnink et al., 2010). Finally, greater PTSD severity has been linked with an avoidant attachment style, or a "fear of closeness and lack of trust" (Hazan & Shaver, 1987 p. 513), in a number of cross-sectional (e.g., Busuito, Huth-Bocks, & Puro, 2014; Clark & Owens, 2012; Renaud, 2008) and longitudinal (e.g., Franz et al., 2014; Solomon, Dekel, & Mikulincer, 2008) studies, as well as one study that assessed both partners' attachment avoidance (Ein-Dor, Doron, Solomon, Mikulincer, & Shaver, 2010).

Additional studies have shown that deficits in emotional and physical intimacy are associated with RF above and beyond the effects of PTSD, and may partially explain the PTSD-RF association. For instance, reduced intimacy has been found to partially

mediate the cross-sectional association of service members' PTSD symptoms with their own RF (Zerach, Anat, Solomon, & Heruti, 2010) and their wives' RF (Allen, Rhoades, Stanley, & Markman, 2010). Similarly, in a sample of dual-trauma couples, each partner's fear of intimacy fully mediated the association of their own PTSD with their own RF (Riggs, 2014). Moreover, decreased sexual satisfaction maintained an association with poorer RF in ex-POWs after accounting for their PTSD symptoms (Dekel & Solomon, 2006a). In a separate study, RF partially mediated the negative relationship between ex-POWs' PTSD symptoms and their sexual satisfaction (Zerach et al., 2010). Finally, two dyadic studies revealed that soldiers' self-reported PTSD-related sexual problems were associated with both partners' RF (Nelson Goff, Crow, Reisbig, & Hamilton, 2007), and that each partner's report of their *own* sexual satisfaction fully mediated the association of veteran's PTSD symptoms with their own (but not their partners') RF (Dekel, Enoch, & Solomon, 2008). Thus, PTSD symptoms in one member of the couple may contribute to deficits in intimacy (both emotional and physical) of *both* couple members. Unsurprisingly, these deficits then account for at least some of the link between PTSD and overall RF.

**Summary.** The affective, behavioral, and relationship-based deficits that are commonly seen in those with PTSD are clearly associated with poor RF. However, there are important caveats to consider when interpreting the results of existing research. Many mechanisms assessed, such as poor sexual functioning or reduced self-disclosure, may be so similar to RF or EN symptoms as to represent a tautology. Moreover, issues of method variance may interfere with the clarity of results, such as when partners' report of

intimacy is compared with survivors' report of PTSD symptoms in predicting partners' self-reported RF. Additionally, the research to date has been limited to mostly cross-sectional designs, with no studies yet examining these processes before and after a traumatic event. Such prospective studies, although difficult, are essential to determining the process through which PTSD symptoms, relationship deficits, and overall RF are linked. Nonetheless, the abundance of empirical evidence on the damaging effects of PTSD-based deficits suggests that clinicians should be especially attuned to deficit-based mechanisms of relationship distress when assessing and treating PTSD.

## **Excesses**

**Symptom- or affective-based excesses.** As noted earlier, both intrusion and hyperarousal PTSD symptom clusters represent excesses. Intrusion symptoms are more clearly related to the traumatic event, whereas hyperarousal symptoms are less explicitly tied to trauma and could be more reflective of general affective or physiological distress. Similar to analyses of the deficit-based SA cluster, the vast majority of analyses show nonsignificant associations of intrusion symptoms with RF when accounting for all clusters (Beck et al., 2009; Cook et al., 2004; Erbes et al., 2011; Erbes et al., 2012; Evans et al., 2003; Lunney & Schnurr, 2007; Riggs et al., 1998; Solomon, Dekel, & Zerach, 2008; Taft et al., 2008). The few exceptions to this pattern are mixed, with three studies showing negative associations (Evans et al., 2010; Hamilton et al., 2009; Solomon et al., 2011), and one study showing a positive association (Erbes et al., 2011).

Research has also somewhat inconsistently linked survivors' hyperarousal

symptoms with their or their partners' RF. A number of individual and dyadic studies have failed to find a significant direct association between hyperarousal symptoms and general RF when all symptom clusters are included in analyses (Cook, et al., 2004; Erbes et al., 2011, 2012; Evans et al., 2003; Lunney & Schnurr, 2007; Riggs et al., 1998). In contrast, three veteran self-report studies (Evans and colleagues 2009; Solomon et al., 2011; Taft et al., 2008) and four dyadic studies (Evans et al., 2010; Hamilton et al., 2009; Hendrix et al., 1998; Renshaw, Campbell, Meis, & Erbes, 2014) revealed significant negative associations between hyperarousal and RF both cross-sectionally and longitudinally. Finally, two cross-sectional studies have found a small *positive* association between hyperarousal symptoms and RF (Beck et al., 2009; Solomon, Dekel, & Zerach, 2008), controlling for intrusion and avoidance symptoms. Thus, results regarding hyperarousal and RF are also mixed.

Numerous researchers have documented significant associations between overall PTSD and another affective excess, anger (e.g., Chemtob, Hamada, Roitblat, & Muraoka, 1994; Chemtob, Novaco, Hamada, Gross, & Smith, 1997). Anger is related to one symptom of the hyperarousal cluster (increased irritability), and it has also been clearly linked with poor RF outside the context of PTSD (e.g., DiGiuseppe & Tafrate, 2007). Thus, the specific level of anger in a trauma survivor may have a stronger association with RF than overall hyperarousal severity. Only one study has tested this possibility, finding that veterans' hyperarousal symptoms were not directly associated with veterans' and partners' reports of RF, but they were weakly indirectly associated, via veterans' self-reported anger (Evans et al., 2003). Thus, it is possible that the irritability/anger

component of hyperarousal symptoms provokes the most negative interpersonal interactions, thus increasing relationship distress for both survivors and partners. Further research is needed to evaluate this possibility.

**Physiological excesses.** Investigation has more recently begun into physiological excesses, such as neuroendocrine functioning and physiological reactivity, which may influence RF in the context of PTSD. Findings suggest that PTSD increases physiological reactivity and attention to threat (Sherin & Nemeroff, 2011), which could in turn promote excessive emotional reactivity that might worsen couple conflict when it occurs. For instance, in a study of 24 heterosexual civilian couples in which one member had experienced trauma, greater PTSD severity in women was associated with faster attention to partners' expressions of anger (Marshall, 2013). The same pattern was found in men, but only when they had received a hormone implicated in both increased affiliation and aggression, suggesting that this effect is directly tied to biological factors in men. Similarly, a study of male combat veterans with ( $n = 32$ ) and without ( $n = 33$ ) PTSD and female partners (Caska et al., 2014) revealed that both veterans and partners in the PTSD-positive group displayed greater cardiovascular reactivity during a conflict discussion than did members of control couples. Moreover, on some of the cardiovascular indices, partners of veterans with PTSD displayed significantly greater reactivity than the symptomatic veterans themselves. Collectively, these results suggest that PTSD may lead to stronger physiological reactions to the experience of conflict and presence of anger in both survivors and their romantic partners. Future research is needed to determine whether such physiological changes result in more frequent or intense conflicts and, thus,

poorer RF.

**Behavioral excesses.** One route through which anger and physiological reactivity may lead to relationship distress is through increased overt aggression. Indeed, anger is strongly tied to both verbal and physical aggression ( $r_s$  .45-.48; Buss & Perry, 1992), and PTSD also has medium-sized associations with both physical aggression ( $\rho = .31$ ) and psychological aggression ( $\rho = .36$ ; meta-analysis by Taft et al., 2011) perpetrated by survivors. In addition, PTSD has been shown to be associated with increases in verbal aggression behaviors (e.g., hostility), as well as distress-maintaining attributions in trauma survivors *and* partners (Carroll et al., 1985; Caska et al., 2014; Glenn et al., 2002; Miller et al., 2013; Westerink & Giarratano, 1999). A number of studies have further shown that, of the PTSD symptoms, the hyperarousal cluster has particularly strong links with IPV perpetration (Savarese, Suvak, King, & King, 2001; Evans et al., 2003; Solomon et al., 2008; Taft, Kaloupek et al., 2007).

Studies that analyze PTSD, aggression, and RF simultaneously further support the notion that these constructs are intertwined. For instance, in a series of cross-sectional studies (Dekel & Solomon, 2006a, 2006b; Dekel et al., 2008), veterans' verbal aggression toward spouses (by veteran report in one study, spouse report in another, and both partner's reports modeled simultaneously in a third) was negatively associated with veterans' self-reported RF even after accounting for veterans' PTSD symptoms. Verbal aggression was also associated with *spouses'* RF, although only when veterans' RF was not included in the model. Solomon, Dekel, and Zerach (2008) similarly found that verbal aggression mediated the cross-sectional association of hyperarousal symptoms with

marital intimacy, with a small indirect effect, in a sample of ex-POWs. From another perspective, poor RF has also been shown to be a risk factor for IPV in the context of PTSD. Taft et al. (2005) found that the link between PTSD and risk for IPV perpetration in veterans was enhanced by poor marital functioning. Additionally, both individual (Kar & O’Leary, 2013, Taft et al., 2009) and dyadic (Byrne & Riggs, 1996) studies of traumatized veterans and civilians have found that RF mediates the association of PTSD with IPV perpetration.

In sum, research clearly supports the empirical links between PTSD (particularly hyperarousal), behavioral excesses related to aggression, and RF. It may be that PTSD symptoms contribute to survivors’ greater irritable outbursts or aggression, reducing feelings of safety in partners and impairing RF in both members of the couple. Alternatively, trauma survivors with poor RF may be more apt to become aggressive with their partners when angry. Despite these possibilities, it is also important to recognize the potential tautological nature of hyperarousal symptoms, anger, and aggression, particularly as measured by self-report. It may prove impossible to completely disentangle these constructs. The overall pattern of findings, however, suggests that researchers should include exploration of the behavioral manifestations of the excess symptoms of PTSD, as well as go beyond self-report assessments, to provide a clearer picture of the interrelationships of these various excesses.

**Relationship-based excesses.** Much as avoidant attachment can be conceptualized as a deficit-based pattern of attachment, anxious attachment can be conceived of as an excess-based style of attachment, in that it implies a preoccupation

with the reciprocated affection of a loved one and an excess of reassurance seeking (Hazan & Shaver, 1987). PTSD is cross-sectionally (e.g., Busuito et al., 2014; Renaud, 2008) and longitudinally (Franz et al., 2014; Solomon et al., 2008) associated with survivors' attachment anxiety. However, in the only study of attachment anxiety in partners of survivors, Ein-Dor and colleagues (2010) failed to find a cross-sectional association of veterans' PTSD with wives' attachment anxiety. Notably, no empirical research has investigated anxious attachment in conjunction with both PTSD and RF, possibly due to conceptual overlap between attachment and RF more broadly. No studies of other relationship-based excesses (e.g., excessive reassurance seeking) were identified.

**Summary.** The symptom-based excesses of PTSD (intrusion and hyperarousal) are not consistently empirically related to RF, but their associated physiological and behavioral excesses (physiological arousal and reactivity, biased attention to partner anger, aggressive behavior) do appear to be linked with poorer RF. It is possible that some of the inconsistency of findings with regard to hyperarousal symptoms may be due to variations in the conceptualization of this cluster. Some research has yielded support for a five-cluster model of PTSD that differentiates the more trauma-specific hypervigilance symptoms from the more general anxious arousal symptoms (e.g., Elhai, et al., 2011). It is possible that these clusters might offer a clearer picture, though to date, no studies on mechanisms of interpersonal distress in the context of PTSD have used this model. As with deficit constructs, many of the behavioral excesses (e.g. anger, physiological arousal) have substantial overlap with PTSD-related symptom excesses. The fact that the associated excesses, rather than the symptoms themselves, demonstrate a

clearer association with RF suggests that the distinction between these constructs may be important. More work is needed to clarify distinct excess-based mechanisms that may inform the PTSD-RF association. In addition, though the excesses are clearly detrimental to RF, it is important to note that there is comparatively more research showing detrimental effects of deficits. Thus, clinicians and researchers should take care to attend to deficits as well as excesses in this population.

### **Additional Studies**

Some constructs are challenging to view as intrapsychic or interpersonal deficits or excesses, due to operationalization. Studies using such conceptualizations are reviewed below.

**Symptoms and affect.** The *dysphoria* model of PTSD is an alternative 4-cluster model that has the same intrusion and SA symptom clusters as the current DSM-5 model, but combines EN symptoms with general distress symptoms from the arousal cluster (irritability, difficulty sleeping, difficulty concentrating) into a dysphoria cluster. The remaining arousal symptoms (hyperstartle and hypervigilance) comprise an anxious arousal cluster. Although there is some empirical support for this model (Simms, Watson, & Doebbeling, 2002), its relevance to a deficit/excess model of interpersonal mechanisms of RF is complicated, due to the combination of deficit and excess symptoms in the dysphoria cluster. Two studies using the dysphoria model found that the dysphoria cluster of soldiers' PTSD had significant cross-sectional and longitudinal associations with their own RF, but nonsignificant, weak prospective effects on partners' RF (Erbes, Meis,

Polusny, & Compton, 2011; Erbes, Meis, Polusny, Compton, & Macdermid Wadsworth, 2012). It is unknown whether the significant effects are due more to the deficit or excess symptoms in this cluster, but it is noteworthy that only the dysphoria cluster, which contained nearly all of the symptoms that are not trauma-specific, exerted any significant associations with RF.

**Behaviors.** Macdonald, Chamberlain, Long, and Flett (1999) assessed self-reported PTSD, romantic RF, and a set of interpersonal problems that included general difficulties with intimacy, aggression, compliance, independence, and sociability in Vietnam veterans. They found that the significant bivariate association between self-reported PTSD and self-reported RF became nonsignificant after accounting for global interpersonal problems. As the conceptualization of interpersonal problems included both deficit-based and excess-based problems, however, it is unknown whether one type of problem was more influential than the other. Isolating these two types of interpersonal difficulties may provide greater detail about the specific problems in RF that arise as a result of those difficulties.

Similarly, one study of PTSD and RF incorporated both deficits in positive communication and excesses of negative communication into a single construct (Allen, Rhoades, Stanley, & Markman, 2010). This composite communication variable, which included escalation, invalidation, negative interpretation, and withdrawal, partially mediated the association between PTSD symptoms and marital satisfaction in 344 male soldiers and their wives. Given that data were cross-sectional, the directionality of associations cannot be determined. Again, it is also not known whether the deficit and

excess elements of communication were additive, or whether one of these accounted for the majority of variance in poor RF.

**Relationship-based.** The Bartholomew and Horowitz (1991) conceptualization of attachment is another theoretical construct that defies easy categorization in a deficit/excess framework. Within this model of attachment, individuals with insecure attachment are characterized as having either high anxiety with low avoidance (preoccupied-dependent), high anxiety with high avoidance (fearful-disorganized), or low anxiety with high avoidance (dismissive-avoidant). A number of studies have used this model, finding associations of preoccupied-dependent and fearful-disorganized types with PTSD symptoms (e.g., Currier, Holland, & Allen, 2012; Declercq & Willemsen, 2006; Escolas et al., 2012; Renaud, 2008). However, these constructs, particularly the fearful-disorganized type, do not fit well into the current framework.

## **OTHER MECHANISMS**

There are other potential mechanisms of the association between PTSD and RF that do not easily fit into a deficit- or excess-based model. These include survivors' cognitions, partners' cognitions and behaviors, and couples' communication specifically about the trauma. Findings related to each of these areas are reviewed below.

### **Survivors' Cognitions**

Although survivors' behaviors fit well into the deficit/excess model presented above, their cognitions are not easily placed into such categories. Cognitions regarding world, self, and others have been identified as important for the psychological functioning of survivors (e.g., Dunmore, Clark, & Ehlers, 2001) and are now included in the diagnostic criteria for PTSD (APA, 2013). To date, however, only a small subset of studies have explored how survivors' cognitions relate to RF. Isolated studies have demonstrated that self-reported loneliness (Solomon & Dekel, 2008), lack of perceived availability of secure relationships (Tsai, Harpaz-Rotem, Pietrzak, & Southwick, 2012), lack of perceived relationship safety (Brown et al., 2012) and lack of perceived forgiveness in relationships (both survivors' forgiveness of partners, and partners' forgiveness of them; Solomon, Dekel, & Zerach, 2009) have been shown to partially or fully mediate the association of PTSD symptoms with RF. Collectively, these results suggest that post-trauma interpersonal cognitions may play a role in the lasting effects

that PTSD symptoms and romantic relationships can have on each other. However, more research replicating these isolated findings and perhaps testing additional cognitive mechanisms is warranted.

### **Partners' Cognitions and Behaviors**

A series of recent studies has evaluated partners' perceptions of service members' deployment experiences and their symptoms of PTSD in relation to partners' RF. Three cross-sectional studies (Renshaw, Allen, Carter, Stanley, & Markman, 2014; Renshaw & Campbell, 2011; Renshaw, Rodrigues, & Jones, 2008) revealed significant interactions indicating that the association of PTSD symptoms (total or EN cluster) with partners' RF was weaker when partners' thought SMs had experienced greater levels of combat during deployment. The authors speculated that perceiving more severe trauma may provide partners with an external event to which they can attribute PTSD symptoms (particularly EN symptoms), thus protecting against the erosion of RF. It is also possible, however, that couples in stronger relationships tend to discuss deployment experiences more, leading to partners' increased knowledge about combat experiences. Longitudinal research is needed to better understand these effects.

Partners' perceptions of survivors' PTSD symptoms have also been found to be associated with partners' RF (e.g., Renshaw, Allen, Carter, Markman, & Stanley, 2014; Solomon et al., 1992); however, evaluations of partners' perceptions of symptoms together with survivors' self-report of symptoms have yielded more nuanced findings. Two studies (Renshaw et al., 2008; Renshaw, Rodebaugh, & Rodrigues, 2010) have revealed some evidence of a *negative* association of veterans' self-reported PTSD

symptoms with partners' marital distress when accounting for partners' perceptions of veterans' PTSD symptoms, particularly when partners perceive high levels of PTSD. The authors hypothesized that this counterintuitive effect could reflect an added detrimental effect of disagreement between partners about the severity of veterans' symptoms, particularly when partners perceive high levels of symptoms and veterans report low levels. At the same time, the pattern could also reflect that more distressed couples are simply more likely to disagree. Again, longitudinal research with a broader sampling of trauma survivors and partners is needed to better understand this possibility.

Two studies with three separate samples (Renshaw & Caska, 2012; Renshaw, Allen et al., 2014) have also examined partners' perceptions of specific PTSD symptom clusters in combat veterans. Consistent with studies of veterans' self-reported PTSD symptoms, partners' perceptions of EN were strongly and positively associated with relationship distress, perceptions of hyperarousal were positively associated with relationship distress (though statistical significance depended on the sample), and perceptions of SA were nonsignificantly associated with relationship distress. In all three samples, however, partners' perceptions of intrusion symptoms were significantly *negatively* associated with relationship distress. In both reports, the researchers posited an attributional explanation for these findings (cf. Weiner, 1985), in that awareness of intrusion symptoms (which are clearly tied to a traumatic event) may allow partners to more readily identify other symptoms (e.g., EN) as components of a pathological reaction to a trauma (i.e., external attribution), rather than a lack of love or interest (i.e., internal attribution).

In an explicit test of this attributional hypothesis, Renshaw, Allen, et al. (2014) found that wives' explicit attributions for soldiers' PTSD symptoms did account for significant variance in wives' RF (in expected directions), even when controlling for PTSD symptom severity. Moreover, wives' internal attributions for soldiers' overall PTSD symptoms moderated the association of PTSD symptoms with wives' RF, such that the association was stronger when wives made more internal attributions for symptoms and near zero when wives made fewer internal attributions. (External attributions did not significantly moderate this association.) Thus, the ways in which romantic partners understand the causes of PTSD symptoms may alter the impact of those symptoms on their own RF, with internal attributions for symptoms demonstrating especially strong ties to poor RF.

Beyond these findings on perceptions and attributions, and a single finding that wives' reported forgiveness of ex-POWs accounted for variance in their own RF when accounting for ex-POWs' PTSD symptoms (Dekel, 2010), most research on partners' cognitions has focused on the construct of perceived burden. Burden is typically defined as "increased household or caregiving responsibilities, physical and psychological problems, financial difficulties, and social or interpersonal problems" that arise when living with someone with PTSD (Caska & Renshaw, 2011, p. 346). Thus, the construct blends reported frequency of partners' behaviors with their cognitive perceptions of these behaviors as burdensome. A number of studies have found that PTSD symptoms are significantly, directly associated with increased reports of burden in spouses (Beckham, Lytle, & Feldman, 1996; Calhoun, Beckham, & Bosworth, 2002; Caska & Renshaw,

2011; Dekel, Solomon, & Bleich, 2005; Manguno-Mire et al., 2007). An additional study revealed that wives' reported burden fully mediated the cross-sectional association between PTSD treatment-seeking veterans' functional disability and wives' RF and partially mediated the association between veterans' psychological distress and wives' RF (Dekel, Solomon, & Bleich, 2005). This pattern of findings is consistent with the notion that partners' experiences caring for distressed and impaired trauma survivors may contribute to increased burden and, in turn, decreased RF.

Finally, one problematic behavior that could contribute to both feelings of burden and poorer RF is partners' behavioral accommodation of survivors' PTSD symptoms. Traditionally studied in the context of OCD (e.g., Calvocoressi et al., 1995; Boeding et al., 2013) or other disorders (e.g., Rapee et al., 2015), PTSD-related accommodation is defined as actions taken by a spouse that are intended to somehow manage or reduce symptoms of PTSD. Examples of PTSD-related accommodation include restricting noise in the house to avoid provoking a startle response, limiting social engagements or survivors' household responsibilities if they are nervous or on edge when in public, and limiting difficult discussions to avoid arguments or emotionally laden topics (Monson, et al., 2010). This construct has often been discussed in clinical literature on PTSD (e.g., Maloney, 1988; Monson et al., 2010), where it is hypothesized to maintain PTSD symptoms by reducing opportunities for exposure to feared stimuli. A recent empirical study further documented that partners' reported accommodation is negatively associated with RF above and beyond both their own psychological distress and their perceptions of survivors' PTSD symptoms (Fredman, Vorstenbosch, Wagner, Macdonald, & Monson,

2014). The impact of partners' accommodation on trauma survivors' symptoms and RF, however, is not yet known. More research is needed to illuminate the direction of these effects and provide more insight into the causes and byproducts of behavioral accommodation.

### **Communication about Traumatic Event**

Regular intimate communication and self-disclosure are hallmarks of functional romantic relationships (e.g., Laurenceau, Barrett, & Rovine, 2005). However, communication focused on a trauma experienced by one member of a couple may have distinct associations with RF. Disclosure of traumatic events to close others has been shown to be beneficial to survivors' mental health, especially when survivors receive positive responses to their disclosure (e.g., Bolton, Glenn, Orsillo, Roemer, & Litz, 2003; Koenen, Stellman, Stellman, & Sommer, 2003; Pennebaker & Susman, 1988). One study of service members also found a significant indirect effect of poor RF on post-deployment PTSD symptoms via reduced likelihood of disclosing combat experiences to their partners (Balderrama-Durbin et al., 2013).

The effects of trauma disclosure on *partners* of trauma survivors, however, are less clear. A study of partners of Holocaust survivors (Lev-Wiesel & Amir, 2001) revealed that trauma memory disclosure was unrelated to partners' RF when survivors had no PTSD symptoms, but associated with poorer RF in partners when survivors had partial or full PTSD. Somewhat similarly, Campbell and Renshaw (2012) found that partners' reports of Vietnam veterans' communication about their experiences in Vietnam were positively associated with partners' *psychological* distress when veterans had higher

levels of PTSD, but the association was nonsignificant when veterans had lower levels of PTSD. Communication about deployment was not associated with partners' *RF*, however, regardless of level of veterans' PTSD. Finally, Zerach, Greene, and Solomon (2014) found that partners' reports of psychological distress stemming directly from learning about survivors' traumatic experience were negatively related to partners' *RF*. Thus, research to date seems to suggest that trauma disclosure is associated with improved mental health for survivors, though it is less likely to occur in poorly functioning relationships. In contrast, the benefits for partners (either in mental or relationship health) seem to depend on survivors' symptom severity.

### **Summary**

Overall, research to date suggests that both survivors' and partners' cognitions (about others, the trauma, and PTSD symptoms) are instrumental to *RF* in the context of PTSD. Though these cognitions are not readily categorized as deficits or excesses, they may be strongly influenced by the deficits and excesses described in the sections above. For instance, survivors with excess arousal may be more likely to perceive their relationships as less safe due to the excess attention to threat associated with arousal symptoms, while those with greater *EN* may feel less connection with and, thus, perceive less support overall from others (e.g., Beck et al., 2009). Moreover, partners who do not view the index trauma as very severe or who make internal attributions for symptoms may be more distressed by PTSD symptoms in their partners. Conversely, partners who are unhappy in their relationships may be likely to misperceive PTSD symptoms and

details about survivors' traumatic experiences. Similarly, spouses' behaviors in the context of PTSD are likely influenced both by the particular constellation of PTSD symptoms present in the survivor and by the deficits or excesses that exist in a relationship struggling with PTSD. The degree to which burden and accommodation arise from specific symptoms or other couple-level behaviors in relationships awaits further study and could inform conjoint treatment efforts or caregiver support programs. Longitudinal research is needed to better understand the role of these cognitions and behaviors in relationships of trauma survivors and their partners, as they may represent viable intervention targets for partners of trauma survivors.

Finally, disclosure of and communication about traumatic events may be therapeutic and beneficial for survivors' RF, but the impact of such disclosure on romantic partners is unclear. To date, research suggests a null effect of trauma disclosure on partners when survivors have minimal PTSD symptoms, but a possible detrimental effect as survivors' PTSD symptoms increase. These results are consistent with clinical suggestion in conjoint therapies for PTSD such as cognitive-behavioral conjoint therapy for PTSD (CBCT; Monson & Fredman, 2012), which suggest that trauma disclosure is very important for couple functioning but should be done from a "10,000 foot view" (Monson & Fredman, 2012, p. 5).

## CONCLUSION

A variety of both individual and interpersonal mechanisms appear to play a role in the link between PTSD symptoms and RF. Identification and evaluation of these mechanisms is needed for a more nuanced development and refinement of interpersonally-based treatments for PTSD, such as CBCT for PTSD (Monson & Fredman, 2012) or structured approach therapy (SAT; Sautter, Glynn, Thompson, Franklin, & Han, 2009). As research in this area grows, it is important to focus on how such knowledge can be used therapeutically. Given the rapid growth of research in this area, it has become increasingly relevant to consider whether studies of new constructs truly add novel information to the field, or are simply different ways of labeling processes that have already been studied. One way to organize our knowledge is to categorize mechanisms as “deficit-based” mechanisms, “excess-based” mechanisms, survivor and partner cognitions, partner behaviors, and trauma sharing. These broad categorizations of mechanisms may serve as a useful heuristic for guiding clinical work and future research.

Broadly speaking, the excesses described above are readily identifiable targets for clinical intervention. A survivor who is consistently on edge, outwardly angry, and perhaps physically aggressive provides the clinician with clear behaviors on which to focus. Similarly, a partner who communicates with hostility or is markedly

physiologically dysregulated during conflict offers unambiguous areas for intervention. At the same time, much research suggests that deficit-based problems account for greater variance in RF than do excesses. Thus, though excesses should not be ignored when conceptualizing PTSD or couple treatments, addressing them at the expense of deficits may be insufficient for engendering broad-based change. Moreover, the majority of “excesses” identified in the literature are associated with survivors, rather than partners. Intervention targeting solely these excesses may result in survivors feeling blamed for all relationship dysfunction and perhaps resistant to treatment.

Indeed, there are numerous PTSD-related deficits in both survivors *and* partners that, despite being less visible, have the capacity to profoundly influence overall RF. EN symptoms, reduced disclosure, use of avoidant coping strategies, and deficits in intimacy and sexual functioning/satisfaction all interrelate and are associated with poorer RF. The research showing stronger negative associations of PTSD-related deficits (compared to excesses) with RF is consistent with findings in other disorders (e.g., schizophrenia; Rabinowitz et al., 2012). Moreover, some researchers have suggested that relationship-based excesses (such as conflict) are most relevant to couple functioning precisely when deficits are especially pronounced (Bradbury et al., 2001). Recent work by Monson and colleagues (2012) called for greater attention to emotional numbing and behavioral avoidance in existing PTSD treatments, and some therapies (Monson & Fredman, 2012; Sautter et al., 2009) do just that.

It is important to note that the existing literature has several limitations. First, it consists predominantly of cross-sectional examination of mechanisms, with only

occasional use of longitudinal design and incorporation of dyadic data. Thus, it is difficult to determine the sequence of events that unfolds in relationships when one individual suffers from PTSD. Many of the mechanisms tested may appear concurrently, rather than sequentially, following trauma. Moreover, though many studies posited RF as an outcome, poor RF may “set the stage” for the development or exacerbation of PTSD-related deficits and excesses. For instance, poorly functioning relationships may maintain or exacerbate PTSD over time through reduced partner support, reduced opportunities for exposure resulting from partner accommodation, and reduced counter-evidence to the typical PTSD-related cognitions about the safety and trustworthiness of others (especially close others). Similarly, increased conflict discussions, frequent anger/arousal, excess substance use (which inhibits recovery) as a means of coping with interpersonal stress, and distress-maintaining attributions that prolong symptoms (e.g., Ehlers & Clark, 2000) are other ways in which poorly functioning relationships may maintain or exacerbate PTSD over time. There are also many potential pathways through which poor RF may contribute to the deficits and excesses that accompany PTSD, and vice versa. Research that allows for evaluation of bidirectional associations is needed to evaluate these hypothesized pathways and make informed treatment recommendations.

With these limitations in mind, we conclude with recommendations for future research as well as clinical work, based on the current state of knowledge in this area.

### **Recommendations for Future Research**

**Longitudinal design.** The majority of the studies cited above are either cross-

sectional or, if longitudinal, rely on only two time points (but see Evans et al., 2009, 2010; Franz et al., 2014). Longitudinal research that extends beyond two time points can provide information about potential directional pathways, offering greater understanding of how the dynamic processes involved in PTSD and relationship distress unfold.

**Reduce retrospective bias.** Most research used retrospective self-report assessing symptoms or RF over the previous 2 weeks, months, etc. Studies that use daily diary or ecological momentary assessment methodologies could minimize recall bias, strengthening confidence in the veracity of self-reports.

**Objective measures.** Designs that incorporate behavioral observation, psychophysiological data, and other such measures can provide more objective assessments of couple phenomena in the context of PTSD, thus reducing problems of shared method variance among constructs.

**Dyadic data.** Although a number of studies have begun incorporating reports from both partners, this practice should become routine when assessing couple functioning, given the importance of capturing both partners' perspectives, as well as potential discrepancies in reports of phenomena such as EN, substance use, and social support (meta-analysis by Haber, Cohen, Lucas, & Baltes, 2007).

**Research using DSM-5 criteria.** The new DSM-5 diagnostic criteria for PTSD, includes the “negative alterations in cognitions and mood” cluster, which is comprised of clear deficits (e.g., constricted affect, diminished interest in significant activities) as well as seeming excesses (e.g., persistent emotions such as horror and anger). Researchers focusing on interpersonal factors should consider the implications of their

operationalization of symptom clusters when conducting research with these criteria, and may need to rely on alternative factor structures of DSM-5 PTSD symptoms.

**Samples.** The vast majority of studies on mechanisms of RF in the context of PTSD rely on heterosexual military couples with male combat veterans. It is imperative that research begins to include a) couples with female survivors and male partners, b) survivors of non-combat related traumas, and c) same-sex couples. There may be important differences in the ways that same-sex couples or female survivors/male partners respond to some of the proposed deficits and excesses that would alter treatment recommendations (e.g., emotional or behavioral withdrawal may not have the same negative impact on gay male couples or male partners in heterosexual couples). Moreover, PTSD after sexual assault (as an example of non-combat trauma) might have unique effects on relationship-related phenomena.

**Empirical validation of clinical phenomena.** Certain constructs that are often discussed clinically with regard to RF in the context of PTSD, such as partner accommodation and survivor substance use, were found to have little or no empirical research addressing them. Empirical studies of these constructs are needed.

**Potential tautologies.** The challenge of defining “relationship functioning” in empirical research is significant. In many of the studies cited above, the proposed mechanisms of the association of PTSD with poor RF could logically be considered aspects of RF (e.g. emotional intimacy, avoidant attachment). Similarly, other mechanisms could be considered isomorphic with PTSD symptoms (e.g., depression, anger). These overlaps create potential tautologies in research on purported mechanisms.

Research identifying conceptually and empirically distinct mechanisms of the association of PTSD with RF might provide clinicians and researchers with clearer targets and a better understanding of these associations.

### **Clinical Implications**

The pathways between PTSD and RF are complex, and no universal treatment plan is likely to be successful for all distressed couples post-trauma. Understanding potential pathways, however, is essential to identifying an expanded array of treatment options. For clinicians, the organization of these mechanisms into “deficits” or “excesses” might provide more streamlined treatment planning. Specifically, clinicians may be able to assess for and target the most detrimental mechanisms of the PTSD-RF association more quickly, which is useful given the limits on the number of sessions covered by insurance, as well as the fact that one of the strongest predictors of treatment drop-out is greater number of sessions (meta-analysis by Imel, Laska, Jakupcak & Simpson, 2013). Based on the current state of the literature, certain targets of assessment and intervention seem especially warranted.

**Communication assessment and training.** Empirical research has identified humor, constructive problem solving, support provision, withdrawal, perspective taking, and levels of hostility and self-disclosure as important elements of communication in couples with a trauma survivor. Thus, attention to these mechanisms is warranted.

**Partner cognitions.** Partners’ perceptions of the traumatic event and survivors’ symptoms and their attributions for those symptoms are a potentially important variable in understanding couples’ RF. Depending on the nature of partners’ perceptions and

attributions, psychoeducation on PTSD symptoms, or even clinically managed trauma disclosure (see below), may be indicated.

**Trauma disclosure.** Research suggests that avoiding any discussion of trauma with loved ones may prove detrimental to both survivors and their partners. However, as the optimal level of disclosure is not known and likely varies significantly across couples, clinicians should be cautious with the level of detail encouraged or facilitated in such disclosures (e.g., Monson & Fredman, 2012).

**Anger and aggression.** Anger has not been shown to be universally detrimental to long-term RF (see Gottman & Krokoff, 1989), but it is associated with poorer concurrent RF, and repeated expression of anger may sustain hyperarousal symptoms. Relaxation training and other anger management strategies (e.g., Kassinove & Tafrate, 2002) may be appropriate for survivors with excessive experiences of anger. Moreover, aggression should be closely assessed before beginning treatment (see Monson & Fredman, 2012) and monitored as treatment progresses, and elimination of aggressive behavior should be a primary and necessary treatment goal.

**Partners' behavioral accommodation and burden.** Clinicians should assess and monitor these constructs throughout treatment, and address these issues as needed with couples. Particular attention should be paid to balancing logistical needs of survivors with the potential interference of accommodating behaviors with treatment progress. Moreover, accommodating partners may need specific psychoeducation about PTSD symptoms and the role of avoidance, as well as clear treatment rationales for exposure-based treatments.

**Deficits and excesses.** Careful assessment of and attention to deficits, in addition to the more overt excesses, in relationships of trauma survivors may enable more effective treatment. Many existing couple therapies incorporate techniques designed to address such deficits (e.g., behavior exchange, joint problem-solving rather than avoidant coping, communication training) and they should be given at least equal, if not greater, weight than techniques to reduce excesses such as conflict.

Overall, this review synthesizes the existing research on potential mechanisms of the associations between PTSD and RF, and offers several suggestions for future research and clinical work in this area. As research suggests that only about half of those entering PTSD treatment are considered improved post-treatment (Bradley, Greene, Russ, Dutra, & Westen, 2005), new approaches to treatment are clearly warranted. Specific targeting of distressing mechanisms in the social environment of survivors may be a highly effective approach.

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## **BIOGRAPHY**

Sarah Burns Campbell received her Bachelor of Arts with dual concentrations in The History of Art and Architecture and French Civilization from Brown University in 2004. Following employment in the performing arts, she subsequently began the Clinical Psychology doctoral program at George Mason University and received her Master of Arts in Psychology from George Mason University in 2012.