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Effect of Brain Injury on Post-Deployment Relationship Satisfaction in Veteran Couples

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Reintegration of veterans from the Operation Enduring Freedom-Operation Iraqi Freedom (OEF/OIF) era presents numerous challenges for both the veteran and their partner, particularly when the veteran returns with physical and psychological injuries. The proposed study aims to explore the factors that affect relationship satisfaction, including depression, emotion dysregulation, and communication patterns in OEF/OIF veterans with a history of mild traumatic brain injury (mTBI) and their partners. Cross-sectional analyses were conducted to compare measures of these factors between 35 veterans and 35 partners from Greater New York and Baltimore, MD. Initial analyses of variance indicated that veterans were more likely to be more depressed and emotionally dysregulated, and less likely to engage in positive communication compared to partners. Hierarchical regression suggested that veterans were less likely to report relationship satisfaction when accounting for depression, emotion dysregulation, and positive interaction patterns. Partners were less likely to report relationship satisfaction only when accounting for depression. These cross-sectional analyses identify key areas that present challenges to OEF/OIF veterans reentering civilian life with their significant other, which could inform mental health services targeting military couples. Limitations and future directions are discussed.

Reintegration of veterans from the Operation Enduring Freedom-Operation Iraqi Freedom (OEF/OIF) era following multiple deployments and extended absence presents numerous challenges for both the veteran and their spouse or partner (Bowling & Sherman, 2008; Cohen et al., 2009). Traumatic brain injury (TBI) has been termed the 'signature injury' of returning OEF/OIF service members, affecting up to 44% of soldiers wounded in combat with 80–90% classified as mild (mTBI) (Hoge et al., 2008). This injury is defined by the VA/DOD Clinical Practice Guideline for Management of Concussion/Mild Traumatic Brain Injury (Concussion/mTBI Guideline Working Group, 2009) as an injury or concussion associated with at least one of the following: brief (< 30 minutes) loss of consciousness, altered state of consciousness or post-traumatic amnesia for < 24 hours following the injury. Moreover, veterans come home with a number of emotional wounds of war that can disrupt the harmony of the relationship such as posttraumatic stress disorder (PTSD) and depression (Bowling & Sherman, 2008), which often occurs in tandem with mTBI (Perlick et al., 2014). Research suggests that veterans with a history of TBI are 1.5 times more likely to die by suicide than veterans without a history of TBI (Brenner et al., 2011). In addition, veteran depression has been linked to role uncertainty, poor marital adjustment and disturbed family functioning (Dekel & Monson, 2010).

Veterans with a history of mTBI can also contend with impulsivity and emotion dysregulation, which can lead to serious ramifications within the couple. Studies of combat veterans have found high rates of marital distress and intimate partner violence reported by 54%

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of OEF/OIF couples (Dekel, & Monson, 2010). As a result of the veteran's impaired interpersonal skills, both those with TBI and their family members experience a "shrinking of support networks" (LoBello et al., 2003), reducing the couple's ability for enjoyment and companionship which might provide a buffer against the challenges of reintegration. Low spousal relationship satisfaction has been associated with poor socio-emotional skills, particularly empathic ability, which is a common sequela of TBI (Burridge et al., 2007). Furthermore, military couples often must re-establish relationship routines, reallocate household responsibilities, renegotiate parental roles in caregiving and discipline, while addressing financial strain and reconnecting emotionally (Gerwitz et al., 2010). As such, studies have found that TBI has a more negative impact on spouses than on other caregivers, supported by high rates of marital distress and intimate partner violence, reported by 54% of OEF/OIF couples (Dekel, & Monson, 2010).

While there is a growing body of research establishing the validity and efficacy of family and couples interventions tailored specifically to the OEF/OIF cohort, targeting PTSD, depression, and relationship functioning post-deployment (Monson et al., 2008; Sautter et al., 2011; Schumm et al., 2013; Sherman et al., 2009; 2012), there has yet to be an evidence-based intervention developed to specifically meet the needs of veterans with a history of mTBI and their partners. Rodgers et al. (2007) adapted the multifamily group (MFG) model (Macfarlane, 2002) for civilian TBI and family members, which was then recently adapted by Perlick et al. (2014) in a pilot study for veterans with a history of mTBI and their partners. Perlick et al. (2014) found overall increases in caregivers' feelings of empowerment, greater occupational activity and interpersonal relationships on the part of the veteran, and decreases in veteran anger and depressive symptoms. Furthermore, participants noted that the group helped to reduce feelings of isolation by providing a space to discuss common struggles and aided in restoring relationships through communication and understanding (Straits-Tröster et al., 2014). These promising results prompted the researchers to develop and test a multifamily group treatment for mTBI in military couples in a randomized controlled trial. The intervention would address problem-solving challenges due to compromised executive functioning, emotion dysregulation, and challenges related to couples communication. Although the study's test groups are still underway, there has already been meaningful data collected from the enrolled participants that could provide some insight to the challenges military couples from the OEF/OIF era are facing post-deployment.

The current study aims to explore the relationship among depression, emotion regulation, communication patterns, and relationship satisfaction in OEF/OIF veterans with a history of mTBI and their partners. Cross-sectional data collected will be analyzed to compare these constructs between veterans and partners and to define the variables that predict relationship satisfaction. We hypothesize that veterans will score higher on measures of depression, emotion regulation, and conflict communication patterns compared to partners. Moreover, we hypothesize that depression, emotion regulation, and communication patterns will significantly predict relationship satisfaction when controlling for each variable. In examining these factors, we hope to illuminate the constellation of constructs that better predict relationship satisfaction in OEF/OIF veterans with mTBI.

Method

Participants and Procedure

A sample was drawn from an ongoing larger randomized controlled trial, which aims to expand upon Perlick et al.'s (2014) MFG adaptation for veterans with mTBI and their partners. These participants, 35 veterans and 35 partners, were recruited via clinician or program director referrals from the TBI/Polytrauma clinics, OEF/OIF centers, and Caregiver Support Groups from the James J. Peters VA Medical Center, VA New York Harbor Healthcare System, and VA Maryland Healthcare System. Because mTBI often overlaps with other conditions, the inclusion criteria were selected to ensure veterans met diagnostic criteria for mTBI that could only be explained by combat exposure in Iraq or Afghanistan. Thus, veterans who had other neurological conditions that either exacerbated the mTBI (i.e., borderline moderate) or better explained the mTBI were screened out. The previous MFG adaptation for this population found a significant cognitive gap between veterans with mTBI versus those with a moderate TBI,

which would have disrupted treatment (Perlick et al., 2014). For this reason, veterans were only included if they received a diagnosis for mild TBI. A detailed list of inclusion and exclusion criteria can be found in Table 1. Couples read and signed separate informed consent forms prior to completing the screening and baseline assessment. Veterans and partners were assessed separately in private offices. Couples were compensated $90 for completion of the assessment battery.

Materials

Depression. The Center for Epidemiologic Studies Depression scale (CES-D; Radloff, 1977) is a 20-item self-report measure of depressive symptoms. Participants indicated the extent to which items applied to themselves within the past weeks on a scale of 0 (rarely or none of the time) to 3 (most or all of the time). Sample items include "I had crying spells," "I felt sad," and "I felt hopeful about the future." Radloff (1977) found high internal consistency (Cronbach's $\alpha = .90$).

Table 1

Inclusion criteria for veterans
• Deployment-related mTBI, confirmed by the VA TBI Identification Clinical Interview (Vanderploeg et al., 2012) and in accordance with the VA/DOD Clinical Practice Guideline for Management of Concussion/Mild Traumatic Brain Injury: injury or concussion associated with at least one of the following: brief (< 30 minutes) loss of consciousness or altered state of consciousness or post-traumatic amnesia for < 24 hours following the injury
• OEF/OIF era
• No pre-existing neurologic condition(s) (head trauma unrelated to deployment, seizures, strokes, neurosurgery, other neurologic impairments based on medical record or self-report)
• No severe cognitive deficits, as defined by a Montreal Cognitive Assessment (MoCA; Nasreddine, 2005) score ≥ 19. The 30-item MoCA screens for impairment in specific areas of cognitive functioning deemed necessary for participation in a 90-minute, structured group including attention and concentration, executive functions, language and conceptual thinking. We have specified a MoCA cut-off at the lower end of the range for mild cognitive dysfunction (≥ 19), in order to exclude Veterans with severe memory and/or other cognitive deficits, while admitting those with more mild deficits, as these represent our target population, i.e., Veterans with a history of mTBI
Inclusion criteria for veterans and partners
• Currently married or cohabitating with a partner for 6+ months
• 18 years old or older
• No current alcohol or drug abuse or dependence defined by a Short Michigan Alcoholism Screening Test (SMAST; Selzer, 1975) ≥ 3, based on the recommended cut-off for TBI survivors (Gentilello et al., 1995) or a Drug Abuse Screening Test-10 (DAST-10; Skinner, 1982) ≥ 3l
• No life diagnosis of a psychotic disorder or active psychosis (schizophrenia, schizoaffective or bipolar disorder) or active psychosis based on the Structured Clinical Interview for DSM-IV-TR (SCID-L; First et al., 2007)
• Absence of "severe" inter-partner violence as defined by the revised 20-item Conflict Tactics Scale Short Form (CTS2S) (Straus & Douglas, 2004)
• No suicide attempt (actual, aborted, or interrupted) within the past six months indicated on the Columbia Suicide Severity Rating scale (C-SSRS)
• Absence of medical condition or life event (e.g., ongoing or pending legal action in another state) that would compromise participation
• No participation in another psychosocial intervention trial or couples' treatment six months prior to or during study or follow-up.

Emotion dysregulation. The Difficulties in Emotional Regulation (DERS; Gratz & Roemer, 2004) is a 41-item self-report measure that assesses emotion dysregulation across the following dimensions of emotion regulation: (a) awareness and understanding of emotions; (b) acceptance of emotions; (c) the ability to engage in goal-directed behavior and refrain from impulsive behavior, when experiencing negative emotions; and (d) access to emotion regulation strategies perceived as effective. Participants were asked to rate the extent of which items apply to themselves, with responses ranging from 1 (almost never) to 5 (almost always). Cronbach's alpha was .93 (Gratz & Roemer, 2004).

Communication. The Communication Patterns Questionnaire (CPQ; Christensen & Sullaway, 1984), is a 35-item self-report measure of conflict communication that addresses partners' behavior during three stages of an argument: (a) when some problem in the relationship arises; (b) during a discussion of a relationship problem; and (c) after a discussion of a relationship problem. The participants' scores are factored into three subscales: demand/withdraw, high conflict, and positive interaction. Christensen (1988) found a relatively high agreement between partners' independent reports for these three subscales (r's above .70). In addition, he found that positive interaction and demand/withdraw communication subscales were significantly related to marital adjustment in the expected direction.

Relationship Satisfaction. The Dyadic Adjustment Scale (DAS; Spanier, 1976) is a 32-item measure of relationship quality in married or unmarried cohabiting couples. Participants are asked to rate 30 questions relating to various aspects of intimacy and relationship satisfaction on a Likert scale and 2 questions with "yes/no" responses (e.g., "Has either of the following been problems in the relationship in the past month?"). The entire scale's Cronbach's α was .96 (Spanier, 1976).

Data Analysis

To test the first hypothesis, one-way analyses of variance (ANOVA) were conducted to compare scores on CES-D, DERS, CPQ, and DAS between veterans and partners to examine differences in depression, emotion dysregulation, communication patterns, and relationship satisfaction, respectively. Hierarchical regression models were run to determine statistical predictive significance of the above measures in the veteran sample and partner sample to test whether depression, emotion regulation, and communication patterns predicted relationship satisfaction. Predictors that were statistically significant at an alpha level of .05 were retained for further analysis. Three multivariate linear regression models were used to analyze the predictive power of these variables separately and together, when controlling for each other. As a result, the models could delineate whether all predictors better explained variance in relationship satisfaction, as hypothesized, or if there were any significant predictors independent of the others.

Results

Table 2 presents demographic characteristics of the veteran and partner sample. Data from 70 participants (i.e., 35 couples) were used in the current investigation.

Findings suggest that veterans scored significantly higher on measures of depression ($F(1, 63) = 18.86$, $p < .01$) and emotion dysregulation ($F(1, 63) = 25.85$, $p < .01$) and lower on positive interaction patterns ($F(1, 63) = 7.44$, $p < .05$) compared to partners. These results partially support the first hypothesis, which states that veterans would score higher on measures of depression and emotion dysregulation. While veterans scored significantly higher on each subscale of emotion dysregulation (see Table 3), no significant findings emerged from the high conflict CPQ subscale. Furthermore, no significant differences were found in veterans' and partners' scores of relationship satisfaction. Medium to large effect sizes were observed. Overall, these initial results suggest that there are significant differences in depression, emotional regulation, and positive communication patterns when comparing veterans to their partners.

To test our second hypothesis, an incremental test was run to determine the potential predictive power of each measure and the subscales within the DERS and CPQ, specifically. Results suggested that the following measures reached statistical significance: the DERS nonacceptance of emotional responses (NONACCEPT) subscale, the CPQ positive interaction subscale, the CES-D, and the DAS. As such, only these variables were used in subsequent multivariate regression analyses.

The findings of these final regression runs partially supported our second hypothesis in that all three constructs were significant predictors of relationship satisfaction in veterans but not partners. Table 4

Table 2
Participant Demographics

Veterans ($N = 35$)	*n* (%)	Partners ($N = 35$)	*n* (%)
Age ($\bar{x} \pm$ s.d.) 35.60 (8.545)		Age ($\bar{x} \pm$ s.d.) 34.41 (9.74)	
Gender		Gender	
Male	33 (94)	Female	32 (91)
Race		Race	
Black	16 (46)	Black	13 (37)
White	17 (48)	White	17 (49)
Multiracial	1 (3)	Asian	1 (3)
Native American	1 (3)	Multiracial	2 (6)
		East Indian	1 (3)
		Unknown	1 (3)
Ethnicity		Ethnicity	
Hispanic	12 (35)	Hispanic	8 (24)
Non-Hispanic	22 (63)	Non-Hispanic	26 (76)
Missing	*1 (3)*		
Education		Education	
Completed college and/or beyond	6 (17)	Completed college and/or beyond	17 (49)
Completed 12th grade or GED	26 (74)	Completed 12th grade or GED	17 (48)
Missing	*3 (9)*	Completed 8th grade	1 (3)
Employment Status		Employment Status	
Full time	12 (34)	Full time	12 (34)
Unemployed	11 (31)	Part time	5 (14)
Retired	3 (9)	Unemployed	11 (31)
Student	7 (20)	Retired	1 (3)
Missing	*2 (6)*	Student	6 (17)
Couples ($N = 35$)			
Marital Status			
Married	22 (62)		
Cohabiting	11 (31)		
Engaged	2 (7)		

summarizes the findings of three regression models run to test whether accounting for the above covariates predicts relationship satisfaction. For veterans, all three regression equations reached statistical significance suggesting that variance in relationship satisfaction is better explained when accounting for greater depression ($\beta = -.65$, $t(24) = -4.80$, $p < .01$), greater emotional non-acceptance ($\beta = .45$, $t(24) = 3.47$, $p < .01$), and fewer positive interaction patterns ($\beta = .57$, $t(24) = 5.15$, $p < .01$). However, the depression-only regression equation was the only model to reach significance for partners ($\beta = -.55$, $t(23) = -3.14$, $p < .01$), suggesting that depression predicts relationship satisfaction while non-acceptance of emotional responses and positive interaction patterns do not play a considerable role.

Discussion

The current study assessed common factors affecting veterans with a history of mTBI and their partners,

Table 3
Characteristics of veterans on emotion regulation, depression, and communication vs. partners

	Veteran ($N = 35$)	Partner ($N = 35$)		
Measure	M(*SD*)	M(*SD*)	Cohen's *d*	*r*
Depression[a]	23.65 (14.12)**	11.06 (8.1)	1.09	.48**
Emotion Dysregulation[b]				
Non-Acceptance	15.65 (7.29)**	11.24 (5.06)	.70	.33**
Goal-Directed Behavior	17.9 (5.53)**	10.64 (4.62)	1.42	.58**
Impulse	15.12 (6.96)**	9.45 (3.64)	1.02	.45**
Awareness	17.35 (5.18)*	14.34 (6.24)	.52	.25*
Strategies	20.56 (8.06)**	12.94 (4.56)	1.16	.5**
Clarity	12.56 (4.94)**	8.64 (2.70)	.98	.44**
Total	99.15 (28.66)**	67.09 (20.41)	1.29	.54**
Communication Patterns[c]				
High Conflict	14.88 (5.60)	12.87 (6.93)	.32	.16
Demand/Withdraw	18.81 (5.63)	17.10 (6.58)	.28	.14
Positive Interaction	17.97 (5.40)*	21.30 (4.69)	-.66	-.31*
Relationship Satisfaction[d]	103.20 (20.86)	110.90 (17.22)	-.40	-0.20

[a] Measured by Center for Epidemiological Studies Depression scale; higher scores indicate higher levels of self-reported depressive symptoms.
[b] Measured by Difficulties in Emotion Regulation scale; higher scores indicate greater self-reported emotion dysregulation.
[c] Measured by the Communication Patterns Questionnaire; higher scores indicate greater self-reported use of pattern.
[d] Measured by the Dyadic Adjustment Scale; higher scores indicate greater self-reported relationship satisfaction.

*$p \leq .05$. **$p \leq .01$.

hypothesizing that depression, emotion dysregulation, and communication patterns were key predictors of relationship satisfaction. Initial analyses suggested veterans were significantly more depressed, more emotionally dysregulated, and less likely to engage in positive interaction patterns compared to partners. Hierarchical regression models then determined the specific constructs that significantly predicted relationship satisfaction. Finally, multivariate linear regression modeling showed that veterans who were more depressed, less likely to accept their emotional responses, and less likely to engage in positive interaction patterns reported less relationship satisfaction. For partners, depression was the only factor that significantly predicted relationship satisfaction, with greater depression leading to lower relationship satisfaction.

These results potentially inform future studies examining relationship difficulties post-deployment. Among spouses, research has shown that caregiver burden generally increases over time after TBI and is sustained 7 years post-injury (Blais & Boisvert, 2005). In line with the results, relationship satisfaction and positive communication patterns could be important factors leading to decreases in caregiver burden, which are changes targeted in future analysis upon completion of the current study. Interviews with partners of veterans with mTBI have also demonstrated the therapeutic qualities of better communication and understanding within the relationship, particularly when emotions run high (Straits-Tröster et al., 2014). This study demonstrated that veterans who have sustained a mTBI struggle with emotion regulation difficulties post-injury

Table 4
Summary of hierarchical regression analysis for variables predicting relationship satisfaction

Veteran ($N = 35$)	Model 1			Model 2			Model 3		
Variable	*B*	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β
Depression	-.92	.23	-.61	-1.3	.27	-.86**	-.98	.20	-.64**
Non-acceptance of emotions				1.19	.51	.42*	1.24	.36	.44*
Positive interactions							2.21	.43	.57**
R^2		.369			.479			.748	
F for change in R^2		15.81**			5.49*			26.68**	
Partners ($N = 35$)	Model 1			Model 2			Model 3		
Variable	*B*	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β
Depression	-1.2	.40	-.55**	-1.33	.44	-.59**	-1.20	.55	-.53
Non-acceptance of emotions				.40	.76	.10	.45	.79	.12
Positive interactions							.37	.88	.10
R^2		.30			.309			.315	
F for change in R^2		9.88**			.27			.17	

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

compared to their romantic partners, which could help explain caregiver burden in terms of how partners must navigate explosive tempers, emotional numbing, and isolation. In sum, this study provides preliminary data on the predictive value of specific factors related to problem areas for military couples, which can then lead to more causal explorations of the types of treatment that effectively target and treat these post-deployment challenges related to reintegration and reestablishing intimate relationships.

Limitations

The following study has several limitations that affect the generalizability of the results. A major limitation arises from the homogeneity of gender in the veteran sample and the partner sample, which are nearly exclusively male and female, respectively. Studies suggest that women are almost twice as likely to suffer from depression compared to men of the same age (Pratt & Brody, 2008). As such, it remains unclear whether the results relating to depression in partners is a function of their relationship to the veteran or to the majority of partners identifying as women. In the larger social context, men are also often expected to limit their range of emotions, while women are expected to be highly emotional and communicative of their feelings (Plant et al., 2000). Thus, the near-exclusive male status of the veteran cohort cannot be ruled out as a possible explanation for the differences in emotional acceptance and positive interaction patterns compared to partners. As the larger study continues and sample size increases, efforts to disperse gender differences among the veteran and partner samples will hopefully dilute any biases that are likely to confound the results related to depression, emotional acceptance, and communication patterns.

In addition, the study did not account for the possible confound of comorbidity. Specifically, veterans who have sustained a mTBI not only tend to suffer from depression and/or PTSD, but also from cognitive and neurologic challenges. The neuropsychiatric sequelae

of mTBI may include cognitive dysfunctions (problems in memory, attention, executive functions, affect recognition, empathy, self-awareness) as well as comorbid mood, posttraumatic stress and other neurobehavioral disorders (Halbauer et al., 2009; Cicerone et al., 2006; Wehman et al., 2009; Huckans et al., 2010). As such, the interaction between the neuropsychiatric sequelae and mood or anxiety disorders could be the defining characteristic that leads to greater emotion dysregulation, which then leads to lower relationship satisfaction. The present study does not allow for us to discount the possibility that mTBI is exclusively responsible for the factors explored in the current study. While exclusion criteria filtered those veterans with more severe cognitive impairments, the study did not completely rule out the possible effects of the aforementioned comorbidities in the relationship among emotional and interpersonal factors that predict relationship satisfaction.

Finally, the study only compares veterans post-injury with their civilian partners, which does not account for the veterans' overall character and disposition before the injury occurred. In addition, many of the partners did not know the veteran pre-injury and thus could not provide reliable data as to the nature of the relationship before the veteran sustained the mTBI. The current study's findings would have been strengthened with an additional cohort of veterans without mTBI and their partners to control for related factors that may better explain the variance in relational difficulties, such as preexisting mood disorders or turbulent personal history. Thus, this study cannot rule out the possible influence of extraneous variables based on the findings of the current sample.

Conclusion

This preliminary study of the factors that contribute to relationship satisfaction identified several key areas that can present challenges to OEF/OIF veterans reentering civilian life with their significant other. Combat-related TBI is accompanied by various sequelae that affect the quality of relationships, such as depression, difficulties in emotion regulation and maladaptive communication patterns, which can compromise relationship satisfaction. However, in knowing the detrimental factors the study also identified possible protective factors that could help sustain relationship satisfaction and wellbeing, such as the potential for improvement through encouraging acceptance of the veteran's emotional responses and engaging in positive communication patterns. Moving forward, this study provides the framework for future expansions of the data as sample size increases and post-intervention data becomes available, which would elucidate the longitudinal effects of multifamily group for OEF/OIF veteran couples.

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