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Name of Candidate: CPT David A. Ross
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Dr. Marian Tanofsky-Kraff
DEPARTMENT OF MEDICAL AND CLINICAL PSYCHOLOGY
Committee Chairperson

8/8/11

Dr. David Riggs
DEPARTMENT OF MEDICAL AND CLINICAL PSYCHOLOGY
Dissertation Advisor

8/8/11

Dr. Andrew Waters
DEPARTMENT OF MEDICAL AND CLINICAL PSYCHOLOGY
Committee Member

8/8/11

Dr. Cara Olsen
DEPARTMENT OF PREVENTIVE MEDICINE AND BIOMETRICS
Committee Member

Abstract

Title of Dissertation:	The Relationship of PTSD and Communication with Intimate Partners in a Sample of Vietnam Veterans
Author:	David A. Ross, Doctor of Philosophy, 2011
Dissertation directed by:	David S. Riggs, Ph.D., Research Associate Professor, Department of Medical and Clinical Psychology

Symptoms of post-traumatic stress disorder (PTSD) have had extraordinary impact on combat veterans and on their social and intimate relationships. Communication behavior is believed to be a primary mechanism through which PTSD influences intimate relationships, and these veterans and their partners often report a variety of negative behavior patterns. Most of the relevant literature has relied on self-report measures, with sparse examples of observational research. In this study, 34 male Vietnam veterans and their intimate partners participated in videotaped conversations discussing three different topics: a recent neutral/positive event (NP), a problem within the relationship (PR), and his Vietnam experience (VN). The content of each conversation was coded using the Rapid Marital Interaction Coding System, and particular codes and sequences were compared based on PTSD severity, status (PTSD vs non-PTSD), and conversation topic. Increasing PTSD severity was related to fewer overall veteran utterances, and veterans typically made fewer utterances in the VN topic than either the NP or PR topics. With increasing PTSD severity, veteran hostility increased during the VN topic but decreased during the NP topic. Rates of veteran self-disclosure were typically lower in the NP topic than either the PR or VN topics, and increased as PTSD severity increased. Instances of

veteran withdrawal and psychological abuse were too infrequent to be analyzed. For wives, acceptance statements were highest during the VN topic and relationship-enhancing attributions were highest during the PR topic. Couples in the PTSD group demonstrated greater odds of negative reciprocity (negative antecedent followed by negative response) during the VN topic, and slightly greater odds during the PR topic. Veterans with PTSD tended to respond more negatively during the PR topic regardless of the antecedent, but not to statistical significance. Of the eleven possible antecedents, wife hostility was the most frequent trigger of veteran negativity. These results are discussed in greater detail, particularly in the context of clinical implications for current-era veterans and their spouses.

The Relationship of PTSD and Communication with Intimate Partners

In a Sample of Vietnam Veterans

David A. Ross

Dissertation submitted to the faculty of the

Department of Medical and Clinical Psychology

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in partial fulfillment of the requirements for the degree of

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Introduction

Vietnam Veterans

The Vietnam War ended in 1975, and in 1981 a report was presented to the US Congress on behalf of the Veterans' Administration outlining myriad social, psychological, and behavioral problems faced by veterans of the war (Egendorf, Kadushin, Laufer, Rothbart, & Sloan, 1981). From this report it became clear that soldiers' perception of the war was not very different from the overall public opinion, as nearly 60% of soldiers opposed or did not understand it. Upon returning home, many describe a lack of a "hero's welcome" and even a sense of alienation from members of their own generation. Readjustment problems included lack of interest in normal activities, lack of confidence, anger and hostility, confusion, recurrent nightmares containing war imagery, medical problems, increased drug and alcohol use, and increased arrests and convictions.

Only one out of four veterans in the report believed the war had little or no effect on them, and these were typically men who had very little exposure to death and remote relationships with the Vietnamese. The authors noted that men from the most stable families were least likely to develop stress reactions after exposure to heavy combat, men from average stability families tended to react to lower amounts of combat, and men from the least stable families developed reactions simply in response to daily life stressors. They also noted that married veterans were typically better adjusted than unmarried men, but the more critical variable was positive social support, not marital status. Overall, the study indicated great complexity as combat exposure, race, family status, social support

quality, and even the size of the veteran's city of residence were all associated with the development of post-war stress and adjustment problems (Egendorf et al., 1981).

After Egendorf et al. (1981) raised awareness of these issues, Congress mandated the National Vietnam Veterans Readjustment Study (NVVRS) in 1983, and the results were published in 1990. This report is generally regarded as the first large-scale public acknowledgement that Vietnam veterans were deeply affected, both emotionally and psychologically, by their combat experiences. The NVVRS reported that over 30% of male veterans had post-traumatic stress disorder (PTSD) at some point during their lifetime, and that half of these met criteria during the six months preceding the survey (Kulka et al., 1990). During that same window, an additional 11% of male veterans suffered from sub-threshold PTSD. A subsequent report indicated that the statistics might be closer to 19% lifetime and 9% current diagnosis. This adjustment reflects a refinement to the diagnostic algorithm to ensure that it included only cases that met the criteria for traumatic exposure (Dohrenwend et al., 2006). Although both men and women served in the war and both experienced challenges in post-war adjustment, front-line combatants were strictly male and therefore the majority of Vietnam veterans with PTSD are men. As a result, the majority of research on Vietnam veterans with PTSD has focused on male veterans and, when applicable, their wives or female intimate partners. The present study also uses a sample of male Vietnam veterans and their female partners. Therefore, throughout this paper, male pronouns (*he*, *him*, etc.) will refer to the male veteran, and female pronouns (*she*, *her*, etc.) will refer to the veteran's wife or intimate partner. It has been well documented that Vietnam veterans have experienced significant difficulties

within intimate relationships, and there have been numerous research efforts to better understand the nature of these problems. This study seeks to examine communication patterns between veterans and their wives and identify any differences that may exist among the topic of conversation or the veteran's PTSD status or severity. This study ventures beyond extant literature by utilizing observational methods in addition to self-report, and by coding the richer details of communication instead of relying entirely on *positive* vs. *negative* variables.

This introduction will outline the general presentation of PTSD, discuss marriage and family relationships, particularly the role of positive and negative communication behaviors, and review the literature on PTSD's impact on marriage, family, and communication. A discussion of the phenomenon of emotional numbing will lead into the rationale, purpose, and specific aims of the present study. Although much of the focus of this introduction will be on Vietnam veterans because they comprise the sample for the current study, connections will be drawn to veterans serving in the current conflicts in Iraq and Afghanistan. The extant literature documents the 20- to 30-year impact of combat and PTSD on Vietnam veterans and their families. Importantly, if no lessons are learned from the experiences of those veterans, then today's veterans could expect the same bleak future in the coming years. The present research aims to help us understand the dynamics involved in the negative cycle of individual PTSD and relationship difficulties in an effort to help prevent history from repeating itself.

PTSD Symptoms and Correlates

It is important to note that clinical observations and research have updated the understanding of PTSD since the NVVRS was conducted. This increased knowledge has led to updated diagnostic criteria. For obvious reasons, it is difficult to compare and contrast veterans who have been diagnosed with the same label, but at the time of their respective diagnosis may have met different criteria. A brief comparison between current and previous understanding of PTSD is intended to help the reader understand the research presented throughout this paper.

The current definition of PTSD can be found in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (American Psychiatric Association, 2000), and includes the following characteristics:

A: Exposure to a traumatic event that includes both of the following:

1: Actual or threatened death or serious injury of self or others

2: Intense fear, helplessness, or horror

B: Persistent re-experiencing in at least one of the following ways:

1: Intrusive images, thoughts, or perceptions of the event

2: Distressing dreams of the event

3: Acting or feeling as if the event were re-occurring

4: Intense distress when exposed to internal or external cues that resemble the event

5: Physiological reactivity when exposed to those cues

C: Persistent numbing or avoidance in at least three of the following ways:

1: Avoiding thoughts, feelings, or conversations about the event

2: Avoiding activities, people, or places that resemble the event

3: Inability to recall an important aspect of the event

4: Diminished interest or participation in significant activities

5: Feeling detached or estranged from others

6: Restricted range of affect

7: Sense of a foreshortened future

D: Persistent increased arousal in at least two of the following ways:

1: Difficulty falling or staying asleep

2: Irritability or outbursts of anger

3: Difficulty concentrating

4: Hypervigilance

5: Exaggerated startle response

E: Duration of the above three categories of symptoms of at least one month

F: The disturbance causes clinically significant distress or impairment in various functional areas

However, much of the early research on PTSD in Vietnam veterans used the original criteria for the disorder, found in the DSM-III (American Psychiatric Association, 1980). This definition differed in the following ways:

- There was no specific requirement for fear, helplessness, or horror during the event (criterion A-2)

- There were fewer re-experiencing symptoms (criterion B-4 was included as an arousal symptom, and criterion B-5 was not included at all)

- There were fewer avoidance symptoms (criteria C-1, C-2, C-3, and C-7 were not included), and the category required the presence of only one symptom

- Category D was not limited to arousal symptoms (in fact, criteria D-2 and D-4 were not included), and included the present criterion B-4 as well as survivor guilt and general avoidance of trauma-related activities

An intermediate version of the PTSD diagnosis can be found in the DSM-III-R (American Psychiatric Association, 1987). The PTSD criteria included in this version were nearly identical to those in the current definition. This point is important because the present study draws from a dataset that was coded using DSM-III-R criteria. In order to simplify matters for the purposes of this review, the reader should remember that any research before 1987 uses the older diagnostic criteria, and references from 1987 onward use the current definition or something very similar.

In addition to the symptoms included in the diagnostic criteria, individuals with PTSD often present with difficulties in other domains of life which may be directly or indirectly related to the disorder. For example, psychiatric comorbidities are common among individuals with PTSD. As many as 83% of veterans with PTSD present with some lifetime diagnosis of anxiety, depression, somatoform pain disorder, or antisocial personality disorder (Biddle, Elliott, Creamer, Forbes, & Devilly, 2002; Green, Lindy, Greace, & Gleser, 1989; O'Toole, Marshall, Schureck, & Dobson, 1998; Sierles, Chen, Messing, Besyner, & Taylor, 1986; Zatzick et al., 1997). Alcohol abuse and dependence

have been noted by treating clinicians (Biddle et al., 2002), and linked to PTSD in epidemiological (Card, 1987) as well as comorbidity research (Green et al., 1989; O'Toole et al., 1998; Sierles et al., 1986). There is evidence of a wide range of physical comorbidities which, because the specific complaints differ among veterans, may or may not be directly related to the combat exposure underlying the PTSD (Marshall, Jorm, Grayson, & O'Toole, 1998). Research has also suggested that Vietnam veterans have a unique PTSD symptom profile. As compared with World War II veterans, those who served in Vietnam demonstrated increased guilt, avoidance of reminders, detachment and estrangement, loss of pleasure, startle reaction, derealization, and suicidal ideation or attempts (Davidson, Kudler, Saunders, & Smith, 1990).

Marriage and Family

Because the present study seeks to understand the communication patterns between the veteran and his wife, it is important first to examine interactions in a family system, as well as the role of emotion and communication within this system. The family is often viewed as a system, in which the family members function both independently and interactively (Bowen, 1978). The family system maintains its stability through a process whereby members interact in a compensatory fashion, such that change in one part of the system is followed by subsequent balancing change in another part of the system. When one member of a successful system experiences dysfunction, such as that which characterizes PTSD, other members compensate with some degree of overfunction. This dysfunction and compensatory overfunction may contribute to emotional distress in members of the family system.

Emotional experience, management, and expression become influential processes that can repair or exacerbate relationship distress (Johnson & Greenberg, 1994). In a romantic relationship, the inability to manage one's affect may lead to emotional disengagement from the partner, and this disengagement is often a key part of marital dissolution. Possibly to prevent this outcome, individuals may make efforts toward controlling or altogether avoiding emotional experience and expression. Some research even suggests that behavior patterns and effects on the relationship vary by role. For example, hostile expression from the wife predicts a decline in husband's marital satisfaction after roughly three years, but her withdrawal does not; conversely, the husband's withdrawal predicts a decline in wife's marital satisfaction over the same period, but his hostile expression does not (L. J. Roberts, 2000). The same study found that regardless of gender, both hostile expressiveness and withdrawal were concurrently related to marital distress.

Dyadic Communication and Marriage

There is a large body of research that has examined dyadic communication and various measures of marital quality, and the results overwhelmingly suggest a strong and consistent relationship between the two. Marital satisfaction is typically characterized by high amounts of positive communication, low amounts of negative communication, or some combination of the two. Likewise, marital dissatisfaction is associated with the presence of negative communication and/or the absence of positive communication. This finding is robust and has been supported in research utilizing a wide range of variables, including a number of observational studies but predominantly relying on self-report

measures, and ranging from broad comparisons of positive and negative statements to detailed discussions of content and patterns of expression.

In one longitudinal study, Lavner and Bradbury (2010) found that specific four-year trajectories for marital satisfaction in both parties could be predicted by a set of positive variables (specifically humor, affection, and interest) and, at least for wives, by a set of negative variables (anger and contempt). In another longitudinal study, Gottman (1993) was able to differentiate between groups of stable (still married after four years) and unstable (seriously considering or already divorced after four years) couples by examining the ratio of positive to negative statements observed in a given conversation. He found that both partners in stable relationships elicited an average of greater than five positive comments for every negative one. Conversely, husbands in unstable marriages had a roughly even ratio of positive to negative, and their wives' positive comments were outnumbered by negative approximately two to one (Gottman, 1993). Of particular danger is the process of *negative reciprocity*, where each negative behavior by individual *A* directed at individual *B* increases the likelihood of a subsequent negative behavior from *B* directed at *A*, and so forth (Gottman, 1979). Levenson and Gottman (1985) examined reciprocity with regard to negative affect and reported that, when attempting to predict relationship satisfaction over three years, simple totals of positive and negative affect performed poorly. However, two patterns of affective reciprocity emerged: the greatest declines in satisfaction were observed in couples wherein wives reciprocated husbands' negative affect, and in couples wherein husbands did not reciprocate wives' negative affect (Levenson & Gottman, 1985). These results indicate that there are additional

factors influencing the importance of expressing affect and perceiving affective response from one's spouse. Additional research has demonstrated the influence of perceptions of communication on relationship satisfaction, as couples' ratings of communication satisfaction during various interaction exercises predict overall relationship satisfaction after two and a half years (Markman, 1979) and again at the five-year point (Markman, 1981).

In a review of 115 longitudinal studies, sampling over 450,000 marriages, Karney and Bradbury (1995) examined effect sizes of nearly 200 independent variables on outcomes of the couples' marital stability and marital satisfaction, measured over a widely varying span of one to forty years. The authors caution against drawing conclusions based on the aggregated effect sizes, but the distribution of predictors on each outcome variable is noteworthy: positive or negative behavior by either or both spouses, as well as positive or negative reciprocity as a couple, comprised the top five predictors of the couples' marital stability and five of the top six predictors of their marital satisfaction.

In an effort to better understand the role of these positive and negative expressions, other researchers have operationalized the communication variables into more specific types of statements and patterns. For example, as compared to couples who self-refer to therapy and couples who are currently divorcing, nondistressed couples typically report having more mutual constructive communication and less mutual avoidance of problem discussion (Christensen & Shenk, 1991). These nondistressed couples also reported the lowest tendency to engage in cycles where one party becomes

demanding and critical, leading the other party to withdraw from the conversation. Caughlin and Huston (2002) determined that these demand/withdraw cycles are unique from overall negativity, and they found that the more specific variable (demand/withdraw cycles) accounted for variance in marital satisfaction that was not explained by the broader variable (negativity). In another cross-sectional examination, perceptions of avoidance and withholding communication patterns were more strongly associated with relationship satisfaction than emotional intelligence and perceptions of constructive communication and demand/withdraw cycles (Smith, Heaven, & Ciarrochi, 2008). Heavey and colleagues (1993) found a gender difference in these cycles, such that husband-demand/wife-withdraw predicted increases in the wife's marital satisfaction one year later, yet wife-demand/husband-withdraw led to declines in her satisfaction over the same period. Conflicting results such as these clearly indicate that additional influences are present and, at least in this example, unaccounted for.

Researchers have also identified differences between a particular variable's immediate influence in the relationship and its impact over a longer time period. Gottman and Krokoff (1989) found that anger and disagreement were concurrently related to unhappiness and negative interaction within the relationship, but actually predicted improvement in satisfaction over a three-year period. They reported that defensiveness, stubbornness, and withdrawal from interaction predicted decreased satisfaction over the same period. A similar study found that reports of spouse negativity (e.g., showing anger or impatience, complaining or criticizing, or seeming bored or uninterested) were associated with lower concurrent relationship satisfaction and predicted declines in wife's

satisfaction two years later, but had no predictive value for the husband's satisfaction (Huston & Vangelisti, 1991). In another longitudinal study, nonverbal negative affect was found to predict marital dissatisfaction five years later, and hostility and neuroticism predicted marital dissolution after the same time period (Rogge, Bradbury, Hahlweg, Engl, & Thurmaier, 2006).

Communication and Conversation Topic

The majority of research devoted to communication is limited to comparisons of self-report data, which offers a limited picture of the variables being examined (Karney & Bradbury, 1995). Observational research employs another type of data representing the same construct but from a different vantage point, and when these objective data are combined with subjective self-report data we begin to attain a clearer picture of the relationships under investigation. One method of observational research involves analyzing a couple's interaction in a laboratory setting. This may entail a single interaction episode (Campbell, Simpson, Kashy, & Rholes, 2001; Simpson, Rholes, & Nelligan, 1992), but often researchers manipulate the conversation topic as an independent variable (Aron, Norman, Aron, McKenna, & Heyman, 2000; Gouin et al., 2009; Heyman, Hunt-Martorano, Malik, & Slep, 2009; Knobloch & Solomon, 2003; Montemayor, Eberly, & Flannery, 1993; Rehman et al., 2010). Specific topics are intended to elicit particular responses from the individuals involved, and using multiple topics creates a broader picture of a couple's interaction and allows for statistical comparison between topics. Examples of conversation topic being manipulated to examine specific hypotheses are briefly discussed below.

Some researchers use multiple conversation topics as a means to increase the generalizability of their results rather than to compare between topics. Knobloch and Solomon (2003), for example, examined how intimate relationships were conceptualized within communication. They recognized that *communication* is a broad term and, in an effort to increase generalizability, they collected data across three different topics: a positive topic, a negative topic, and a recent surprise event that impacted the relationship. Although the results of the study are not germane to this discussion, the authors' methodology supports the notion that different topics carry the potential for differences in tone and content. Other researchers have manipulated conversation topic as a means of avoiding particular confounds. Aron et al. (2000) studied communication within a complex design of physical and verbal interaction, and asked participants to discuss either vacation or home improvement planning as a deliberate effort to avoid conflict, which the authors feared would confound results in the physical activity. Again, the results are not relevant to this discussion but rather the study is included as an example of another purpose which conversation topic may serve in research. More pertinent to this discussion, researchers often manipulate conversation topics in order to compare the effect of topic on another variable. For example, Gouin and colleagues (2009) examined immune functioning using two different conversations. In the first conversation, couples took turns discussing aspects of themselves that they wanted to change while the partner provided social support. The second conversation was a conflict-resolution task focusing on problems within the couple's relationship. The authors determined that conversation

topic predicted immune dysregulation, as inflammatory response was greater following the conflict task compared with the social support interaction.

Another research team examined differences between conversations where the man requests change from his female partner, and vice-versa, where the woman requests change from her male partner (Heyman et al., 2009). They found that women are more positive and less negative during the male-initiated conversation than during a topic of their own choosing. In a similar study, Rehman and colleagues (2010) studied marital distress as predicted by positive and negative affect in couples discussing two conflicts within the relationship, one sexual and one nonsexual. They found that marital distress was most strongly predicted by negative affect, specifically that which was displayed in the conversation about a sexual conflict. Altogether, these examples demonstrate the utility of manipulating conversation topic in order to elicit a particular affect and/or increase generalizability of results.

PTSD and Family

Now that we have established a broad understanding of marriage, family, and the communication that takes place within these environments, we will examine the ways that veterans' PTSD influences these situations. The impact of PTSD with marriage and family is complex. For example, the fact that PTSD has been associated with the lack of an intimate relationship (Card, 1987) may lead the reader to believe that simply being involved in an intimate relationship protects the veteran against PTSD. Yet there are numerous reports of PTSD's negative effects on the family, which will be discussed in detail below. Other research links PTSD with veterans' negative perceptions of family's

helpfulness upon homecoming (Frye & Stockton, 1982), indicating that the quality of the family may be more influential than merely its presence or absence. The reader may recall the findings of Egendorf et al. (1981), that social support appeared more relevant than marital status in accounting for PTSD. Before delving into the complexities of family, it is appropriate to start with a discussion of social support in general.

Social support. Social support is usually regarded as beneficial for those who have it, and is typically conceptualized in two ways: emotional, as a sense of connectedness with trusted others (King, King, Foy, Keane, & Fairbank, 1999; Walsh, 2007), or functional, as a network of people offering resources to meet basic logistical needs (Boscarino, 1995). Using a qualitative measure of perceived availability and adequacy of functional social support, Boscarino (1995) studied the variable as a predictor of post-traumatic symptom clusters and comorbidities in Vietnam veterans. He found that social support had a negative correlation with diagnoses of PTSD and several common comorbidities, namely generalized anxiety, depression, and alcohol abuse and dependence. Strikingly, veterans with low social support (scores falling more than one standard deviation below the mean) had approximately 80% greater chance of developing PTSD than those with average (within one standard deviation of the mean) support, and 180% greater risk than those with high (over one standard deviation above the mean) scores. In a meta-analysis of 77 studies examining 14 potential risk factors, lack of social support was second only to trauma severity in predicting PTSD in trauma-exposed adults (Brewin, Andrews, & Valentine, 2000).

King et al. (1999) also found that both the size and emotional/functional nature of the social support network served as protective factors against development of PTSD in Vietnam veterans. However, additional pre-war risk factors and war-zone stressors were found to predict the size and nature of post-war social support. Similarly, war-zone stressors are a necessary precursor to combat-related PTSD, and a number of pre-war variables have also been identified as predictors for the disorder (Kulka et al., 1990). Given that both PTSD and social support are influenced by earlier experiences and circumstances, it becomes more difficult to elucidate the exact relationship between the two.

Marriage and family. Most theorists suggest that the ideal marriage or family is one that fosters emotional and functional social support, and should therefore protect either individual from developing PTSD. However, the current literature overwhelmingly indicates that PTSD is a stressful influence on the marriage and family, and often has negative results (Monson & Taft, 2005), which perhaps serves to decrease the support within the marriage. The bidirectional relationship between marriage and PTSD has been studied extensively and although much has been learned from this research, there are still questions unanswered.

Greater PTSD symptom severity has been associated with poorer overall marital adjustment (Caselli & Motta, 1995; Khaylis, Polusny, Erbes, Gewirtz, & Rath, 2011). Similarly, veterans with PTSD are significantly more likely to report problems in marital, family, and parental adjustment than their counterparts without PTSD (Galovski & Lyons, 2004; Jordan et al., 1992). The veteran's PTSD is often associated with a host of

stressors affecting the spouse, including physical abuse, emotional detachment, lack of sexual intimacy, and responsibility for the children's welfare, the veteran's mental health, and the family's finances (Galovski & Lyons, 2004). In a qualitative analysis where families described the impact of the veteran's PTSD, Ray and Vanstone (2009) reported that the major themes that caused problems with family relationships were anger and emotional numbing and withdrawal. Another study found that husbands' PTSD symptoms were associated with lower positive bonding, confidence in and dedication to the relationship, and parenting alliance, and higher levels of negative communication, and that even after controlling for these variables, PTSD symptoms were still related to marital satisfaction (Allen, Rhoades, Stanley, & Markman, 2010). Renshaw and colleagues (2010) found that, in terms of the spouse's report of psychological and marital distress, spouse perceptions of veteran PTSD symptoms were more responsible than the PTSD symptoms themselves.

However, Jordan and colleagues (1992) were deliberate to assert that not all families of veterans with PTSD experienced severe negative circumstances. These researchers examined several demographic, individual/family background, and present functioning variables in an attempt to clarify the relationships between PTSD and family functioning. They determined that although spouse/partner age and education, number of prior divorces, and length and status of relationship were related to problems in family functioning, none of the background variables explained family functioning as strongly as the veteran's current PTSD severity. This finding suggests that although PTSD may play a leading role in influencing family functioning, the picture is quite complex. One

example of the complexity is the difficulty in determining the directionality of the relationship. In a sample of combat veterans, Meis and colleagues (2010) found that pre-existing negative emotionality put veterans at greater risk for developing PTSD symptoms, which in turn led to lower marital satisfaction. Evans and colleagues (2010) generally found the reverse, but suggested that the relationship between PTSD and family functioning is at least somewhat bidirectional. Although they did not include pre-marital or pre-trauma variables, they studied PTSD symptoms and family functioning at three different time-points surrounding PTSD treatment. They found that family functioning was strongly predictive of all three PTSD symptom clusters at various time-points, and that only avoidance symptoms predicted family functioning, and only after treatment was complete.

On a positive note, healthy relationships have been identified as a protective factor against PTSD. One example is spouse support, which refers to one spouse leading the other to believe he or she is loved, cared for, esteemed, and valued, and that he or she belongs to a supportive network characterized by communication and obligation (Shehan, 1987).

From a larger family system perspective, spouse support is activated as part of the systemic response to the disruption of an individual member, in this case the veteran's PTSD. The family response is, of course, greater than simply spouse support, and also consists of observing the veteran's symptoms, or dealing with the direct and indirect consequences of these symptoms. Research has demonstrated that veterans' spouses and romantic partners describe avoidance symptomatology similar to the veterans themselves,

but there is less agreement on symptoms of re-experiencing and hyper-arousal (Gallagher, Riggs, Byrne, & Weathers, 1998). In addition, quality of the relationship was not found to directly influence the agreement between symptom ratings (Taft, King, King, Leskin, & Riggs, 1999).

Researchers have not yet determined the exact mechanism to explain the relationship between PTSD and marital relationships. Gimbel and Booth (1994) found evidence supporting three different theories. The first theory suggests that there are characteristics about an individual that make him both more likely to be exposed to combat and also poorly skilled in managing intimate relationships. This common thread may be an underlying psychological problem, proneness toward antisocial acts, or some other variable. The second theory holds that the soldier's combat-related PTSD directly and indirectly impacts marital quality. The marriage is directly affected via the interpersonal stress elicited by the PTSD symptoms, and indirectly affected by PTSD's impact on employment, income, and other variables which are themselves related to marital quality. The final theory posits that combat exposure exaggerates pre-existing problems within the soldier, and that this exacerbation negatively impacts the marriage. The authors report evidence supporting all three theories, and emphasize that the theories are not necessarily mutually exclusive.

In an effort to clarify the complex associations between PTSD and marriage, MacDonald and colleagues (1999) found that although PTSD was correlated with measures of family functioning and marital satisfaction, both relationships became insignificant after controlling for the veteran's interpersonal problems, which included

difficulties in intimacy, aggression, assertiveness, compliance, independence, and sociability. It is important, therefore, to better understand these interpersonal problems if we are to understand the link between PTSD and problems within the family system.

Impact on spouses. Regardless of the exact mechanism acting on the family, there is a widely reported phenomenon in spouses' and partners' reactions to veterans' PTSD. Managing and helping the veteran manage his symptoms is difficult enough, but partners must also share consequences such as constricted lifestyle and social isolation that are often part of the avoidance symptom cluster. Generally known as *caregiver burden*, there has been some variation in how the concept has been defined and examined across the literature, but it typically involves an unequal sharing of responsibility in areas of health, finances, social life, and interpersonal relations due to one individual's behavioral or functional impairment (Calhoun, Beckham, & Bosworth, 2002). Wives of veterans with PTSD report feeling trapped, defeated, isolated, and unable to cope with their husbands' symptoms, and feel an overwhelming sense of responsibility for managing the family without the help of, and despite occasional negative influence from, the veteran (Coughlan & Parkin, 1987). These women also express a sense of guilt and worthlessness because they are unable to "fix" their husbands' condition, and feelings of uncertainty and helplessness particularly when trying to endure or intervene during nightmares, flashbacks, or other re-experiencing episodes (Verbosky & Ryan, 1988). From a family system perspective, the wife is liable to overcompensate for the husband's dysfunction in various areas, assuming disproportionate duties in parenting, caretaking, and earning family income.

Perhaps not surprisingly, the wife's reports of caregiver burden are correlated with the veteran's PTSD symptom severity and are predictive of her general psychological adjustment (Calhoun et al., 2002). Wives of veterans with PTSD have reported lower subjective well-being and greater psychological distress than wives of veterans without PTSD (Jordan et al., 1992). Termed *secondary traumatization*, wives have been known to develop their own post-traumatic symptoms such as anxiety, hypervigilance, distrust, and somatic complaints, absent from any personal history of trauma but presumably related to that experienced by their husbands (Galovski & Lyons, 2004; Lyons, 2001; Solomon et al., 1992). Solomon and colleagues (1992) suggest that the wife's challenges and/or pathology may be a response to the chronic stressor of living with an individual with PTSD, may result from an increased susceptibility based on the loneliness and isolation described above, or may be explained by the emotional closeness with her husband and her subsequent internalization of his stressful experiences and imagery.

PTSD and Communication

Communication is an integral component of interpersonal relationships, and particularly so in intimate relationships such as marriage. Given the impact of PTSD on the individual veteran, his wife/partner, and his family, it is thought that one area in which the impact of PTSD on relationships might manifest is in communication between veterans and their significant others. It is predicted that these communication effects will be observed in an overall lower level of expressiveness, and also apparent in more

specific patterns of communication or types of expressiveness, such as increased conflict, anger, and hostility.

Previous studies have linked PTSD to indicators of potential communication difficulties, but these studies have largely relied on paper-and-pencil measures of potential difficulties rather than utilizing direct observation of conversations between veterans and their partners. When compared to veterans without PTSD, those with PTSD report more problems with intimacy (Riggs, Byrne, Weathers, & Litz, 1998) and sociability (W. R. Roberts et al., 1982), and are less able to express or share feelings with their spouses or partners (Shehan, 1987). This problem may be compounded by the fact that partners of veterans with PTSD report greater fear of intimacy than partners of veterans without PTSD (Riggs et al., 1998). In a sample of combat veterans seeking treatment for substance abuse, those with PTSD reported having more problems getting emotionally close to someone, feeling or expressing emotions, and being able to express their feelings, especially to those they care about (Penk et al., 1981). Subsequent research linked this decreased expressiveness specifically with the avoidance component of PTSD, which was also associated with lower marital satisfaction (Hendrix, Jurich, & Schumm, 1995). In the same study, intrusion symptoms were correlated with lower levels of cohesion and expressiveness, as well as lower marital satisfaction. The authors also reported that conflict, although not correlated with any PTSD symptom category, was grouped with cohesion and expressiveness as having the greatest impact on marital satisfaction.

Anger and Hostility.

In a sample of veterans seeking treatment for anxiety, mood, adjustment, and personality disorders, those with PTSD reported greater physical aggression and expression of hostility than veterans without PTSD (Carroll, Rueger, Foy, & Donahoe, 1985). Veterans report feeling and expressing anger and hostility at levels greater than depressed and control comparison groups (Riley, Treiber, & Woods, 1989). Given the combination of aggression, hostility, and a tendency to be less self-disclosing and expressive to their partners, it is not surprising that these veterans had poorer adjustment to marital and cohabitating relationships. In a community sample of veterans, PTSD symptoms were correlated with frequency and severity of relationship problems, as well as verbally and psychologically abusive behavior toward their intimate female partners (Byrne & Riggs, 1996). The researchers found that this relationship did not change when controlling for the veteran's combat exposure.

One study found that combat veterans with full-syndrome or sub-threshold PTSD demonstrated less effective coping reactions and poorer problem solving than well-adjusted combat veterans and Vietnam-era veterans who did not experience combat (Nezu & Carnevale, 1987). Several studies have covered the spectrum of anger, hostility, and violence in Vietnam veterans. In separate studies, PTSD was found to be correlated with anger (Evans, McHugh, Hopwood, & Watt, 2003), and with interpersonal violence (Beckham, Feldman, Kirby, Hertzberg, & Moore, 1997). Taft and colleagues (2007) combined these variables, and their results suggest that anger is the pathway between PTSD and both physical assault and psychological aggression. In samples of combat veterans, those with PTSD obtained higher scores on a measure of hostility (Kubany,

Gino, Denny, & Torigoe, 1994), and demonstrated more hostility during an interpersonal behavioral exercise (Beckham et al., 1996) than those without PTSD. One might expect that these reactions would be even more significant during an interpersonal exercise or other situation that is contextually relevant to combat exposure or PTSD itself (there was no indication that the above exercise had any such relevance), as activation of trauma-related networks in memory are likely to result in expression of PTSD symptoms (Litz & Keane, 1989). Chemtob et al. (1988) suggest that even a subtle perception of threat can quickly escalate the veteran into a positive feedback loop wherein even ambiguous stimuli are interpreted as threatening, further activating the veteran's threat arousal response.

Although the majority of research on PTSD and communication has focused on the veteran's communication, it should be noted that family members' communication patterns have also been shown to impact the veteran's symptomatology. Researchers have examined psychopathology related to family members' expressed emotion, which encompasses various ways in which the family member talks about (and, presumably, talks to) the individual with psychopathology (Hooley, 2007). Tarrier and colleagues (1999) found that veterans with PTSD showed greater improvement when they belonged to families with low expressed emotion, particularly on scales of hostility and criticism.

Emotional Numbing

Emotional expression has been suggested to play a critical role in creating the intimacy that is characteristic of healthy relationships (Greenberg & Johnson, 1986; Johnson & Greenberg, 1994). As discussed above, many studies have reported that men

returning from combat find it difficult to feel emotions or to express them, particularly to intimate partners (Penk et al., 1981; Shehan, 1987). Whether defined as a problem in experiencing emotion or expressing it, the term *emotional numbing* has been used as researchers seek to understand the relationship between PTSD and interpersonal difficulties. Typically, three of the diagnostic criteria for PTSD are categorized as indicators of emotional numbing: diminished interest in significant activities, feelings of detachment or estrangement from others, and restricted range of affect (American Psychiatric Association, 2000; Litz et al., 1997). Emotional numbing has been at least partly blamed for the difficulties experienced by the veteran with PTSD trying to maintain his relationship with his wife (Galovski & Lyons, 2004; Litz, 1992; Riggs et al., 1998) and children (Ruscio, Weathers, King, & King, 2002). Litz et al. (1997) report that the strongest predictor of emotional numbing is activation of the hyper-arousal symptom cluster of PTSD. They suggest that chronic hyper-arousal results in a depletion of emotional resources, which produces the numbing reported by many veterans.

Avoidance and hyper-arousal symptoms have also been correlated with alexithymia in Holocaust survivors with PTSD (Yehuda et al., 1997). Alexithymic individuals are unaware of their emotional experience or unable to put this experience into words (Badura, 2003; Nemiah & Sifneos, 1970; Yehuda et al., 1997). Although the problem can be present innately, it also appears possible that individuals can develop the issue secondary to some difficult experience. Alexithymia is strongly present in males with combat-related PTSD and is also elevated, albeit to a lesser degree, in those whose PTSD does not result from combat (Frewen, Dozois, Neufeld, & Lanius, 2008). Veterans

with PTSD have been shown to demonstrate the problem to a greater degree than peers with alcohol abuse and other psychiatric diagnoses (Hyer, Woods, Summers, Boudewyns, & Harrison, 1990). The exact interplay between alexithymia and PTSD remains unclear, however, as a sample of Iraqi refugees simultaneously endorsed alexithymic statements while also acknowledging the presence of negative affect, which are seemingly contradictory (Sondergaard & Theorell, 2004). These results suggest that, at least in that sample, the challenge was in identifying positive affect but not negative. Conversely, Litz (1992) references unpublished research in which combat veterans with PTSD successfully described positive emotional experience while imagining a pleasant beach scene, which suggests that such individuals are not entirely incapable of experiencing positive emotions.

Observations in OEF/OIF Veterans

As mentioned earlier, the challenges of PTSD and its impact on families are not limited to Vietnam veterans, but are beginning to be identified among veterans of the current conflicts in Afghanistan and Iraq. The scientific community appears more prepared to identify, monitor, and treat these problems in current veterans than was the case after Vietnam, when the first reports surfaced five to ten years after the war ended. Today's veterans receive medical and behavioral health screenings before leaving the combat theater (post-deployment health assessment; PDHA), and receive follow-up screenings (post-deployment health re-assessment; PDHRA) and often the watchful eye of concerned commanders after returning home.

One report of veterans returning early in the conflict indicated that roughly 12-20% met criteria for PTSD, and 6-13% of the sample were experiencing significant impairment as a result of the condition (Hoge et al., 2004). Data from one sample of PDHAs indicated that roughly 5-10% of returning veterans were at risk for PTSD and were referred for additional evaluation (Hoge, Auchterlonie, & Milliken, 2006). A separate longitudinal study followed two groups of veterans and found that roughly 12% were at risk for PTSD upon returning home, and the numbers grew to nearly 17% for active duty and 25% for national guard and reserve soldiers six months later (Milliken, Auchterlonie, & Hoge, 2007). The same study reported that roughly 4% of soldiers endorsed interpersonal conflict upon homecoming, but this grew to 14% of active duty and 21% of national guard and reserve veterans at the follow-up point. Each group examined multiple samples of veterans, and reported statistics specific to each sample. In addition, following the body of research on Vietnam veterans, samples of current-era veterans are demonstrating similar links between PTSD symptoms and various relationship problems including consideration of divorce or separation (MHAT-VI, 2009), and marital distress as reported by one or both parties (Renshaw, Rodrigues, & Jones, 2008). Regardless of the observed variations in rates of PTSD reported here, the results of these recent studies support the conclusion that the problem of PTSD and its ensuing ripple effects are quite similar to the Vietnam cohort.

Summary

Serving in and returning home from the Vietnam War posed many significant challenges to the veterans, which resulted in a high number of full-syndrome and sub-

threshold cases of PTSD. The effects of this disorder are not limited to the veteran himself, and have direct and indirect effects on individuals with whom he has a relationship. Although research typically treats marital satisfaction as an outcome of PTSD, there is also evidence that the quality of the relationship can influence the presence or severity of the disorder (Figure 1).

One mechanism that might contribute to the relationship between PTSD and marital satisfaction is through communication, which consists of observable behaviors and patterns. PTSD has been shown to influence several aspects of communication and, based on the emotional expression literature, communication also impacts the course of the disorder. It should be noted that previous research on PTSD and communication has relied on the reports of veterans and their partners, and the observational research that is so prevalent in marital literature has not been conducted in a sample of combat veterans. Additionally, there is abundant evidence of the bidirectional relationship between communication and marital satisfaction (Figure 2).

Based on various studies manipulating conversation topic, it is reasonable to expect that a similar research design would allow us to produce variability in communication patterns. The assumption in this type of design is that different conversation topics elicit different cognitions and emotions, which influence communication. In this case, the topics are expected to activate PTSD symptoms which should, in turn, elicit predictable communication patterns (Figure 3).

Therefore, specific aspects of communication were examined between veterans and their intimate partners in order to better understand the content of a variety of

conversations, as well as each party's role in the overall tone of the interaction. Although marital satisfaction is often treated as an outcome variable, this study is primarily interested in the relationship of PTSD and communication, and the influence of conversation topic. Therefore, the influence of marital satisfaction on PTSD and communication was taken into consideration and treated as a covariate (Figure 4).

Study Purpose and Rationale

The extant literature on PTSD and its correlates suggests a pattern of interaction that may lead to difficulties in intimate relationships. With regard to communication patterns, previous results suggest that veterans with PTSD might appear quiet or aloof during conversations in general, yet be prone to hostile communication or action within an intimate relationship. The current literature on PTSD and relationships is notably devoid of any deeper investigation into the more specific variables found in marital communication research. The reader is left to wonder what a veteran's typical conversation, when one occurs, actually entails. This uncharted area drives the research questions of the current study. If the veterans are typically not self-disclosing or discussing their emotions, then what *are* they saying? And what about their wives? Does the veteran's PTSD status influence the couple's susceptibility to cycles of negative reciprocity? Are there any consistent patterns in the veteran's negative outburst, either in the way he responds or what he responds to? Does the wife say something to trigger his anger? Are the answers to these questions different depending on the veteran's PTSD status? And does the topic of conversation make any difference? All of these questions are addressed in the present study, and bear great relevance to today's veterans returning

from combat in Iraq and Afghanistan. Improving understanding of the dynamics in these intimate relationships will inform clinicians working to treat existing relationship problems and prevent future problems from developing.

Specific Aims and Hypotheses

The present study has two specific aims. The first is to describe conversations between Vietnam veterans and their wives, which will serve to increase the current understanding of content present in conversations about the veteran's current relationship and prior combat experience. Although not all couples in the current study were married, *wife* and *wives* will be used henceforth for simplicity of discussion. The second aim is to more closely examine the dyadic exchange between partners, in an effort to better understand each party's role in the overall tone of conversation, as well as the influence of the veteran's PTSD symptoms. Each couple discussed three different topics: something neutral/positive in their recent past (NP), some problematic issue in their relationship (PR), and some aspect of his experience in Vietnam (VN). As previous researchers have also done, these topics were deliberately chosen based on the emotional content each was expected to elicit. The NP topic was intended to reflect a typical conversation between the veteran and his partner. It was expected that the veteran would perceive the PR conversation as a subtle threat, which would activate a threat arousal response and influence him toward negative communication patterns. The VN conversation was expected to serve as a more salient activator of the veteran's PTSD symptoms, and would therefore lead to an exaggerated increase in negative communication patterns.

Specific Aim One: Describe the content of a conversation between a Vietnam veteran and his wife, identifying any differences in content based on the conversation topic or the veteran's PTSD symptom severity.

Previous studies have reported decreased expressiveness in veterans with PTSD (Hendrix et al., 1995; Penk et al., 1981). It was expected that there would be an interaction between PTSD severity and conversation type on general expressiveness (as measured by overall frequency of codes) of the veterans (**Hypothesis 1 [H1]**). Veterans with more severe symptoms of PTSD would be generally less expressive than veterans with less severe PTSD symptoms, and this relationship would be moderately exaggerated in the PR conversation, and more strongly exaggerated in the VN conversation. All hypotheses predict this interaction pattern: significant effect in the NP conversation, exaggerated in the PR topic, and even more exaggerated in the VN topic.

Research has consistently found that veterans with PTSD demonstrate decreased self-disclosure and increased withdrawal and hostility (Byrne & Riggs, 1996; Carroll et al., 1985; Penk et al., 1981; Shehan, 1987; Taft, Street, Marshall, Dowdall, & Riggs, 2007). It was expected that there would be an interaction between PTSD severity and conversation type on the specific communication codes assigned to the veteran (**H2**). Veterans with more severe PTSD symptoms would demonstrate more psychological abuse (**H2a**), hostility (**H2b**), and withdrawal (**H2c**), and less self-disclosure (**H2d**) than veterans with less severe PTSD symptoms. These relationships would be moderately exaggerated in the PR conversation (compared to NP), and more strongly exaggerated in the VN conversation.

Qualitative reports have documented wives' sense of responsibility to positively intervene in the midst of the veteran's PTSD symptoms (Coughlan & Parkin, 1987; Verbosky & Ryan, 1988). It was expected that there would be an interaction between veteran PTSD status and conversation type on specific communication codes assigned to the wife (**H3**). Wives of veterans with more severe symptoms of PTSD would demonstrate a greater increase in relative frequency of relationship-enhancing attributions (**H3a**) and acceptance (**H3b**) than would partners of veterans with less severe PTSD symptoms. This association would be moderately exaggerated in the PR conversation (as compared to NP), and more strongly exaggerated in the VN conversation.

Data analytic strategy for Aim One. Hypotheses 1-3 were planned to be evaluated using mixed model regression analyses. Planned analyses were modified slightly when a preliminary inspection of the dataset revealed that veteran total utterances was the only normally distributed variable, an assumption of the mixed model approach. The other Aim One variables were non-normally distributed, and adjustments in analyses were made accordingly. In order to present the evolution of the methodology, the original plan is discussed here in context of Hypothesis 1, and modifications will be discussed in context of the data inspection below. The criterion variable for the first analysis was the total number of utterances coded for the veteran during the conversation (**H1**). The criterion variables for the remaining analyses were the relative frequency of specific codes being investigated, measured as a proportion of the frequency of the examined code relative to the total utterances in that conversation (e.g., frequency of hostility divided by total utterances). In Hypothesis 1, the criterion variable was regressed on two

between-couples variables (PTSD severity and marital satisfaction), one within-couples variable (conversation topic), and two interaction terms (PTSD*VN, PTSD*PR). Conversation topic was dummy-coded into two variables. The NP conversation was the comparison group; the first dummy variable compared PR against NP, and the second dummy variable compared VN against NP (Aiken & West, 1991). The predictors were entered hierarchically in three blocks, based on an *a priori* model: 1) marital satisfaction, 2) PTSD and conversation topic, and 3) interaction terms. Because we expected marital satisfaction will be related to PTSD, and because our primary interest was the influence of PTSD on communication, marital satisfaction was entered first in order to isolate its effect on the DV. Entering PTSD in the second block showed its effect on the DV after accounting for marital satisfaction. In other words, given two veterans with the same marital satisfaction, this analysis indicated to what extent increasing PTSD severity influences the communication pattern. PTSD and conversation topic were entered before the interaction in order to examine the main effects of each variable and then identify additional variance explained by the interaction terms.

Power analysis for Aim One. Power analyses for mixed-model regression require prior knowledge of the correlations between particular variables in the dataset. Not having access to this information, two different analyses were conducted and were believed to serve as "bookends" for the power expected in this study. Each analysis included a fixed sample size of 35 couples and 105 total observations, incorporated specific parameters described below, analyzed results across 1000 simulated datasets, and determined the power to detect the PTSD*conversation interaction and the main effects of each. Marital

satisfaction was not included in these calculations because the primary focus of the analysis will be the influence of PTSD and conversation topic on the outcome variables after controlling for satisfaction in the first block of the regression sequence.

It was assumed that the three conversations conducted by each couple will be moderately correlated with one another (.25). The general predicted pattern is such that PTSD is moderately correlated to the outcome variable during the NP conversation, more strongly correlated in the PR conversation and, at least for particular codes, even more strongly correlated in the VN conversation. One possible set of values that would have 80% power of detecting a PTSD*conversation interaction are correlations of .1, .7, and .8 for the NP, PR, and VN conversations, respectively. This model also includes a standardized difference of .6 between the outcome variable in the NP, PR, and VN conversations, representing the main effect of conversation topic independent of PTSD's influence. In this example, the power to detect main effects for PTSD and conversation are .99 and .81, respectively.

Recognizing that the actual data pattern may not be this pronounced, another analysis was conducted where each value was regressed toward the mean. With correlations of .2, .6, and .7, and a conversation main effect of .5, the power to detect an interaction drops to .50, and power for the main effects of PTSD and conversation are .99 and .65, respectively. Finally, if within-couple correlation is higher than estimated, it will improve the power to detect an interaction but reduce the power for the main effect of PTSD. Based on these calculations and considering the fixed nature of this dataset, it was determined that the research questions are of sufficient interest and value to move

forward with the analyses, and concluded that the risk of Type-2 error is acceptable, although not ideal.

Specific Aim Two: Identify patterns in speaker-turn sequences during conversations between a Vietnam veteran and his wife. The second aim of the study is to better understand each party's role in the overall tone of the dyadic exchange, particularly examining statements that lead to negative responses. Most hypotheses are based on prior research but the final analysis is purely exploratory and, to my knowledge, has never been examined in a sample of combat veterans. Whenever used in the below hypotheses, "negative," "positive," and "neutral" refer to variables wherein all possible codes in that category have been collapsed in order to form a single variable. Also, marital satisfaction is expected to be associated with the variables under investigation, but the primary interest is on PTSD status and conversation topic, and therefore satisfaction will be statistically controlled for during the analyses.

Negative statement → negative statement (negative reciprocity) sequence. The negative reciprocity sequence has been observed in distressed couples (Gottman, 1979), and veterans' interpersonal difficulties may be a critical component in the relationship between PTSD and marital satisfaction (MacDonald, Chamberlain, Long, & Flett, 1999). It was expected that the strain of PTSD would manifest in similar patterns in the couples under investigation, specifically, that the likelihood of a negative reciprocity sequence would vary between couples, depending on the veteran's PTSD status and the topic of conversation (**H4**). This comparison was not concerned with which individual is responsible for the antecedent or the consequent; any sequence of alternating negative

comments fits the category. Given a negative antecedent by one party, the likelihood of a negative consequent by the other party would be increased in couples where the veteran has PTSD (**H4a**). This difference would be moderately exaggerated during the PR conversation as compared to NP (**H4b**), and more strongly exaggerated during the VN (**H4c**) conversation.

Wife negative → veteran statement sequence. One commonly reported characteristic of communication in veterans with PTSD is the exaggerated negativity (Beckham et al., 1996; Byrne & Riggs, 1996; Evans et al., 2003; Kubany et al., 1994). This tendency is of particular interest in this study. It was expected that the likelihood of a veteran responding to a negative wife-antecedent with his own negative consequent would vary between couples, depending on the veteran's PTSD status (**H5**). Given a negative wife-antecedent, veterans with PTSD would be more likely than those without PTSD to respond with a negative consequent (**H5a**). This difference would be exaggerated during the PR conversation as compared to NP (**H5b**), and more exaggerated during the VN (**H5c**) conversation.

Wife non-negative → veteran statement sequence. Hypothesis 5 predicted that when the wife was negative, the veteran would often be negative in response. Simple reasoning might then suggest that when the wife is non-negative, the veteran will be non-negative in response. However, there have been anecdotal reports of seemingly-unprovoked negativity from veterans with PTSD. Therefore, it was expected that there would be patterns of veteran negative responses to wife non-negative statements, depending on PTSD status and conversation topic (**H6**). It was expected that given a non-negative wife

antecedent, veterans with PTSD would be more likely than those without PTSD to respond with a negative consequent (**H6a**). This difference would be exaggerated during the PR conversation as compared to NP (**H6b**), and more exaggerated during the VN (**H6c**) conversation.

In order to better understand this broader range of statements that trigger a negative veteran-consequent, two exploratory analyses attempted to identify specific statements that most commonly precede the veteran's negative response (**H7**), and determine if this trigger varies based on the veteran's PTSD status (**H7a**) or the topic of conversation (**H7b**). These analyses were conducted for every type of wife statement.

Data analytic strategy for Aim Two. These hypotheses were planned to be analyzed using a multilevel log-linear model (Dagne, Howe, Brown, & Muthen, 2002; Howe, Dagne, & Brown, 2005). This analysis is based on linear regression principles with odds ratios, but uses log odds ratios instead of traditional odds ratios in order to normalize the distributions in otherwise skewed samples (hence, log-linear model). This type of analysis yields an estimated odds ratio, which is able to account for the size of each cell (in this case, the frequency of a particular type of utterance), which a traditional odds ratio cannot (Dagne et al., 2002). Similar to Aim One, a unique covariance structure within the dataset required slight modifications in the analytic method in order to accurately address the hypotheses under examination.

Proponents of the multilevel log-linear model recommend applying it to an observation system with only two categories because increasing numbers of antecedent-consequent patterns will be observed in systems with additional categories, and the

independence of these additional patterns cannot be ensured (Dagne et al., 2002). For this reason, all analyses involving odds ratios were dichotomized to *negative* and *non-negative*, where the latter group includes positive and neutral codes. This decision was made for three reasons. First, there are only two neutral codes in the coding system (as opposed to five negative and four positive codes), so it was decided that it would not be worthwhile to use a more complex analysis which would allow for three different types of codes. Second, although discarding the neutral codes would have naturally dichotomized the analyses, such a decision would threaten the integrity of the dataset, potentially losing valuable information. Finally, because the main interest in most hypotheses centers on the veteran's negative utterances, it seemed logical to group neutral codes with positive, in order to maintain the purity of the negative codes.

The basic element of this analysis is an odds value, which is calculated based on a single conversation between a couple. In Hypothesis 4, this is expressed as (speaker-$1_{negative}$ → speaker-$2_{negative}$) / (speaker-$1_{negative}$ → speaker-$2_{non\text{-}negative}$), where either veteran or wife may serve as speaker-1 or -2. In simpler terms, given a negative statement by one individual, this value describes the odds of a negative versus a non-negative response by the partner. Hypothesis 5 is interested in the specific role each partner plays, and the odds for this hypothesis are expressed as ($wife_{negative}$ → $veteran_{negative}$) / ($wife_{negative}$ → $veteran_{non\text{-}negative}$). Whereas Hypotheses 4 and 5 are concerned with different consequents following a given antecedent, Hypothesis 6 examines the difference in antecedents leading to a particular consequent. This value is expressed as ($wife_{negative}$ → $veteran_{negative}$) / ($wife_{non\text{-}negative}$ → $veteran_{negative}$). However, when this method was applied

to the dataset, the non-normal data distribution and unique covariance structure prevented the model from reaching convergence, which resulted in inestimable interaction terms. This problem was mitigated by shifting to a multilevel logistic regression model, which created different conditions based on the three variables in the model: Given two groups for PTSD diagnosis, three conversation topics, and two types of antecedent, there were a total of 12 possible conditions. The model included each of these 12 conditions as a main effect rather than including main effects and 2- and 3- way interactions among the three variables of PTSD, conversation topic and antecedent. The model first calculated the odds of a negative response following each of these conditions, then compared pre-selected pairs of conditions based on the hypotheses. When applicable, these odds ratios were then compared against each other based on some combination of common elements, roughly analogous to an interaction term.

It is usually ideal to test a variable such as PTSD as a continuous variable, as continuous measures offer more detailed information and more powerful analyses. However, it was determined that using a continuous measure of PTSD in the current analyses would yield results that would be more difficult to meaningfully interpret, associating a change in odds value to a particular change in PTSD severity. Therefore it was decided to dichotomize PTSD by status (symptoms consistent vs. inconsistent with PTSD) and report the odds ratio comparing the two groups.

The final analyses (**H7a** and **H7b**) are exploratory, and seek to identify any pattern in wife-antecedents that trigger negative veteran-consequents. Each hypothesis was planned to be tested using the same method as described above, except that a

separate analysis would be run based on each of the codes assigned to the wife. For example, one analysis would examine the ratio ($wife_{hostility} \rightarrow veteran_{negative}$) / ($wife_{hostility} \rightarrow veteran_{non\text{-}negative}$), another will examine ($wife_{acceptance} \rightarrow veteran_{negative}$) / ($wife_{acceptance} \rightarrow veteran_{non\text{-}negative}$), and so on, for each of the 11 communication codes. Each analysis was planned to include the between- and within-groups variables at Level 2 of the model. However, due to the low frequency of veteran negative statements across this dataset, methods for exploring the final hypothesis were limited. Because of the broad variance of all code types across the dataset and the high frequency of zero-count cells, meaningful comparisons between PTSD diagnosis and conversation topic would be impossible. Instead the frequency of veteran negative response will be presented given every possible wife antecedent, as well as the odds of a veteran negative response compared to non-negative.

Power analysis for Aim Two. As Dagne et al. (2002) explain, "[b]ecause power depends in a complex way on the number of episodes and observations per episode, number of observational codes, and other model-specific factors, currently there are no simple ways to determine power and sample size for these models" (p. 278). However, their findings allow for loose estimates in comparison. Their sample involved 254 couples, each observed for a single episode. The full sample reached .01 significance, and they subsequently re-analyzed a randomly selected half of the sample (n = 127) and reached .02 significance, which they say "suggest[s] that the effects are strong enough to be detected with a substantially smaller sample" (p. 278).

A more recent study involving 198 observations of parent-adolescent dyads used the same analytic methods, and examined three antecedent-consequent outcomes with ten different independent variables, six 2-way interaction terms, and two 3-way interaction terms (Yap, Allen, Leve, & Katz, 2008). The authors reported many results significant at the .05 level and a handful at the .005 level. By comparison, the current study also examines three antecedent-consequent outcomes in a sample of 105 behavioral observations, and uses only two independent variables, one covariate, and one 2-way interaction term. Based on the findings from these two studies, it is believed that analyses for Hypotheses 4, 5, and 6 will be adequately powered, given the current sample size and variables, to detect a moderate effect size. Because Hypothesis 7 examines specific codes, each sample size is equal to the frequency of utterances attributed to that code. Therefore these analyses will be substantially under-powered, but will remain for their exploratory value.

Method

The data for this study come from an existing dataset that was collected in 1996 at a large northeastern Department of Veterans Affairs Medical Center. The dataset has already yielded three publications which were discussed above: One examined veterans' PTSD symptoms and aggressive behavior toward the female partner (Byrne & Riggs, 1996), one looked at PTSD status and severity related to marital quality (Riggs et al., 1998), and the third reported concordance between veterans' self-ratings and partner reports of the veteran's PTSD severity (Gallagher et al., 1998). The dataset also includes

observational data based on veteran-partner conversations (discussed below), and this untapped resource presents an ideal opportunity to answer the questions posed above.

Participants

Participants were 35 male Vietnam veterans and their female intimate partners (for simplicity, referred as *wives*). Couples were recruited through newspaper advertisements and flyers posted in a Department of Veterans Affairs Medical Center, seeking participants for a study examining intimate relationships of male Vietnam veterans. Veterans were included if they served in the Vietnam theater of operations between 1964 and 1975, and if they had been married to or cohabiting with their current partner for at least one year prior to participating in the study. Couples were excluded if either individual was actively psychotic at the time of the study, and all were asked to refrain from alcohol or drug use for 24 hours prior to participating in the study.

Procedure

Potential participants responded to advertisements by telephoning a member of the research team, who described the research project and scheduled the couple for an appointment at the VA medical center. When the couple arrived at the clinic they were met by a researcher, each of whom held a masters or doctoral degree in clinical psychology. The researcher explained the procedure and presented both individuals with informed consent forms. Participants read and signed the forms at this time. Individuals were then placed in separate rooms to complete the questionnaires. After completing the questionnaires, the couple was moved to a third room containing three chairs and a videotape camera, where they completed a series of three communication interactions.

The order of the interactions was counterbalanced across couples. After completing the three interactions, each participant rated the extent to which each of the conversations "bothered" them using a 7-point scale ranging from "not at all bothered" to "very much bothered." Once these ratings were completed, participants met with the researcher to ask questions and discuss any concerns raised by their participation in the study. At this time the researcher debriefed them as to the hypotheses and procedures of the study.

Measures

Questionnaires

PTSD Checklist Military Version (PCL-M). The PCL-M (Weathers, Huska, & Keane, 1991) is a 17-item self-report measure of PTSD symptomatology. Each item of the measure directly corresponds with a DSM-IV symptom criterion for the disorder, and the respondent is asked to indicate the extent to which they have been bothered by the symptom in the past month using a 5-point Likert type scale ranging from "Not at all" to "Extremely." The PCL has demonstrated internal consistency (alpha = .97), reliability (test-retest over three days, r = .96), and adequate convergent and diagnostic validity (Weathers, Litz, Herman, Huska, & Keane, 1993). The presence of a PTSD symptom was assessed based on any item which the veteran rated moderately bothersome (rating of 3) or more severe. The items were summed to produce a total score of symptom severity. Also, following DSM-III-R requirements (American Psychiatric Association, 1987), veterans were labeled as PTSD if they indicated the presence of at least one re-experiencing, at least three avoidance, and at least two arousal symptoms. All other veterans were coded as non-PTSD.

Relationship Problem Scale (RPS). The RPS (Riggs, 1993) is a 32-item questionnaire that assesses the severity of problems within relationships. Each item represents a potential problem within the relationship (e.g., Religious difference), and respondents rate each on a scale of 0 (No problem) to 3 (Major problem). Typically, responses are summed to produce a total problem score. However, in the present study the RPS was used only to identify problem areas to serve as the topic of one of the communication interactions.

Dyadic Adjustment Scale (DAS). The DAS (Spanier, 1976) is a 32-item self-report measure of marital adjustment. The items load onto four subscales (Affectional Expression, Cohesion, Consensus, and Satisfaction), and they can be summed to create a total score. The subscales and total score have demonstrated coefficient alphas ranging from .70 to .96 (Carey, Spector, Lantinga, & Krauss, 1993; Spanier, 1976), and stability coefficients ranging from .75 to .87 (Carey et al., 1993). Although there has been some debate over the validity of the four subscales (Sharpley & Cross, 1982; Spanier & Thompson, 1982), most researchers agree that the DAS is a good measure of overall marital adjustment (Carey et al., 1993; Sharpley & Cross, 1982).

Communication interactions

Conversation topic. Couples completed three ten-minute conversations that were videotaped for observational coding. The three conversations differed in content: one focused on some neutral or positive event in the couple's recent past (NP), one on a problematic issue within the relationship (PR), and one on some aspect of the veteran's experiences in Vietnam (VN). Each is described in greater detail below.

For the NP topic, couples were asked to identify a "relatively neutral topic" to discuss but were reminded that they would be asked to discuss it for ten minutes. Upon review, the selected topics tended to be more positive, such as plans for family outings, children's sporting events, and upcoming holidays. Less common were neutral topics, such as dinner plans for that evening, work activities, and recent events in the couple's life. Because so many topics were positive, the initial "neutral" label was re-named "neutral/positive."

The PR topic was selected from one of the RPS items that both individuals reported as moderate or severe problems. Couples tended to choose topics on which there was disagreement but which had not produced the most significant arguments during previous (outside of the study) conversations. The specific topics varied greatly among couples, but generally reflected common problems arising in relationships, including financial difficulties, child-rearing issues, child behavior problems, communication difficulties, and intimacy issues.

The veteran was asked to select a VN conversation topic which was emotionally distressing but not overwhelming. Veterans tended to identify relatively non-threatening aspects of their service in Vietnam, including their arrival in Vietnam, food options in country, and the difficult living conditions. Although a few discussed the sense of loss they experienced because of friends who were killed in Vietnam, none chose to discuss specific traumatic events.

The process for each topic was identical. The researcher met with the couple prior to each conversation to inform them of the topic (NP, PR, or VN) and assist in

determining the specific issue to be discussed. After the couple selected the topic for discussion, the researcher started the video camera and left the room. After ten minutes, the researcher returned to the room and stopped the camera, and allowed the couple to take a short break. The process was repeated for the next two conversations. The possibility of emotional carryover between conversations was considered, and the risk of resulting confound was acknowledged. This risk was balanced against logistical concerns of other possible designs, such as scheduling each couple for multiple sessions to be held on separate days. In the end, the research team decided to counterbalance the order of the conversations and insert a short break between them, which included an opportunity for the couple to address with the researcher any problems elicited by the previous conversation. Protocol for this study is consistent with previous research wherein conversation topic was manipulated as an independent variable, including the duration of each conversation, the consolidation of all discussions into a single session, and the practice of counterbalancing the topic order between couples (Heyman et al., 2009; Knobloch & Solomon, 2003; Rehman et al., 2010).

Rapid Marital Interaction Coding System (RMICS). The RMICS (Heyman & Vivian, 1993) is an observational coding system used to assess couples' communication on a number of dimensions. The RMICS was derived from the Marital Interaction Coding System as a more efficient coding mechanism that yielded more readily analyzable measures. Data from nearly 20 different studies with a variety of different types (dating, engaged, married) and ages (adolescent, adult) of couples suggest that the measure is psychometrically sound. The average inter-rater agreement was .59, and most measures

of internal consistency were above .90 (Heyman, 2004). Additionally, the RMICS has been shown to accurately discriminate between distressed and non-distressed couples and predict improvement in treatment for partner-aggression. At any given moment during the interaction, one speaker holds the floor. The content of that speaker's turn is given a single code, unless the turn is held for an extended period, in which case one code is given for every 30-second speaking period. When the speaker voluntarily gives up the floor or the partner interrupts, that individual's speaker turn ends and the partner's speaker turn begins. Regardless of the variety of content emitted, each speaker turn is given a single code from the set of eleven, which is prioritized hierarchically based on communication theory and research indicating that negative behaviors are most critical for understanding marital conflict (Heyman, 2001). The codes will be described in hierarchical order and categorized by negative, positive, and neutral (Crowell et al., 2002; Heyman & Vivian, 1993).

Negative. *Psychological abuse* (PA) is a statement that causes psychological pain to the partner. The pain may have been intended, or the partner may have perceived it to be intended. *Distress-maintaining attributions* (DA) are negative causal explanations of an event. They may explain negative situations as due to personality traits or voluntary/intentional causes, or positive situations as due to circumstances or involuntary/unintentional causes. *Hostility* (HO) refers to negative affect and statements with negative content, such as criticism, negative assumptions, or overly harsh or pointless disagreement. *Dysphoric affect* (DY) indicates expressions of sadness or depression, to include self-complaining, whining, crying, and tearfulness. *Withdrawal*

(WI) codes include negatively-toned verbal attempts to end the discussion, as well as several behavioral signs that distance the self from the partner.

Positive. *Relationship-enhancing attributions* (RA), essentially the opposite of DAs, are positive causal explanations of an event. They may explain positive situations as due to personality traits or voluntary/intentional causes, or negative situations as due to circumstances or involuntary/unintentional causes. *Acceptance* (AC) statements are ones that help the partner feel understood and validated, and may include active listening and empathic feedback. *Self-disclosure* (SD) statements express the speaker's neutral or positive feelings, wishes, or beliefs. SDs with an explicit or implicit negative tone are not included, as they would be coded elsewhere. *Humor* (HM) typically refers to statements that are obviously intended to be funny, but also includes each turn of a laugh or smile. Sarcastic or hurtful humor would be coded elsewhere, likely as HO or PA.

Neutral. *Constructive problem discussion/solution* (PD) statements indicate an effort by the speaker to understand, describe, or address a problem in a constructive manner. This may include asking a question, stating a problem, or suggesting a solution. Any such statement expressed with positive or negative verbal or nonverbal intonation would be coded elsewhere. Finally, any statement that is clearly unrelated to the discussion topic is coded as *other* (OT). If the statement has any relevance to the couple's lives or relationship, it would be coded elsewhere in the most appropriate category.

Results

Preliminary Data Inspection

The original experiment included 50 couples, 35 of which agreed to participate in the conversations for the current study. Descriptive statistics were not available for the subsample of 35 couples, but the following brief description of the larger sample was gleaned from previously published reports (Byrne & Riggs, 1996; Riggs et al., 1998). The majority of individuals in the complete sample were Caucasian and Catholic, with some college education and full-time employment at the time of data collection. Yearly income was somewhat disparate, with roughly 30% of veterans earning under $10,000 and another 30% over $40,000; most of the wives earned under $10,000. Scores on the Marital Status Inventory suggested that PTSD couples were generally more distressed than non-PTSD couples, and that wives were generally more distressed than veterans; notably, all of the group means were below the cutoff typically used to indicate severe distress. The Fear of Intimacy Scale indicated that PTSD couples (compared to non-PTSD couples) and veterans (compared to wives) reported greater problems with intimacy. The Relationship Problems Scale also demonstrated that PTSD couples reported more problems than non-PTSD couples, but the gender comparison revealed an interaction such that men reported more problems than women within the PTSD group, while women reported more problems than men in the non-PTSD group.

Preliminary inspection of the current dataset revealed that of the original 35 couples, only 30 had complete data including all three conversations. One couple did not participate in any conversation, another couple participated in only one conversation, and

three couples participated in only two conversations. Because of the concerns about adequate sample size and power and in order to preserve as much data as possible, it was determined that analysis would include the 34 couples with at least one recorded conversation, yielding a total of 97 conversations to be analyzed.

In lieu of raw measures of PTSD severity and marital satisfaction, each was replaced by a centered variable for analysis. A variable is centered by calculating the mean value across the entire sample, then subtracting that mean from the individual's raw score, resulting in a set of values distributed around a mean of zero, each value indicating how far above (positive) or below (negative) the individual's score deviated from the mean. A centered variable maintains all the variance of the raw measure, but it allows for increased generalizability in comparisons of other variables in the analysis (e.g., one can test whether there are differences in communication patterns across conversation topics in a veteran with *average* severity of PTSD, rather than testing the differences given a *zero*-level PTSD severity; because over 40% of veterans return with some indication of post-traumatic stress (Kulka et al., 1990), it is more relevant to describe this group based on the average severity).

The distribution of veterans' total utterances was roughly normal, allowing linear mixed model analyses as planned. However, data inspection revealed a strikingly low frequency of several of the specific RMICS codes. Most notably, there was not a single instance of psychological abuse attributed to any veteran during any conversation. Accordingly, none of the hypotheses involving this variable were submitted to analysis. Similarly, of the 97 conversations recorded for this study, only six had any evidence of

veteran withdrawal, so hypotheses pertaining to this variable were also not analyzed. Veterans' hostility and self-disclosure and wives' acceptance and relationship-enhancing attributions were also relatively infrequent, but each had enough incidents and variance to be analyzed. However, the high number of zero-frequency counts for each of these codes created non-normal distributions, which violated the assumption of normality required for the linear mixed model analysis that was initially planned. Poisson regression was considered as a more appropriate method, but the distribution of each variable indicated overdispersion, which is incompatible with the model. A negative binomial regression model allows for more variability when the data do not fit a Poisson distribution, thus it was selected as the method to test all hypotheses for individual codes examined in Aim One.

Participant Characteristics

This study analyzed data from 34 male Vietnam veterans and their female intimate partners. Most (85.29%) of the couples were married; the remaining couples had been living together an average of nearly seven years (M = 82.4mos, SD = 84.21, Min = 13, Max = 180). [Note: There was some inconsistency between veterans' and wives' reports of time living together. Nine veterans answered "how long living with partner" even though only five endorsed the marital status "live-in partner," suggesting that some mistakenly believed the question referred to married couples instead of only live-in partners. Additionally, there were differences within some couples' reported duration living together. In these cases, the wife's report was used for descriptive statistics.] The average age of the veterans was 47.48 years (SD = 2.48), and the average age of their

wives was 43.97 years (*SD* = 5.74). The men were predominantly Caucasian (exceptions: one African-American, one Other), as were the women (exceptions: one African-American, two Asian).

As discussed above, although a PTSD diagnosis typically requires a clinical interview, the PCL may be used to identify veterans whose symptom profiles meet the frequency and severity criteria listed in the DSM. This study makes several predictions based on the presence or absence of PTSD, and these groups (*PTSD* and *non-PTSD*) are designated based on whether or not their PCL responses meet the DSM symptom profile. Nearly half (47.1%) of the men reported symptoms consistent with PTSD; of these, the average PCL score was 61.75 (*SD* = 13.59). For veterans whose symptoms were not consistent with PTSD, the average PCL score was 9.67 (*SD* = 9.26; the average across the entire sample of veterans was 34.18, *SD* = 28.71). The average veteran-reported DAS score was 98.82 (*SD* = 19.27); this was lower in the PTSD group (*M* = 87.37, *SD* = 17.8) than the non-PTSD group (*M* = 109.00, *SD* = 14.43). Notably, scores below 107 are commonly considered to reflect dissatisfied relationships (Graham, Liu, & Jeziorski, 2006). A similar pattern was observed in wife-reported DAS, with an overall average of 99.65 (*SD* = 15.65), and a lower rate in wives of PTSD veterans (*M* = 90.88, *SD* = 14.09) than wives of non-PTSD veterans (*M* = 107.44, *SD* = 12.79).

As reported above, the majority of the couples in this study were married. There were no differences between married and live-in couples on the presence of PTSD (Pearson Chi-Square = 2.553, *p* = .11) or PTSD symptom severity (*t* = 1.497, *p* = .14). Veteran-reported dyadic adjustment was higher for married (*M* = 101.86, *SD* = 16.32)

than live-in (M = 81.20, SD = 27.23; t = -2.363, p = .024) but there was no difference on wife-reported dyadic adjustment (t = -0.713, p = .48). Because there were relatively few differences between these groups, all couples were analyzed as a single group regardless of actual marital status. For the sake of simplicity, for the remainder of this report the terms "husband" and "wife" will refer to the veteran and his partner, respectively, and "marital satisfaction" will refer to scores on the DAS.

Specific Aim One: Describe the content of a conversation between a Vietnam veteran and his wife, identifying any differences in content based on the conversation topic or the veteran's PTSD symptom severity.

Before addressing specific hypotheses, it is appropriate to offer a broad view of the content of each conversation. It is immediately apparent that the most frequent code assigned to speaker turns for both parties was constructive problem discussion/solution. Overall, this code accounted for 76.3% of veteran comments and 77.6% of wife comments. This rate is not uncommon, as previous research has reported rates ranging from 50-75% (Heyman, 2004; Manne et al., 2004). Table 1 lists the average percentage of each code for veterans and wives, presented as overall averages and also split by conversation topic. In order to present context of how those percentages equate to actual comments in a ten-minute conversation, Table 2 presents the same breakdown of raw frequencies for each code. Aim One includes hypotheses regarding the veteran's total utterances, psychological abuse, hostility, withdrawal, and self-disclosure, and the wife's acceptance and relationship-enhancing attributions.

Each hypothesis predicted a specific relationship, with the results of each hypothesis expected to follow a consistent pattern, specifically, that the effect would be significant in the NP conversation, exaggerated in the PR conversation, and even more exaggerated in the VN conversation. Among veterans, increasing PTSD severity was expected to be associated with fewer total utterances, greater proportions of psychological abuse, hostility, and withdrawal, and a lower proportion self-disclosure. Among wives, increasing veteran PTSD severity was expected to be associated with greater proportions of relationship-enhancing attributions and acceptance. Each of these relationships was expected to be observable in the NP conversation, moderately exaggerated in the PR conversation, and more strongly exaggerated in the VN conversation. Marital satisfaction was included as an independent variable in each model, and although this was done primarily to control for its effects, significant results are relevant to this study and will be reported accordingly. "Proportion" refers to the frequency of the particular code divided by total utterances for that individual in that conversation, and is expressed as a percentage of total utterances in a given conversation. Because this variable helps control for individual differences in general expressiveness, it will be the primary focus of the analysis and discussion for each hypothesis. However, because raw frequencies may be more easily conceptualized, these values will also be presented when relevant.

Veteran Total Utterances. As predicted, PTSD symptom severity was found to negatively influence veterans' total utterances, $F(1,32.92) = 8.76$, $p = .006$. Specifically, the parameter estimate of -0.21 indicates that for every one-point increase in PTSD

symptom severity, there is a decrease of 0.2 utterances in a given ten-minute conversation (or one less utterance during a 50-minute conversation). Total utterances were also found to differ among conversation topics, $F(2,31.11) = 6.53$, $p = .004$. Given a veteran with average marital satisfaction and average PTSD symptom severity (both averages refer to the current sample), he made 45.8 ($SD = 2.53$) statements in the NP conversation and 42.48 ($SD = 2.31$) in the PR conversation, both of which were significantly greater than the VN conversation, in which he made 35.15 ($SD = 1.63$) statements. Because the interaction term was not significant ($F(2,31.94) = 0.18$, $p = .84$), differences observed between topics do not reflect differential activation of PTSD symptoms, and any increase in PTSD severity would lead to a consistent decrease in total utterances regardless of topic.

Veteran Psychological Abuse. As discussed above, there was not a single instance of psychological abuse attributed to any veteran during any conversation, therefore this variable could not be analyzed.

Veteran Hostility. (See Table 3 for a complete overview of significant tests and parameter estimates for all remaining Aim 1 hypotheses.) On average, hostility comprised 5.54% ($SD = 1.84$) of veteran statements in the PR conversation, compared to 1.05% ($SD = 0.37$) in the NP topic, and 0.08% ($SD = .05$) in the VN topic. The interaction of conversation topic and PTSD symptom severity was found to have a significant influence on proportion of veteran hostile comments, $\chi^2(2) = 16.05$, $p < .001$. Specifically, the B-value of 0.032 for PTSD indicates that in the VN conversation, a one-point increase in PTSD severity was associated with a 3.25% increase in hostile

comments (based on the way data were coded, the statistical software selected VN as the reference topic for this analysis and therefore it was associated with the PTSD parameter estimate). The influence of PTSD in the other two topics is determined by adding the parameter estimate for a given interaction term to the overall estimate for PTSD. In the NP conversation, the B-value of -0.065 from the interaction term is added to the overall B-value of 0.032, yielding a value of -0.033, which indicates that a one-point increase in symptom severity was associated with a 3.25% decrease in hostile comments during this conversation. In the PR conversation, the B-value of -0.037 from the interaction term essentially negates the overall B-value of 0.032, yielding a value of -0.005. This value indicates that a one-point increase in symptom severity was associated with a 0.5% decrease in hostile comments during this conversation, which already had the highest proportion of hostile statements. Additionally, marital satisfaction was found to have a significant influence on hostility ($\chi^2(1) = 7.48$, $p = .006$), such that a one-point increase in DAS score was associated with a 3.54% decrease (B = -0.036) in hostile comments. Because there was no interaction term for marital satisfaction, this decrease can be generalized to all three conversation topics.

Veteran Withdrawal. As discussed above, only six conversations had any evidence of veteran withdrawal. This incidence rate is insufficient to address the current research question, therefore this variable was not analyzed.

Veteran Self-Disclosure. There was a significant main effect for conversation topic, $\chi^2(2) = 13.10$, $p = .001$, on the proportion of veteran self-disclosure statements. Specifically, a veteran with average marital satisfaction and average PTSD symptom

severity made a lower proportion of self-disclosure statements in the NP conversation (M = 2.40%, SD = 0.66%) than in the PR (M = 4.91%, SD = 0.77%) or VN conversations (M = 7.84%, SD = 1.50%). There was also a significant main effect of PTSD symptom severity, $\chi^2(1) = 8.80$, $p = .003$. Because the interaction term was not significant ($\chi^2(2) = 4.87$, $p = .09$), a one-point increase in PTSD severity was associated with a 2.63% increase in veteran self-disclosure statements regardless of conversation topic. Although the result was statistically significant, it was in the opposite direction than hypothesized, and will be addressed in more depth in the discussion. Marital satisfaction also had a significant influence on veteran self-disclosure ($\chi^2(1) = 6.70$, $p = .01$), such that a one-point increase in DAS score was associated with a 2.43% increase in self-disclosure statements. Notably, despite an inverse association between PTSD severity and marital satisfaction, each variable had a direct association with self-disclosure.

Wife Acceptance. Conversation topic was found to have a significant influence on the proportion of acceptance statements made by the wife, $\chi^2(2) = 41.02$, $p < .001$. Given average PTSD severity in her husband and average marital satisfaction by her own rating, she made a significantly higher proportion of acceptance statements during the VN conversation (M = 5.14%, SD = 1.50%) than either the PR (M = 1.25%, SD = 0.51%) or NP conversations (M = 0.46%, SD = 0.17%). There was no significant effect of veteran PTSD ($\chi^2(1) = 0.85$, $p = .36$), PTSD*topic interaction ($\chi^2(2) = 3.78$, $p = .15$), or wife-reported marital satisfaction ($\chi^2(1) = 0.12$, $p = .73$).

Wife Relationship-Enhancing Attributions. Conversation topic was also found to have a significant influence on the proportion of relationship-enhancing attributions made

by the wife, $\chi^2(2) = 18.74$, $p < .001$. Given average PTSD severity in her husband and average marital satisfaction by her own rating, she made a significantly higher proportion of these attributions during the PR conversation ($M = 5.01\%$, $SD = 1.03\%$) than the NP conversation ($M = 1.73\%$, $SD = 0.36\%$) or the VN conversation ($M = 1.04\%$, $SD = 0.33\%$). Similar to wife acceptance, in the case of wife relationship-enhancing attributions there was no significant effect of veteran PTSD ($\chi^2(1) = 3.23$, $p = .07$), PTSD*topic interaction ($\chi^2(2) = 1.47$, $p = .48$), or wife-reported marital satisfaction ($\chi^2(1) = 2.16$, $p = .14$).

Overall, the typical NP conversation had the highest number of veteran utterances, but none of the specific codes in Aim One appeared to be prevalent in this topic, as each code reflected less than 3% of the total statements for that speaker. In the typical PR conversation, the veteran's overall participation is roughly equivalent to the NP conversation but the content is notably different in that there is more self-disclosure and, notably, the highest amount of hostility among any of the topics. These conversations also included more relationship-enhancing statements from the wife, but she did not offer a remarkable amount of acceptance per se. The VN conversations had the fewest total veteran utterances and, contrary to expectations, the greatest amount of veteran self-disclosure and the least amount of veteran hostility between the three topics. This topic elicited the most acceptance from the wife, but an unremarkable amount of relationship-enhancing attributions. Across all three topics, problem-solving comments were more common than any other type of statement. In general, increased veteran PTSD led to decreased veteran total utterances and increased self-disclosure, with no effect on

wife acceptance or relationship-enhancing attributions. Increased PTSD also led to increased hostility in the VN conversation, but decreased hostility in the NP topic and no substantial change in the PR topic.

Specific Aim Two: Identify patterns in speaker-turn sequences during conversations between a Vietnam veteran and his wife.

As discussed during Aim One, the general breakdown of communication codes within this sample was somewhat surprising, and these unique characteristics had an impact on the remaining analyses. Aim Two was intended to reveal patterns in the back-and-forth dialogue between veterans and their wives. The hypotheses were not designed around specific interaction codes, rather these codes were aggregated into dichotomous groups: Negative and Non-Negative. One reason for this decision was to minimize the impact of low cell counts for a given sequence. Creating sequence variables inherently decreases cell counts across all variables. In Aim One, where codes were analyzed individually, there were only 11 cells because there are only 11 codes in the RMICS system. However, when creating lag-one pairs, multiplying 11 possible antecedents by 11 possible responses yields 121 cells, and the increased number of cells inherently results in a lower count within each cell. Following this reasoning, aggregating the codes into Negative and Non-Negative groups reduced the number of cells from 121 to 4, which was expected to result in higher counts within each cell. However, because of the relative infrequency of several of the negative codes described in Aim One, the average cell count for these antecedent and response statements did not rise as expected. This issue was largely mitigated by shifting to a multilevel logistic regression model, but one condition

remained problematic: there were zero instances where the wife of a non-PTSD veteran uttered a negative statement during the conversation about Vietnam experiences. This resulted in a zero-count for that condition (non-PTSD, VN topic, negative antecedent), which cannot be mathematically included in any odds ratio. Therefore, results are limited because there is no odds ratio for PTSD in the VN topic, and VN could not be compared against the other two topics. The results will be explained in more detail below.

Negative statement → negative statement (negative reciprocity) sequence. Hypothesis 4 predicted that, given a negative antecedent, the odds of a negative response would be higher in PTSD couples than in non-PTSD couples, and that this relationship would be exaggerated in the PR topic and more exaggerated in the VN topic. The first step in the analysis was to select the comparisons of PTSD v. non-PTSD couples, given a negative antecedent, for each of the three conversation topics. These odds ratios were then compared against each other in pairwise fashion between topics, to determine how the relationship with PTSD differed between topics. Results for Hypothesis 4 are presented in Table 4.

The only significant odds ratio for PTSD was found in the VN topic. The odds ratio was calculated by comparing the odds values of two specific conditions. In this hypothesis, given a negative antecedent during the VN conversation, the odds of a negative response were compared between the PTSD group and the non-PTSD group. Specifically, the odds of a negative response in the PTSD group were 0.217, and the odds of a negative response in the non-PTSD group were 0.0216. Not to be confused with a percentage, odds of 0.217 indicate that for every negative response there were

approximately four non-negative responses; odds of 0.0216 indicate that each negative response was outnumbered by nearly 50 non-negative responses. Odds in this range were typical in these hypotheses, given the relative rarity of negative statements throughout the dataset. These hypotheses are not interested in the odds themselves, but rather the relationships between the odds. For example, when an unlikely event is compared with a *more* unlikely event, significant odds ratios may result. Specifically, in this hypothesis the odds ratio stated that the odds of negative response in the PTSD group were 10.07 times higher than the odds of negative response in the non-PTSD group, a statistically significant result ($t = 2.06$, $df = 103$, $p = .04$). Although the pattern was similar in the PR topic, it did not reach statistical significance ($OR = 4.28$, $t = 1.74$, $df = 103$, $p = .09$), and there was no detectable difference between couples in the NP topic ($OR = 0.72$, $t = -0.30$, $df = 103$, $p = .77$). When comparing these odds ratios between topics, only one comparison approached statistical significance: The impact of PTSD was 13.91 times higher in the VN topic than the NP topic ($t = 1.72$, $df = 103$, $p = .09$). Although the pattern was similar comparing PR to NP, it did not reach statistical significance ($OR = 5.91$, $t = 1.42$, $df = 103$, $p = .16$), and there was no detectable difference between VN and PR ($OR = 2.35$, $t = 0.63$, $df = 103$, $p = .53$). Overall, the influence of PTSD generally followed the expected stepwise pattern (NP < PR < VN), but the differences between topics were not large enough to reach statistical significance.

Wife negative → veteran negative sequence. Analyses for H5 were essentially identical as those for H4, but the variables in this model were more specific. Whereas H4 was interested in negative antecedents and responses uttered by either party, H5 focused

exclusively on sequences where the wife spoke first and the veteran responded. Results for Hypotheses 5 and 6 are presented in Table 5.

In the comparisons within Hypothesis 5, there was only one that approached statistical significance: Given a negative wife-antecedent during the PR conversation, the likelihood of a negative response was 3.94 times higher in veterans with PTSD than veterans without PTSD (t = 1.85, df = 86, p = .07). There was no detectable difference between these groups in the NP topic (OR = 0.65, t = -0.32, p = .75). When comparing the influence of PTSD between these two topics, the odds ratio was 6.11 times higher in the PR conversation than in the NP conversation, a difference that may be clinically significant but was not statistically so (t = 1.33, df = 86, p = .19). Overall, the influence of PTSD was not as strong as hypothesized, and although the pattern of NP and PR was in the expected direction, the picture is far from complete without valid results from the VN conversations.

Wife non-negative → veteran negative sequence. Analyses for H6 were identical to H5 except they focused on sequences initiated with a wife's non-negative antecedent. Out of the three conversation topics, the closest to statistical significance was PR, in which the likelihood of a negative response was 2.55 times higher in veterans with PTSD than veterans without (t = 1.86, df = 86, p = .07). The influence of PTSD on veteran negative response failed to reach significance in the NP (OR = 1.79, t = 0.86, df = 86, p = .39) or VN topics (OR = 0.84, t = -0.25, df = 86, p = .80). There was very little difference in the influence of PTSD on the different topics. Specifically, the PTSD odds ratio was 3.02 times higher in the PR conversation than the VN conversation, a difference that

approached statistical significance (t = 1.85, df = 86, p = .07). There was minimal difference in the impact of PTSD between NP and PR (1.42 times higher in PR, t = 0.61, df = 86, p = .54) or NP and VN topics (2.12 times higher in NP, t = 1.01, df = 86, p = .31). Statistically speaking, the role of PTSD compared between topics was minimal and the minor differences observed were not in the expected direction.

Exploratory: Identifying triggers for veteran hostility. As discussed above, the low frequency of veteran negative statements limited the available methods for exploring the final hypothesis. Specifically, in more than 4,000 veteran statements across 97 different conversations, only 246 were negative. Additionally, because many of these statements were either the first speaker turn in a conversation or were part of an extended speaker turn by the veteran, only 174 of these could be linked to an antecedent from the wife and thus analyzed in this hypothesis. Because of the unique variance across the dataset and the high frequency of zero-count cells, meaningful comparisons between PTSD diagnosis and conversation topic are impossible. Instead, the analysis consisted of the frequency of veteran negative responses, given every possible wife antecedent, as well as the odds of a veteran negative response compared to non-negative.

The overall frequency of negative responses indicates some noteworthy trends (see Table 6 for full breakdown of antecedents). In particular, PR conversations accounted for over 75% of veteran negative statements, and VN and NP accounted for only 13% and 11%, respectively. The breakdown of antecedent statements was also disproportionate, as two of the eleven RMICS codes accounted for over 80% of veteran negative statements: 91 negative responses followed problem discussion/solution

statements and 51 followed wife hostility. The role of PTSD in wives triggering veteran negativity is harder to identify. A rough estimate of this main effect indicates very little difference between the groups, with 93 such sequences attributed to veterans with PTSD and 81 to veterans without PTSD. One trend could be observed, specifically that compared to veterans without PTSD, those with PTSD appeared to respond with less negativity after hostility (PTSD group = 16 negative responses, non-PTSD group = 35), but more negativity after problem-solving statements (PTSD = 54, non-PTSD = 37).

Additional information is gained by examining the odds of a veteran negative response compared to a non-negative response following particular wife antecedents (see Table 7). Three of the four strongest predictors of veteran negativity were found in the PR conversation with veterans with PTSD. Specifically, for veterans with PTSD in the PR conversation, following a dysphoric wife antecedent, a negative response was 2.5 times more likely than a non-negative response. Given the same couples in the same conversation, the likelihood of a negative response was almost equal to that of a non-negative response following hostile statements and distress-maintaining attributions from the wife (odds 0.93 and 0.89, respectively). The odds of a negative versus a non-negative response were even (1.0) for veterans with PTSD following wife hostility during the VN conversation. Aside from these, there was only one other circumstance that raised the odds of veteran negative response above 0.50, and that was wife hostility during PR conversation among veterans without PTSD (odds = 0.58). For the majority of wife antecedents, regardless of veteran PTSD status or conversation topic, veteran negative responses were heavily outweighed by non-negative responses.

Discussion

The general distribution of communication codes in this sample was unexpected. The average rate of PD for both veterans and wives in the current sample was above 75%, including rates above 80% for particular conversations. Because most research using the RMICS does not report the full breakdown of codes, it is difficult to determine if this rate of PD is abnormally high; however, it appears that a 50-66% rate of PD is not uncommon (Heyman, 2004; Manne et al., 2004). With two exceptions described below, there was enough variance in the rest of the RMICS codes to analyze the hypotheses in this study.

A consistent pattern of results (significant PTSD*topic interaction with PTSD influencing the outcome variable in NP, more strongly in PR, most strongly in VN) was expected to emerge across all variables being examined in Aim One and all sequences in Aim Two. The underlying hypothesis was that the VN conversation is contextually relevant to combat exposure, and would therefore activate trauma-related memory networks and result in expression of PTSD symptoms (Litz & Keane, 1989). Even a subtle perception of threat, which it was believed the PR conversation would present, can escalate the veteran into a positive feedback loop of increasing arousal and heightened response (Chemtob, Roitblat, Hamada, Carlson, & Twentyman, 1988).

Of the five testable Aim One hypotheses, the interaction pattern was not as large or consistent as expected, but the patterns do provide a glimpse into conversations between veterans and their wives, which may inform strategies for reintegration and

treatment methods. Veteran total utterances revealed significant differences associated with PTSD severity and conversation topics, and although both effects were in the expected direction, the only significant difference in conversation means was between VN and the other two topics. Similar to total utterances, veteran self-disclosure revealed significant main effects for PTSD and conversation topic, but in this case both patterns were opposite the predicted results; increasing PTSD led to increased self-disclosure and NP had a significantly lower group mean than the other two topics. Veteran hostility demonstrated a significant interaction effect, as increasing PTSD led to decreased hostility in the NP conversation relative to the VN conversation and similar levels of hostility in the VN and PR topics. Collectively, these results indicate the need to refine understanding of the interplay between PTSD and communication in particular, or PTSD and relationships in general.

The only significant finding in wife acceptance was the main effect of topic, such that the women demonstrated more acceptance in the VN conversation than in the other two topics, possibly as a deliberate effort to validate the veterans' experiences. Similarly, wife relationship-enhancing attributions had only the main effect of topic significant, but in this case it was during the PR discussion, as compared to the other two conversations, that the women showed significantly higher levels of such attributions, suggesting that wives felt increased duty to protect the relationship during this type of conversation. Overall, although several patterns of variation in communication behaviors were found related to PTSD and conversation topic, there was inconsistent evidence to support the specific hypothesis that the VN conversation, and to a lesser degree the PR conversation,

activated PTSD symptoms in a way that influenced the veteran's communication style or the wife's caregiver response.

Similar to Aim One, the results of the Aim Two analyses did not reveal the predicted pattern. Although PTSD influenced several of the sequences examined, its role was not as pervasive as predicted and the topics did not differ as strongly as predicted or in the predicted directions. For example, PTSD was associated with increased likelihood of negative reciprocity during the VN conversation, as predicted, but not in the PR or NP topics. Although its impact between conversations differed in the expected direction, none of the differences were statistically significant. When examining only veteran negativity in response to wife negativity, PTSD was not found to have any influence, and the difference between NP and PR topics was not statistically significant. Zero-counts in the data prevented the VN topic from being analyzed, so it is difficult to ascertain the impact of PTSD in this conversation. PTSD had only slight influence on veteran negativity in response to wife non-negativity, and this was only observed in the PR conversation, which was not substantively different than the other two topics.

The exploratory hypotheses indicated that the veteran was most likely to respond negatively during the PR conversation, and was most often triggered by wife dysphoria, hostility, and distress-maintaining attributions. Wife hostility during the VN conversation also led to veteran negativity. Each hypothesis will be discussed in greater detail below.

As expected, PTSD symptom severity negatively influenced the veteran's total utterances. This is most meaningfully described in the context of comparing veterans with and without PTSD. The current sample found that, on average, veterans with PTSD

scored 52 points higher on the PCL than veterans without PTSD. At 0.2 utterances per one-point PCL increase, this equals 10.4 fewer comments per conversation, or 25% of the average 41 comments per conversation. This result builds upon previous research linking PTSD and expressiveness in veterans. The relationship has already been established using self-report measures of family expressiveness (Hendrix et al., 1995) and wives' descriptions of husbands given during a support group (Shehan, 1987). It has also been supported by self-report of veterans with heavy versus light combat exposure (Penk et al., 1981) which is strongly, although certainly not perfectly, associated with PTSD. The current study adds evidence based on observational data from a laboratory setting using a non-clinical sample, but indicates that the phenomenon is not pervasive but rather it may be specific to certain conversation topics.

Although the interaction term was not significant, the main effect of conversation topic partially supported the hypothesized pattern of results. Specifically, a veteran with average marital satisfaction and average PTSD symptom severity (both averages refer to the current sample) would be expected to make significantly fewer total comments during the VN conversation (35.15) than either the NP (45.80) or the PR conversations (42.48). Although the difference between NP and PR was not significant, it was in the expected direction.

The hypothesized pattern of results was based on the expectation that PTSD would generally be associated with lower overall expressiveness and that the PR conversation, and to a greater degree the VN conversation, would activate the PTSD symptoms and result in an exaggerated portrayal of the expected relationship. In the

current sample, it appears that the difference in expressiveness between conversation topics is not due to any difference in PTSD symptom severity, which held a significant but stable influence on expressiveness across topics. Instead, it may reflect a general hesitancy to discuss issues related to Vietnam experience, particularly if there is a history of trauma. Alternatively, it may simply be that it is more difficult for two individuals to dialogue about an experience that is not mutual. That is to say, it is easier for husband and wife to discuss a recent event or a problem within the relationship because these are experienced by both parties, whereas the wife had no personal experience in Vietnam and thus has less to contribute to the conversation. Notably, a wife with average self-reported marital satisfaction and average veteran PTSD severity has a similar profile of total utterances, such that she would be expected to make fewer comments during the VN conversation (28.33) than either the NP (46.37) or PR conversations (41.77). For both parties, a greater number of comments in the NP and PR topics may reflect more fluid dialogue because of shared experience and equal comfort discussing a given topic, and the lesser number of comments in the VN topic may indicate less fluid conversation due to the lack of mutual experience and/or possibly mutual avoidance of a subject (i.e. combat, and possibly trauma) that is uncomfortable for either party to discuss. One aspect remains clear: the VN topic elicited fewer comments and therefore more "holes" in conversations, and neither party made a noticeable effort to fill these holes.

Although not stated explicitly, an assumption underlying the hypotheses was that total utterances, self-disclosure, and withdrawal all constitute similar measures of the same construct *expressiveness*. That is to say, an "expressive" individual would make a

large contribution to a given conversation (high total utterances), would disclose much about himself (high self-disclosure), and would not be inclined to pull away from the conversation (low withdrawal). Differences in the general expressiveness between individuals would therefore lead to predictable differences in each of these variables. However, this was not the case in the current dataset: total utterances generally followed the expected pattern of results, self-disclosure was essentially opposite, and withdrawal was so rare it could not be statistically analyzed. This collection of results may indicate that these variables in fact measure different constructs. It may be more appropriate to suggest that the total number of utterances reflects a behavioral measure along a continuum from expressiveness (high number of utterances) to withdrawal (low utterances). Further, the RMICS definition of self-disclosure is likely a more pure measure of self-related statements (and thus should not be confused with *disclosure* or *expressiveness*) and RMICS withdrawal reflects verbal efforts to remove oneself from a conversation (which may not be entirely consistent with behavioral efforts such as decreased speech). Collectively, these results may indicate that veterans with PTSD are less likely to make a verbal effort to withdraw from the conversation, choosing instead to "shut down" and become less verbal altogether. As a result, if communication is an integral aspect of a healthy relationship, this verbal shutdown may be more damaging than a communicated withdrawal effort, as the wife is left with little information about why the conversation has ended.

Possibly the most unexpected finding of the current analysis was the complete absence of any psychological abuse on behalf of the veteran. An overall frequency of

zero precludes any type of data analysis, so it is impossible to speak to the hypothesis other than that it was untestable. However, there is clearly more to be discussed. This hypothesis was based on a previous study using data from the same parent project as the current study. Byrne and Riggs (1996) found a relationship between PTSD symptoms and various measures of abuse, including veteran and partner reports of the veteran's psychologically abusive behavior as well as an aggregated measure that included verbally and physically abusive behaviors. Although not all couples used in Byrne and Riggs' comparison participated in the conversations used in the current study, and are therefore not all included in the current analysis, they were all recruited within identical parameters under the parent study and there were no differences between the two subsamples on veteran's PTSD status or severity, or on marital satisfaction rated by veteran and wife. It is more likely that there are differences between the measures, specifically between self-report and observation measures. Observational measures were selected with the belief that this method provides a more objective (and potentially more accurate) assessment of communication styles. However, the disparity between self-report and observational assessment in this case suggests two possibilities: 1) that the structure of the conversation exercise was somehow not conducive to a genuine communication experience between veteran and wife, or 2) that this sample may have been more comfortable honestly reporting their negative communication styles on paper than demonstrating them on camera. Previous research has established that manipulating conversation topic is often an effective means of eliciting particular affective responses within and between participants (Aron et al., 2000; Heyman et al., 2009; Knobloch & Solomon, 2003;

Montemayor et al., 1993). Although some researchers maintain that laboratory observation may be inherently biased toward a falsely positive self-presentation (Jacob, Tennenbaum, & Krahn, 1987), negative interactions have been observed in samples of particularly distressed relationships, such as those characterized by violence (Holtzworth-Munroe, Smultzer, & Stuart, 1998; Sabourin & Stamp, 1995). Another possible problem with the conversation exercise was its duration. Heyman et al. (2001) suggested at least 15 minutes of interaction to obtain a reliable estimate of the frequency of RMICS codes. Although this study used only ten minutes per conversation, most of the studies referenced above were at or even below ten minutes, and none of them reported any concerns about the conversations being a poor reflection of a typical interaction. Instead, the disparity between self-report and observational assessment is more likely due to the bias of falsely positive impression management.

The interaction of conversation topic and PTSD severity was found to significantly influence veteran hostility, generally following the hypothesized direction. Again, the practical impact of these results is most striking when comparing between veterans in the PTSD group vs. the non-PTSD group, who differed by an average of 52 points on the PCL. With each point associated with a 3.25% increase during VN conversations, veterans with PTSD can be expected to make 169% more hostile utterances than their peers without PTSD. This equates to 10 hostile comments by a non-PTSD veteran, compared to 27 by a PTSD veteran, although it should be emphasized that, in the current sample, the overall frequency of hostile comments during the VN conversations was much smaller and did not demonstrate such a strong disparity.

Notably, change in PTSD severity has opposite effects in the NP and VN conversations. The increased hostility during the VN conversation is consistent with the hypothesis, and although a decrease in hostility during the NP topic was not specifically predicted, this result is essentially consistent in that it results in lower hostility in NP compared to VN. Although not a specific prediction within the hypothesis, decreased marital satisfaction was significantly associated with increased veteran hostility, supporting previous findings in the literature on marital satisfaction (Erel & Burman, 1995; Hawkins, 1968). Similarly, the fact that hostility demonstrated the highest base within the PR topic is also consistent with previous research (Newton, Kiecolt-Glaser, Glaser, & Malarkey, 1995). The fact that PTSD does not affect hostility during the PR topic indicates that any changes in hostility observed in that conversation are not due to PTSD or marital satisfaction, but rather reflect some outside factor not considered in this analysis. In terms of general base rate, a veteran with average marital satisfaction and average PTSD severity could be expected to use the most hostility (5.54% of total utterances) during the PR conversation, and the results indicate that this rate does not change significantly with changes in PTSD severity. There is a markedly lower base rate in the NP (1.05%) and VN (0.08%) conversations, but hostility levels during these conversations are more prone to change with changes in PTSD severity. Contextual comparisons for the NP conversation are more difficult because any value decreased by 169% (because the rate of change in NP was exactly opposite that of VN) becomes a negative number, which is impossible when dealing with behavioral observations. At a rate of 3.5% fewer hostile comments per PCL

point, any base rate of hostility would reach zero with a difference of 29 points on the PCL.

The increased hostility during the VN conversation supports the theory that the trauma-laden topic would activate PTSD symptomology, which is characterized by interpersonal hostility. It also supports previous research linking PTSD and hostility in communication (Beckham et al., 1996; Carroll et al., 1985; Kubany et al., 1994), although it is believed that this is the first such study to manipulate a communication interaction with the expectation of increased hostility. These results may refine previous understanding of this relationship by the fact that PTSD and hostility only demonstrated the expected relationship in one of the three conversations, suggesting that the effect reported in previous studies may have resulted from very specific instances of hostile communication and was not generalized across multiple topics of conversation. The lack of observable association between PTSD and hostility in the PR conversation may indicate that discussing problems within the relationship does not elicit a threat response and activate the PTSD arousal network as expected. The decrease in hostility during NP conversations is harder to interpret. Although this explanation has no empirical support from the current data, it is possible that veterans with increasing PTSD symptoms are aware of their susceptibility to speak and act in a hostile manner, and they may make a conscious effort to avoid this negative communication style. Such self-control may have been easier during the NP conversation but more difficult during the other topics.

Similar to psychological abuse, there was far less veteran withdrawal in the current sample than expected. Because 91 of the 97 conversations had zero withdrawal

statements credited to the veteran, the hypotheses were virtually impossible to analyze, much less to interpret. Although there was no previous literature specifically linking PTSD and withdrawal, the relationship was hypothesized based on a belief that withdrawal was conceptually similar to (or a symptom resulting from) emotional numbing, or a difficulty establishing an emotional closeness with another person, which is commonly reported in veterans with PTSD (Riggs et al., 1998; W. R. Roberts et al., 1982) and found in comparisons of combat/non-combat and heavy/light combat veterans (Penk et al., 1981). The hypothesis was also supported by the link between avoidance/withdrawal communication patterns and marital satisfaction (Caughlin & Huston, 2002; Smith et al., 2008), which itself has a strong relationship with PTSD (Monson & Taft, 2005). In the current study, withdrawal was the most relevant RMICS code to reflect this effort to avoid or withdraw from communication. However, avoidance or withdrawal could be operationalized either in verbal attempts to evade or withdraw from a discussion (measured by RMICS withdrawal), or in an inherently nonverbal unwillingness to engage in conversation (measured by total utterances, or lack thereof). The lack of verbal withdrawal observed in this sample may be explained in two ways: 1) veterans in the current sample tend to use nonverbal more than verbal means of withdrawing from their wives, or 2) RMICS withdrawal and the avoidance/withdrawal characteristic of emotional numbing are unrelated or loosely related constructs. The test of general expressiveness, reported above, suggested that greater PTSD severity was related to fewer overall veteran statements in any given conversation, lending credit to the possibility that these veterans tended toward nonverbal means of withdrawing instead

of verbal means. The RMICS withdrawal code is designed to capture both verbal and nonverbal efforts, as the broad definition includes verbal attempts to end the conversation or change the subject, pseudo-agreement presented in a way to block further discussion ("Sure, you're right… you're right…"), and nonverbal cues such as closed-off body language and failure to respond to the partner's question (Heyman & Vivian, 1993). Despite the broad scope of this measure, its relative absence within this dataset indicates there is very little overlap with the emotional numbing / avoidance symptom cluster in PTSD.

Contrary to expectations, increasing PTSD severity was associated with increased veteran self-disclosure, such that a one-point increase in PTSD severity was associated with a 2.63% increase in self-disclosure comments. Additionally, there was a significant difference in self-disclosure between conversation topics, but not in the hypothesized direction. Veterans made a higher proportion of self-disclosure comments in the VN (7.84%) and PR conversations (4.91%) than in the NP conversation (2.40%). Because the interaction term was not significant, the 2.63% increase could be expected for all conversation topics. These findings appear to contradict previous research (Hendrix et al., 1995; Penk et al., 1981; Shehan, 1987), which drove the hypothesis that increased PTSD would be associated with decreased self-disclosure. These results continue to challenge the underlying assumption that veterans' total utterances, withdrawal, and self-disclosure would all be related. All of those hypotheses were rooted in the same general theory, that healthy relationships are characterized by communication wherein both parties actively and reciprocally express themselves and their feelings, but that increasing PTSD

symptoms disrupt or prevent healthy relationships and communication. According to the current sample, the data for total utterances largely support this theory, the data (or lack thereof) for withdrawal only partially support it, and the data for self-disclosure largely oppose it.

Although the findings are unexpected, at least one aspect is easy to interpret. One could argue that because the wife was not present in Vietnam, she would have very little to "contribute" to the VN conversation and the burden would fall on the veteran to discuss what he did and how he felt, which would be coded as self-disclosure. Even if this is true, the frequency of self-disclosure is at the low end of previously reported rates, which range from 5-25% (Heyman, 2004; Manne et al., 2004). Although it would be inappropriate to draw strong conclusions by comparing unrelated samples, it is notable that the most self-disclosing conversation in this study is still one of the lowest rates reported in the literature. The percentages in this dataset equate to less than three self-disclosure statements during the average VN conversation, compared to roughly two in the PR and roughly one in the NP conversation.

The results on self-disclosure are difficult to interpret. Previous research consistently indicates that increasing PTSD is associated with decreased self-disclosure, whether the authors specifically use that term (Purves & Erwin, 2004) or, using other words, describe the phenomenon of sharing emotional content with another person (Hendrix et al., 1995; Penk et al., 1981; Shehan, 1987). There are no major variations between the RMICS definition of self-disclosure (Heyman & Vivian, 1993) and the operational definitions used in previous research. The current sample is non-treatment-

seeking Vietnam veterans, and previous research has sampled undergraduate students (Purves & Erwin, 2004) as well as Vietnam veteran spouse support groups (Shehan, 1987) and substance-abusing (Penk et al., 1981) and non-treatment-seeking Vietnam veterans (Hendrix et al., 1995). The only major aspect of the current study that is unique from previous research is the method of assessment; this is the first such study to use an observational measure to assess self-disclosure. Assuming that the couples in this study interacted in a genuine manner in front of the camera, it is also possible that there are differences between an individual's actual and reported communication behavior. That is to say, one's report of one's own communication style, or that of one's partner, may not accurately reflect actual behavior. Again assuming the individual is not intentionally lying, it is possible that the frequency or severity of a behavior is not accurately perceived. In light of the negative attention that PTSD has gained, particularly regarding hostile communication, it is possible that partners may disproportionately attend to and report negative interactions, resulting in inflated "evidence" of negative communication. It is also possible that veterans themselves hold the same misperception. Unfortunately, the current dataset does not include the type of self-report measures that could serve as a test of internal validity.

Contrary to expectations, veteran PTSD had no discernable influence on the wife's proportion of acceptance statements. However, there was a significant difference between conversation topics, as she made a higher proportion of acceptance statements in the VN conversation (4.96%) than either the PR (1.25%) or NP conversations (0.47%). This hypothesis was driven by previous research on spouses' reactions to veterans'

PTSD, specifically the phenomenon of caregiver burden. More specifically, it was expected that these conversations would elicit her caregiver *response*, which includes her efforts to "fix" or compensate for his condition; it is prolonged and generally fruitless caregiver *response* that eventually yields caregiver *burden* (Calhoun et al., 2002; Verbosky & Ryan, 1988). It was expected that the VN and, to a lesser degree, the PR conversations would activate the veteran's PTSD, which in turn was expected to activate the wife's caregiver response. These results may indicate that a) the conversations failed to activate the PTSD enough to warrant a caregiver response, or b) her caregiver response is driven more by context (in this case, an awareness of potential distress as her husband discusses his combat experience) than by expression of PTSD symptoms. Given the larger picture painted by the data, both may be true. As discussed in greater detail above, the conversation topics did not activate the veterans' PTSD symptoms as strongly as expected. However, despite the lower-than-expected PTSD activation, she increased her rate of acceptance comments during the VN conversation. It is possible that she was sensitive to the subject of his combat exposure and used soothing and validating communication as an attempt to mitigate his PTSD activation.

Similar to wife's acceptance, veteran PTSD had no detectable influence on the wife's proportion of relationship-enhancing attributions. However, there was a significant difference between the conversation topics, such that she made a higher proportion of relationship-enhancing attributions during the PR conversation (5.03%) than either the NP (1.73%) or VN conversations (1.01%). Once again, the wife's caregiver response was found to be completely unrelated to the veteran's PTSD severity. This pattern of results

may, however, lend support to the interpretation of the wife's acceptance described above. Her use of relationship-enhancing attributions was not activated by his PTSD but was related to a specific context, in this case the PR conversation. Just as she may have been using acceptance to mitigate his PTSD activation during the VN conversation, perhaps these relationship-enhancing attributions were an attempt to frame interpersonal problems more positively, making peace during a challenging conversation that might otherwise have detrimental effects on their relationship. Both strategies could indicate an underlying goal of maintaining the relationship, with a slightly different tactic depending on the nature of the stressor: relationship-focused statements when managing a point of mutual contention, and acceptance statements when addressing distress that is being experienced primarily by the veteran.

Although there has been much research on mental health sequelae of the spouse in a caregiving role, the vast majority of such studies have focused on physical injuries, cancer, and various later-life conditions such as Alzheimer's and Parkinson's disease. Relatively little research has been devoted to caregiving spouses of mental health patients. Findings generally indicate that caring for such patients, particularly those with anxiety disorders, can lead to difficulties with interpersonal relationships, family functioning, and individual role strain (Kalra, Kamath, Trivedi, & Janca, 2008), even if the individual distress may not reach diagnostic levels within the caregivers themselves (Idstad, Ask, & Tambs, 2010). Caregiver behaviors were observed in the wives' increased acceptance and relationship-enhancing attributions, but caregiver burden (indicated by wife psychopathology) was beyond the scope of the current study.

Although marital satisfaction was included in the model as a control variable, it is worth noting that it was found to be significantly related to veteran hostility and self-disclosure, and, to a lesser degree, to veteran total utterances. This link between marital satisfaction and communication, combined with the link between PTSD and marital satisfaction that has been evidenced in previous research and supported by these results, suggest another path through which PTSD may influence communication patterns. The current results indicate that any such relationship only exists within the veteran himself, as wife-reported marital satisfaction was not associated with her statements of acceptance or relationship-enhancing attributions. A full mediation analysis is beyond the scope of the current study, but should be considered in future research in order to test this hypothesis.

The distribution of conversation codes was problematic in Aim One, as some of the zero-count codes made particular hypotheses untestable. These problems were largely mediated in Aim Two by dichotomizing the codes into Negative and Non-Negative, greatly reducing the number of zero-count cells. However, one condition remained problematic: there were no instances where the wife of a non-PTSD veteran uttered a negative statement during the Vietnam conversation. There were only three comparisons affected by this issue, and they will be addressed below.

PTSD was related to increased likelihood of negative reciprocity, but only in the VN conversation; there was no significant effect in NP or PR. Comparisons between topics revealed that, for couples with PTSD, negative reciprocity was more likely in the VN conversation than in the NP conversation. The likelihood of negative reciprocity in

these couples during the PR conversation was not substantially different than the VN or NP topics. Taken alone, these results appear to partially support the hypothesis that the VN topic activated the veteran's PTSD symptoms, which brought a negative tone to the veteran's comments, which increased the likelihood of negative responses by the wife. However, the inconsistency of this pattern across other hypotheses indicates that the relationship is not so simple. Furthermore, the negative reciprocity hypothesis was founded on research that observed the communication pattern among distressed couples (Gottman, 1979). The underlying assumption was that couples where the veteran has PTSD are more distressed than couples where the veteran does not have PTSD, and that any relevant communication patterns would be observable to some extent in any conversation. Confirming previous findings (Monson & Taft, 2005), PTSD couples had lower marital satisfaction scores than non-PTSD couples. However, the negative reciprocity pattern was only observed in PTSD couples during the VN conversation, suggesting that negative reciprocity is not as pervasive as expected and cannot be assumed to occur with consistent strength across multiple types of conversation. This may indicate that the relationship between marital distress and negative reciprocity, which is well established in literature, is somehow complicated by the presence of psychopathology, specifically PTSD.

Contrary to expectations, veterans with PTSD did not demonstrate exaggerated negativity compared to peers without PTSD. In fact, negativity was generally low across the entire sample, accounting for less than 6% of all veteran communication codes. Given a negative wife antecedent, veterans with PTSD were slightly more likely than non-PTSD

veterans to respond negatively during the PR conversation, but there were no significant differences in NP. This hypothesis was largely driven by previous research, which demonstrated that veterans with PTSD commonly display negativity in communication (Beckham et al., 1996; Byrne & Riggs, 1996; Evans et al., 2003; Kubany et al., 1994). It was hypothesized that this negativity would be pervasive across all conversation topics. Given that comparisons within the VN topic were impossible because of the zero-count described above (no negative statements by wives of veterans with PTSD during VN conversations), analyses were limited to the PR and NP topics. The hypothesis was not supported in the NP topic, and only tentatively supported in the PR topic, where results did not reach statistical significance. These results add support to the discussion above, namely that negative reciprocity is not as pervasive as expected but rather appears to be present in specific contexts. However, there was more promise for the sub-hypothesis, which expected to see a stronger relationship between PTSD and communication in the PR topic than in the NP topic. Although it did not reach statistical significance, the odds ratio of 6.12 may carry clinical implications. Given a negative wife antecedent during the NP topic, veterans with PTSD were actually less likely to respond negatively than veterans without PTSD (OR = 0.65). In contrast, given the same antecedent during the PR topic, veterans with PTSD were nearly four times as likely to respond negatively compared veterans without PTSD. This indicates that generally speaking, for wives of veterans with PTSD, negative comments during a conversation about problems within the relationship are more prone to incite negative responses than the same comments delivered during a conversation about some neutral event. The main clinical implication

of this finding is that veterans and wives are urged to recognize the greater risk for negativity within emotionally-charged conversations, such as when discussing a problem within the relationship.

The final hypothesis examined veteran negativity following wife non-negativity, and there was very little difference in the likelihood of such sequences based on PTSD. Specifically, given a non-negative wife antecedent, PTSD had only a slight impact on the likelihood of a negative veteran response, and that was only observed in the PR conversation. PTSD had no identifiable role in this particular pattern within the NP or VN conversations. Consequently, there was very little difference in PTSD's impact when compared between the topics. The role of PTSD on the veteran's negative response was somewhat higher in the PR topic compared to VN, and neither was substantially different than NP. These hypotheses were based on anecdotal reports of seemingly-unprovoked negativity from veterans with PTSD, and although there is no literature that specifically describes this relationship, it seemed plausible given the research demonstrating general negativity in communication patterns of veterans with PTSD, and the correlations with poor marital satisfaction. The overall lack of significant results within this hypothesis seems to indicate that, at least within this sample and in this setting, unprovoked negativity is not as pervasive as anecdotal reports might suggest. Further, given the triggers of veteran negativity as described in the exploratory hypothesis, it appears that within the current dataset, veteran negativity was generally provoked by wife negativity, and more specifically during conversations about problems within the relationship. "Unprovoked" veteran negativity, i.e. following wife non-negativity, is difficult to

meaningfully calculate because of the extreme variability in data dispersion. For example, although it is true that unprovoked veteran negativity accounted for less than 3% of all wife → veteran sequences, this statistic is somewhat misleading because negative comments from both parties were relatively infrequent. Similarly, although over 60% of veteran negative responses followed a non-negative antecedent, the vast majority of these antecedents were problem-solving comments, which were disproportionately assigned across the dataset. If we briefly return to the original RMICS coding categories, we are reminded that PD is classified as a "neutral" code. The spirit of this hypothesis is to understand unprovoked negativity from the veteran, and the most unprovoked negative comment would be that which follows a positive comment. Using this comparison, 67 negative veteran comments followed negative wife antecedents, while only 12 followed positive antecedents. This comparison seems most meaningful, and indicates that although unprovoked veteran negativity did occur in this sample, it was the exception rather than the rule. As there is no previous research estimating the prevalence of this phenomenon, it is difficult to compare this statistic against anecdotal reports. Troubled wives of veterans with PTSD may claim that this statistic underestimates their personal experience, but the discrepancy may be at least partly explained by the adage that it takes five positive experiences to outweigh a single negative one.

The exploratory hypothesis sought to identify any pattern in wife antecedents that led to negative veteran statements. The most striking finding was the relative infrequency of veteran negativity across the dataset. With over 4,000 veteran statements, roughly 3,400 were captured in sequences paired with a wife antecedent. (The remaining veteran

statements were either the first statement in a given conversation or they were part of a longer speaker-turn, and thus not linked to a wife antecedent.) Of these 3,400 wife → veteran sequences, the veteran was negative in only 174. As indicated in Table 5, the PR conversation was clearly the largest setting for triggers of veteran negativity, accounting for over 75% of such sequences. Triggers within the NP and VN conversations were generally problem discussion statements, which is to be expected given that these codes were predominant across the dataset, and a handful of other negative comments during these conversations followed wife hostility; there was no discernable difference in PTSD status explaining either trigger. The PR conversation demonstrated a wider variety of wife triggers to veteran negativity. As in the NP and VN topics, the majority of the negativity in the PR topic was triggered by problem discussion and hostility. PTSD appeared to play a stronger role, as any given wife statement was more likely to trigger negativity if the veteran had PTSD. One exception to this was wife hostility, which triggered 29 cases of negativity in non-PTSD veterans and only 13 cases in PTSD veterans. Exact odds values for each trigger are listed in Table 6, but these should be interpreted cautiously, as most of these statistics were calculated using samples of less than ten incidents.

The majority of PTSD literature and anecdotal reports indicate that veterans with PTSD have a negative pattern of communication, particularly with intimate partners. Appropriately, most clinicians are likely to focus attention on this category of veterans when considering treatment strategies or education and prevention efforts. These results challenge existing beliefs, and suggest that although PTSD plays a role in problematic

communication patterns, conversation topic frequently proved to be a more influential factor, as each topic tended to foster a different pattern of interaction. Couples discussing a recent neutral or positive event tended to interact rather unremarkably. Both parties participated equally, with content that was mostly characterized by neutral codes, with no particularly strong patterns of positive or negative emotional content. When discussing a problem within the relationship, each individual's participation was similar to the neutral topic but the content was noticeably different. Veterans were generally more hostile during these discussions, and those in the PTSD group were more prone to respond to wives' negative comments with subsequent negativity of their own. Perhaps recognizing this risk, wives in both groups seemed to make an effort to speak in ways to protect and enhance the relationship. Somewhat paradoxically, there was a noticeable amount of positive veteran self-disclosure in these conversations, which may have developed as a response to the wife's peace-making efforts or, rather, may have provided enough positivity to empower the wife to respond accordingly. Finally, when discussing the veteran's Vietnam experiences, there was a noticeable decline in the overall participation of both parties. The discussions carried a generally positive tone, characterized by positive self-disclosure from the veterans and acceptance from the wives. Although these positive individual statements were still common, there was an underlying tendency for couples in the PTSD group to engage in negative reciprocity, such that any negative comment from one party would often lead to a negative response from the other. Compared to the non-PTSD group, veterans in the PTSD group had more self-disclosure

but lower overall participation in all three conversations, and demonstrated more hostility in the VN topic but less in the NP topic.

Clinical Implications

The primary strength of this study is that it is believed to be the first to examine observational communication codes in veteran-wife communication, and therefore offers a deeper understanding of these interactions than any quantitative study yet published. The ability to report on dyadic antecedent-consequent exchanges and make comparisons between PTSD status and conversation topic will add significantly to extant literature. The main body of this study, as well as the exploratory analyses, will guide future research into the interpersonal dynamic and specific communication components relevant to individuals with PTSD.

It was expected that the VN conversation would be the "worst" in all categories, but this was largely untrue aside from the increased risk of negative reciprocity in the PTSD group. Overall, the PR topic was worst of the three, with increased hostility in all veterans and increased risk of wife-negative → veteran-negative sequences; even these characteristics were not as severe as expected. It remains unclear whether the PR topic activated PTSD symptomatology as predicted, or whether the negative communication was a result of a different variable altogether. Whatever the underlying mechanism, clinicians would be wise to consider the possibility that all combat veterans, regardless of PTSD diagnosis or severity, are at risk of negative communication patterns when discussing emotionally volatile issues such as problems within an intimate relationship.

These results will also inform clinicians treating relationship problems where one or both parties suffer from PTSD, and demand for such treatment has been reported as high as 80% of returning soldiers (Khaylis et al., 2011). In particular, researchers have suggested several different PTSD treatment modalities involving intimate partners. A basic treatment focus is communication skills, which is present in some form in most marital or family treatment methods (Cornelius, Alessi, & Shorey, 2007). Cognitive-behavioral conjoint therapy considers the couple as the unit of treatment, and focuses attention in three areas: psychoeducation; behavioral interventions and communication skills; and cognitive interventions (Monson, Fredman, & Adair, 2008; Monson, Schnurr, Stevens, & Guthrie, 2004). Behavioral family therapy addresses interactive problem-solving skills, typically within intimate dyads (Glynn et al., 1999). Monson, Taft, and Fredman (2009) also review two unpublished studies where behavioral conjoint therapy was applied in a group setting; one was limited to communication and problem-solving skills, and the other also included enhancing intimacy and increasing positive interactions. Additionally, there is research using interpersonal psychotherapy (IPT) techniques to address veterans whose PTSD interferes with their general social interaction (Markowitz, Milrod, Bleiberg, & Marshall, 2009). Other researchers suggest that it is better not to wait until relationship problems present, but that the military should implement training in basic relationship skills as early as possible (Gottman, Gottman, & Atkins, 2011). Regardless of how or when these relationships are strengthened, recent research has demonstrated that these stronger relationships may provide a context where the veteran feels more comfortable seeking treatment for PTSD (Meis, Barry, Kehle,

Erbes, & Polusny, 2010), suggesting that any such intervention pays future dividends for both the veteran and for the relationship. Results from the current study suggest that, regardless of therapeutic modality, all parties should be less concerned about combat-themed discussion and more focused on improving communication about problems within the relationship.

Limitations

When interpreting the results of this study, some limitations should also be considered. First, as discussed above, challenges were encountered in estimating the power for both mixed-model regression and log-linear modeling leaving some uncertainty about the significance of the results. Therefore, the chances of a Type-2 error may be higher than anticipated, and future studies should strive for a larger sample size. Unfortunately, the database used in this study has a limited number of participant couples, and cannot be increased now that the study is complete. Also, the 10-minute conversations recorded for each topic may yield low frequencies for some of the communication codes. Other researchers (Heyman et al., 2001) have recommended a minimum of 15 minutes of observational data in order to obtain a reliable estimate of the frequency of RMICS codes. The current dataset was unfortunately collected before that discovery was made, but future studies should be mindful of the recommendation. Finally, the VN conversation topic was not strictly controlled. This topic was intended to elicit a moderate amount of post-traumatic affective and stress response, which presumably activate many of the negative communication behaviors reported in literature on veterans with PTSD. However, given the complicated nature of affective and stress

responding, it would be impossible to standardize these variables between veterans with a wide range of PTSD symptom severity.

One strength of the RMICS coding system is the opportunity for a richer understanding of communication patterns compared to simpler coding systems that dichotomize statements by positive or negative valence. Unfortunately, this richness did not materialize in the current dataset. The disproportionate attribution of problem discussion/solution codes accounted for over 75% of the statements from both individuals, and resulted in clusters of data that were often too small, leading to relatively weak analyses, allowing few meaningful conclusions. It is likely that the 6,000 data points represented by this code actually fell along a meaningful spectrum of emotional valence and, were they coded with greater precision, may have allowed for more meaningful analyses. Instead, these results indicate possible relationships and suggest strategies for future research.

The possibility of laboratory bias must always be considered. Although specific research questions were not discussed with the participants, the nature of the research was apparent and may have led certain individuals to behave differently in the presence of a camera. Individuals concerned with perceptions of their behavior would be likely to interact more positively, or at least less negatively, on camera in a laboratory compared to the privacy of their home. However, this bias would have been similarly present in previous research, and therefore cannot contribute to the unique findings of this study.

A common limitation of most research is generalizability. The rate of PTSD in veterans returning from current conflicts is staggering, and craves research that is

immediately relevant to the current generation. Unfortunately this study exclusively sampled Vietnam veterans, and although there are obvious similarities between the two populations, there are also many differences. The combat experiences are likely comparable, as the nature of guerilla warfare in Vietnam is similar in many ways to battling insurgents in the current conflicts. Although the current attitude of Americans on the homefront is much more positive than the Vietnam veterans experienced, today's operational tempo often finds soldiers deploying multiple times, resulting in greater frequency of deployments and greater overall family separation compared to Vietnam era. Additionally, current veterans are typically much younger than those included in this study, and their relationships are therefore also "younger" and less developed. In contrast, most of the wives of Vietnam veterans in the current study were not involved with the veteran during his deployment or reintegration, compared to many veterans today whose relationships are more directly impacted by deployment (often repeated deployments), trauma, and subsequent PTSD symptoms. However, the basic elements of interpersonal communication have not changed significantly between generations, and these findings should be considered relevant to current-era veterans and their families. Relationships can be strengthened early and later treatment efforts can be informed by these findings, which continue to hone in on the circumstances that create the opportunity for negative communication patterns, thereby preventing or repairing damage caused to the relationship.

Future Research

These hypotheses assumed that particular communication patterns should be evident across all types of conversation. If this assumption were correct, it could be concluded that exceptions found in the current results suggest that particular topics are somehow protective against particular outcomes. Alternatively, if assumptions are shifted to believe that communication patterns are not universal but rather may be influenced by a number of internal and external variables, it could be concluded that some unique combination of variables explains any given set of results in the analysis. The results were not explained by the variables included in these analyses, namely conversation topic PTSD, or marital satisfaction, indicating that additional research is still needed to understand this aspect of communication between intimate partners.

As discussed briefly above, the current analyses suggested possible relationships between particular variables as evidenced by results that approached, but did not reach, statistical significance. These relationships should be examined further to determine if the results were spurious findings or merely under-powered analyses. The most common method of increasing power is to increase sample size, and thus investigators should consider replicating the current study with a larger sample. Future research should continue to clarify the relationships between these variables in combat veterans, and general understanding could be broadened by considering other variations such as civilian trauma survivors, younger veterans with newer relationships, and female veterans with male partners

Conclusions

These results challenge the scientific community to refine current understanding of the relationships between PTSD and communication within intimate partners. The general expectation is that veterans with PTSD are generally quiet, and when they speak there is a risk of outbursts of anger and hostility. However, the current study failed to identify differences between PTSD status on most measures of communication. Also, results indicated that negative communication patterns were most evident in conversations about a problem within the relationship, and even in those conversations the negative comments were far outweighed by neutral or positive statements. Often, results were generally consistent with the predicted roles of PTSD and conversation topic but failed to reach statistical significance. In general, provoked and unprovoked veteran negativity and the ensuing pattern of negative reciprocity were evident in particular couples and particular situations, but at rates far less than expected. These results challenge researchers to continue efforts to accurately quantify the nature of communication, and to identify what predicts the type of negativity that has earned PTSD such a feared reputation in marital and communication literature.

Tables

Table 1

Average percentage of each code

Topics: NP = Neutral/positive; PR = Problem in relationship; VN = Vietnam

RMICS Code		Men					Women				RMICS Code	
		Overall	NP	PR	VN		Overall	NP	PR	VN		
Negative	Psychological Abuse	0.00	0.00	0.00	0.00		0.03	0.00	0.07	0.00	Psychological Abuse	Negative
	Distress-Maintaining Attr.	0.38	0.19	0.92	0.00		0.69	0.19	1.84	0.00	Distress-Maintaining Attr.	
	Hostility	2.41	1.21	5.74	0.15		3.30	2.51	6.51	0.71	Hostility	
	Dysphoria	2.35	0.00	2.18	5.04		0.52	0.15	0.90	0.51	Dysphoria	
	Withdrawal	0.68	0.42	1.48	0.10		0.37	0.00	0.09	1.07	Withdrawal	
Positive	Rel.-Enh. Attr.	3.18	1.95	4.66	2.94		2.84	2.01	5.35	1.05	Rel.-Enh. Attr.	Positive
	Acceptance	0.68	0.82	0.86	0.34		2.35	0.68	1.37	5.16	Acceptance	
	Self-Disclosure	6.18	3.98	5.15	9.63		2.76	2.87	4.53	0.75	Self-Disclosure	
	Humor	2.74	2.91	3.63	1.63		3.51	3.81	3.95	2.72	Humor	
Neutral	Constr. Prob. Disc./Solution	76.28	81.55	69.18	78.24		77.56	81.23	68.48	83.26	Constr. Prob./Disc. Solution	Neutral
	Other	5.11	6.98	6.22	1.94		6.08	6.48	6.91	4.78	Other	

Table 2

Total frequency of each code

Topics: NP = Neutral/positive; PR = Problem in relationship; VN = Vietnam

RMICS Code		Men					Women				RMICS Code	
		Overall	NP	PR	VN		Overall	NP	PR	VN		
Negative	Psychological Abuse	0	0	0	0		1	0	1	0	Psychological Abuse	Negative
	Distress-Maintaining Attr.	15	3	12	0		29	3	26	0	Distress-Maintaining Attr.	
	Hostility	129	18	109	2		152	36	108	8	Hostility	
	Dysphoria	68	0	24	44		18	2	14	2	Dysphoria	
	Withdrawal	34	5	28	1		7	0	1	6	Withdrawal	
Positive	Rel.-Enh. Attr.	119	27	62	30		104	27	68	9	Rel.-Enh. Attr.	Positive
	Acceptance	23	10	10	3		62	8	15	39	Acceptance	
	Self-Disclosure	204	42	67	95		94	31	56	7	Self-Disclosure	
	Humor	116	45	52	19		147	61	55	31	Humor	
Neutral	Constr. Prob. Disc./Solution	3072	1246	949	877		2936	1254	939	743	Constr. Prob./Disc. Solution	Neutral
	Other	223	113	87	23		233	107	95	31	Other	
	Total	4003	1509	1400	1094		3783	1529	1378	876	Total	

Table 3

Significance tests and parameter estimates from negative binomial analyses.

** - Significant at .05 level*

*** - Significant at .001 level*

§ - Percent change in outcome variable, given a one-point increase in predictor variable

£ - Topic 3 (VN) served as the reference group for the interaction term

¤ - EMM = Percentage of outcome variable (relative to total utterances)

(a, b, c) - Means within one notation are significantly different than means within another notation

	HOSTILITY		**SELF-DISCLOSURE**		**ACCEPTANCE**		**RELATIONSHIP-ENHANCING ATTRIBUTIONS**	
	Wald Chi-Sq	p	Wald Chi-Sq	p-value	Wald Chi-Sq	p-value	Wald Chi-Sq	p-value
Topic	44.692	0.000	13.097	0.001 **	41.016	0.000 **	18.737	0.000 **
Marital Satisfaction	7.475	0.006 *	6.702	0.010 *	0.124	0.725	2.160	0.142
PTSD	0.025	0.875	8.803	0.003 **	0.851	0.356	3.228	0.072
PTSD * Topic	16.050	0.000 **	4.873	0.087	3.776	0.151	1.469	0.480
	B	Impact §	B	Impact §	B	Impact §	B	Impact §
Marital Satisfaction	-0.036	-3.54%	0.024	2.43%	0.005	0.50%	0.013	1.31%
PTSD	0.032	3.25%	0.026	2.63%	0.003	0.30%	0.003	0.30%
PTSD * topic 1 (NP)	-0.065	-3.25%	0.006	3.25%	0.024	2.74%	0.016	1.92%
PTSD * topic 2 (PR)	-0.037	-0.50%	-0.014	1.21%	-0.003	0.00%	0.010	1.31%
PTSD * topic 3 (VN) £	0	3.25%	0	2.63%	0	0.30%	0	0.30%
Topic	Estimated Marginal Mean ¤		Estimated Marginal Mean ¤		Estimated Marginal Mean ¤		Estimated Marginal Mean ¤	
NP	1.05% (a)		2.40% (a)		0.46% (a)		1.73% (a)	
PR	5.54% (b)		4.91% (b)		1.25% (a)		5.01% (b)	
VN	0.08% (c)		7.84% (b)		5.14% (b)		1.04% (a)	

Table 4

Odds ratios for Hypothesis 4

~ - p < .10

** - Significant at .05 level*

Hypothesis 4			
Odds Ratio of Negative Reciprocity			
(PTSD vs Non-PTSD)		Antecedent	
		NEG	NON-NEG
Topic	NP	0.72	1.28
	PR	4.28~	2.23
	VN	10.07*	1.18
Comparisons Between Topic			
	Topics	OR	
	PR/NP	5.91	
	VN/NP	13.91~	
	VN/PR	2.35	

Table 5

Odds ratios for Hypotheses 5 and 6

~ - p < .10

** - p < .05*

Hypothesis 5 & 6			
Odds Ratio of Veteran Negative Response			
(PTSD vs Non-PTSD)		Partner Antecedent	
		NEG (H5)	NON-NEG (H6)
Topic	NP	0.65	1.79
	PR	3.94~	2.55~
	VN	(ERR)	0.84
Comparisons Between Topic			
(Given Negative Antecedent)			
	Topics	OR	
	PR/NP	6.11	
	NP/VN	(ERR)	
	PR/VN	(ERR)	
Comparisons Between Topic			
(Given Non-Negative Antecedent)			
	Topics	OR	
	PR/NP	1.42	
	NP/VN	2.12	
	PR/VN	3.02~	

Table 6

Frequency and percentage of negative veteran comments triggered by each partner antecedent, displayed in the entire sample and split by PTSD diagnosis and conversation topic.

Entire Sample			No PTSD			PTSD		
Antecedent	**Frequency**	%	NP	PR	VN	NP	PR	VN
Psychological Abuse	**0**	0.00	--	--	--	--	--	--
Distress-Maintaining Attr.	**9**	5.17	--	1	--	--	8	--
Hostility	**51**	29.31	6	29	--	1	13	2
Dysphoria	**6**	3.45	--	1	--	--	5	--
Withdrawal	**1**	0.57	--	--	--	--	--	1
Rel.-Enh. Attr.	**4**	2.30	--	2	--	--	2	--
Acceptance	**2**	1.15	--	--	2	--	--	--
Self-Disclosure	**5**	2.87	1	1	--	--	3	--
Humor	**1**	0.57	--	--	--	--	1	--
Constr. Prob. Disc./Solution	**91**	52.30	6	23	8	9	39	6
Other	**4**	2.30	--	1	--	--	3	--
TOTAL	**174**		**13**	**58**	**10**	**10**	**74**	**9**
Percentage			**16.05**	**71.60**	**12.35**	**10.75**	**79.57**	**9.68**

Table 7

Odds of a negative veteran response (vs non-negative response) after any given partner antecedent, displayed in the entire sample and split by PTSD diagnosis and conversation topic.

Partner Antecedent	Veteran Response	Total		No PTSD						PTSD					
				NP		PR		VN		NP		PR		VN	
		N = 97		N=18		N=18		N=17		N=15		N=15		N=14	
		Count	Odds	Count	Odds	Count	Odds	Count	Odds	Count	Odds	Count	Odds	Count	Odds
Psych. Abuse	Negative	0	**.00**	0	**(ERR)**	0	**(ERR)**	0	**(ERR)**	0	**(ERR)**	0	**.00**	0	**(ERR)**
	Non-Negative	1		0		0		0		0		1		0	
Dist.-Maint. Attributions	Negative	9	**.47**	0	**(ERR)**	1	**.13**	0	**(ERR)**	0	**.00**	8	**.89**	0	**(ERR)**
	Non-Negative	19		0		8		0		2		9		0	
Hostility	Negative	51	**.52**	6	**.30**	29	**.58**	0	**.00**	1	**.11**	13	**.93**	2	**1.00**
	Non-Negative	99		20		50		4		9		14		2	
Dysphoria	Negative	6	**.60**	0	**.00**	1	**.20**	0	**.00**	0	**(ERR)**	5	**2.50**	0	**(ERR)**
	Non-Negative	10		2		5		1		0		2		0	
Withdrawal	Negative	1	**.04**	0	**.00**	0	**.00**	0	**.00**	0	**.00**	0	**.00**	1	**.50**
	Non-Negative	23		3		4		11		1		2		2	
Rel.-Enh. Attributions	Negative	4	**.04**	0	**.00**	2	**.10**	0	**.00**	0	**.00**	2	**.05**	0	**.00**
	Non-Negative	99		11		20		6		16		43		3	
Acceptance	Negative	3	**.05**	0	**.00**	1	**.07**	2	**.13**	0	**.00**	0	**.00**	0	**.00**
	Non-Negative	65		3		15		15		13		4		15	
Self-Disclosure	Negative	5	**.06**	1	**.09**	1	**.03**	0	**.00**	0	**.00**	3	**.17**	0	**.00**
	Non-Negative	88		11		33		2		19		18		5	
Humor	Negative	1	**.01**	0	**.00**	0	**.00**	0	**.00**	0	**.00**	1	**.04**	0	**.00**
	Non-Negative	146		42		30		22		19		24		9	
Constructive Pr. Disc./Sol.	Negative	91	**.03**	6	**.01**	23	**.05**	8	**.02**	9	**.02**	39	**.11**	6	**.02**
	Non-Negative	2802		709		509		458		514		354		258	
Other	Negative	4	**.02**	0	**.00**	1	**.03**	0	**.00**	0	**.00**	3	**.06**	0	**.00**
	Non-Negative	221		53		39		15		50		49		15	

Figures

Figure 1. Proposed relationship between PTSD and marital satisfaction.

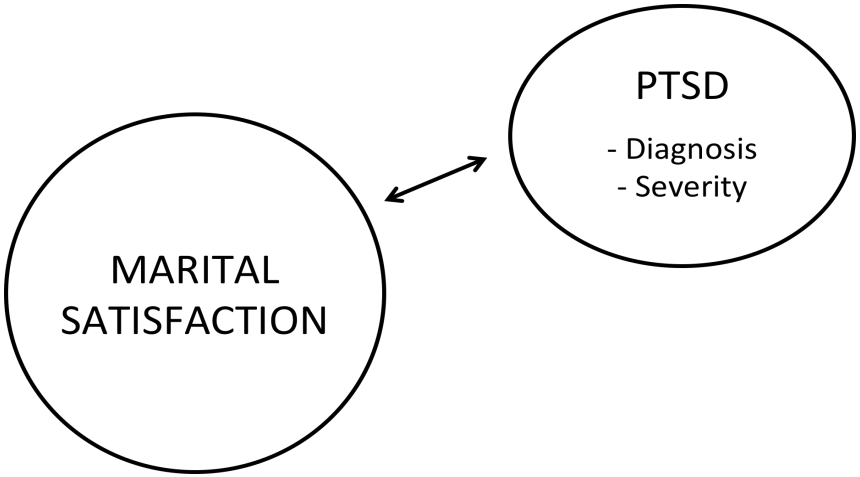


Figure 2. Proposed relationship of communication with both PTSD and marital satisfaction.

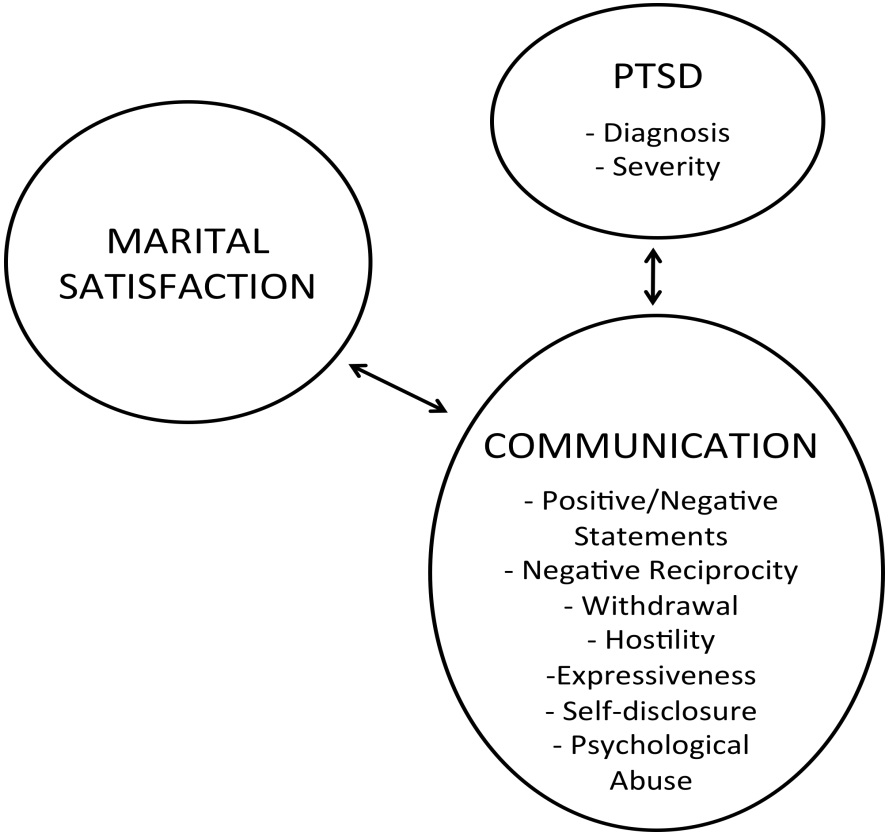


Figure 3. Proposed relationship between PTSD, communication, and conversation topic.

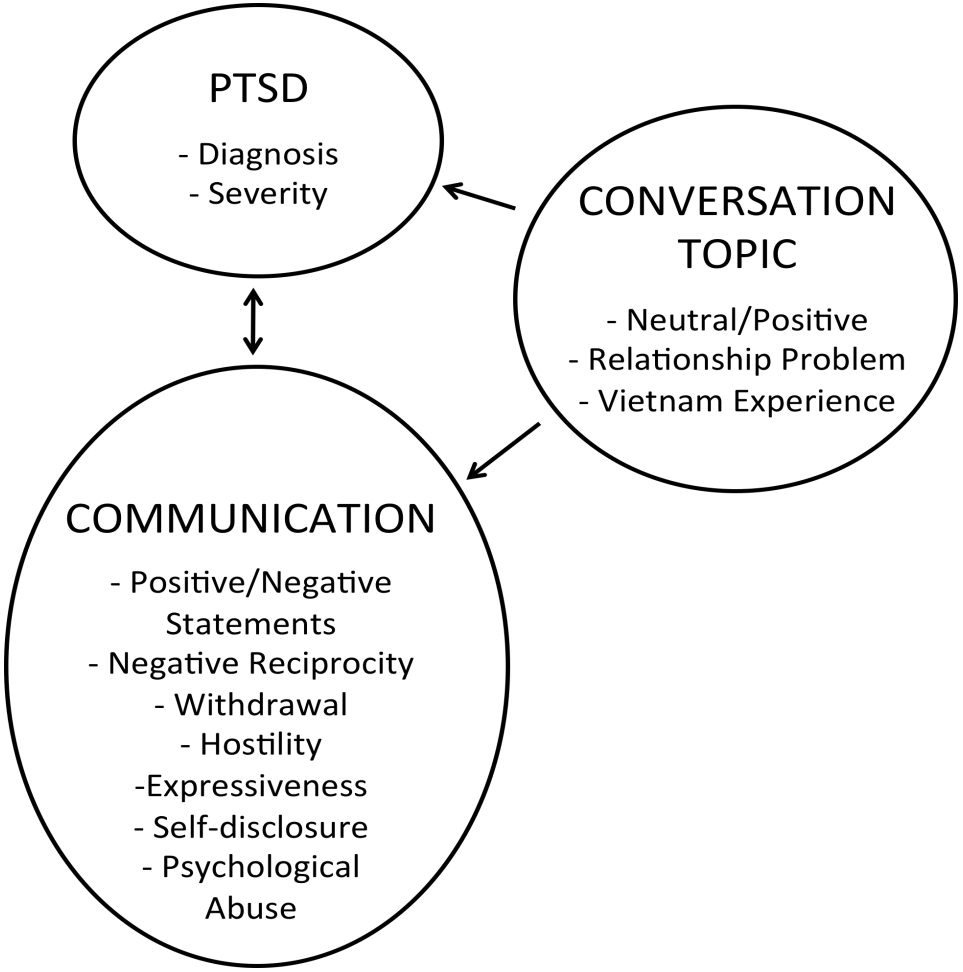
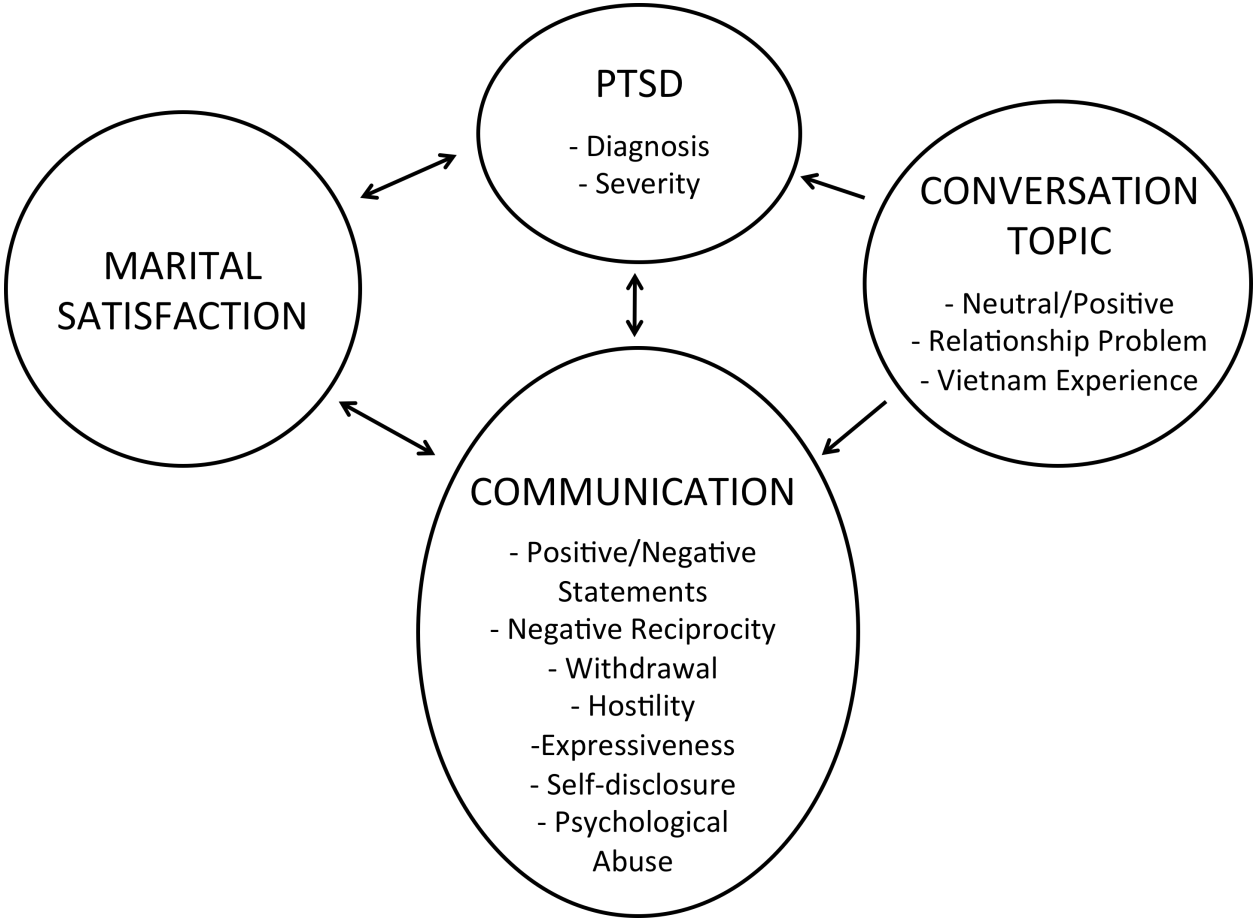


Figure 4. Final proposed model.



References

Aiken, L. S., & West, S. G. (1991). *Multiple Regression: Testing and Interpreting Interactions*. Newbury Park, CA: Sage Publications, Inc.

Allen, E. S., Rhoades, G. K., Stanley, S. M., & Markman, H. J. (2010). Hitting home: relationships between recent deployment, posttraumatic stress symptoms, and marital functioning for Army couples. *Journal of Family Psychology, 24*(3), 280-288.

American Psychiatric Association. (1980). *Diagnostic and Statistical Manual of Mental Disorders, Third Edition*. Washington, D.C.: American Psychiatric Association.

American Psychiatric Association. (1987). *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised*. Washington, D.C.: American Psychiatric Association.

American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*. Washington, D.C.: American Psychiatric Association.

Aron, A., Norman, C. C., Aron, E. N., McKenna, C., & Heyman, R. E. (2000). Couples' shared participation in novel and arousing activities and experienced relationship quality. *Journal of Personality and Social Psychology, 78*(2), 273-284.

Badura, A. S. (2003). Theoretical and empirical exploration of the similarities between emotional numbing in posttraumatic stress disorder and alexithymia. *Journal of Anxiety Disorders, 17*(3), 349-360.

Beckham, J. C., Feldman, M. E., Kirby, A. C., Hertzberg, M. A., & Moore, S. D. (1997). Interpersonal violence and its correlates in Vietnam veterans with chronic posttraumatic stress disorder. *Journal of Clinical Psychology, 53*(8), 859-869.

Beckham, J. C., Roodman, A. A., Barefoot, J. C., Haney, T. L., Helms, M. J., Fairbank, J. A., et al. (1996). Interpersonal and self-reported hostility among combat veterans with and without posttraumatic stress disorder. *Journal of Traumatic Stress, 9*(2), 335-342.

Biddle, D., Elliott, P., Creamer, M., Forbes, D., & Devilly, G. J. (2002). Self-reported problems: a comparison between PTSD-diagnosed veterans, their spouses, and clinicians. *Behaviour Research and Therapy, 40*, 853-865.

Boscarino, J. A. (1995). Post-traumatic stress and associated disorders among Vietnam veterans: The significance of combat exposure and social support. *Journal of Traumatic Stress, 8*(2), 317-336.

Bowen, M. (1978). *Family Therapy in Clinical Practice*. Northvale, N.J.: Jason Aronson Inc.

Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for post-traumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68*(5), 748-766.

Byrne, C. A., & Riggs, D. S. (1996). The cycle of trauma: Relationship aggression in male Vietnam veterans with symptoms of posttraumatic stress disorder. *Violence and Victims, 11*(3), 213-225.

Calhoun, P. S., Beckham, J. C., & Bosworth, H. B. (2002). Caregiver burden and psychological distress in partners of veterans with chronic posttraumatic stress disorder. *Journal of Traumatic Stress, 15*(3), 205-212.

Campbell, L., Simpson, J. A., Kashy, D. A., & Rholes, W. S. (2001). Attachment orientations, dependence, and behavior in a stressful situation: An application of the Actor-Partner Independence Model. *Journal of Social and Personal Relationships, 18*(6), 821-843.

Card, J. (1987). Epidemiology of PTSD in a national cohort of Vietnam veterans. *Journal of Clinical Psychology, 43*(1), 6-17.

Carey, M. P., Spector, I. P., Lantinga, L. J., & Krauss, D. J. (1993). Reliability of the Dyadic Adjustment Scale. *Psychological Assessment, 5*, 238-240.

Carroll, E. M., Rueger, D. B., Foy, D. W., & Donahoe, C. P. (1985). Vietnam combat veterans with posttraumatic stress disorder: Analysis of marital and cohabitating adjustment. *Journal of Abnormal Psychology, 94*(3), 329-337.

Caselli, L. T., & Motta, R. W. (1995). The effect of PTSD and combat level on Vietnam veterans' perceptions of child behavior and marital adjustment. *Journal of Clinical Psychology, 51*(1), 4-12.

Caughlin, J. P., & Huston, T. L. (2002). A contextual analysis of the association between demand/withdraw and marital satisfaction. *Personal Relationships, 9*, 95-119.

Chemtob, C., Roitblat, H. L., Hamada, R. S., Carlson, J. G., & Twentyman, C. T. (1988). A cognitive action theory of post-traumatic stress disorder. *Journal of Anxiety Disorders, 2*, 253-275.

Christensen, A., & Shenk, J. L. (1991). Communication, conflict, and psychological distance in nondistressed, clinic, and divorcing couples. *Journal of Consulting and Clinical Psychology, 59*(3), 458-463.

Cornelius, T. L., Alessi, G., & Shorey, R. C. (2007). The effectiveness of communication skills training with married couples: Does the issue discussed matter? *The Family Journal: Counseling and Therapy for Couples and Families, 15*(2), 124-132.

Coughlan, K., & Parkin, C. (1987). Women partners of Vietnam vets. *Journal of Psychosocial Nursing, 25*(10), 25-27.

Crowell, J. A., Treboux, D., Gao, Y., Fyffe, C., Pan, H., & Waters, E. (2002). Assessing secure base behavior in adulthood: Development of a measure, links to adult attachment representations, and relations to couples' communication and reports of relationships. *Developmental Psychology, 38*(5), 679-693.

Dagne, G. A., Howe, G. W., Brown, C. H., & Muthen, B. O. (2002). Hierarchical modeling of sequential behavioral data: An empirical Bayesian approach. *Psychological Methods, 7*(2), 262-280.

Davidson, J. R. T., Kudler, H. S., Saunders, W. B., & Smith, R. D. (1990). Symptom and comorbidity patterns in World War II and Vietnam veterans with posttraumatic stress disorder. *Comprehensive Psychiatry, 31*(2), 162-170.

Dohrenwend, B. P., Turner, J. B., Turse, N. A., Adams, B. G., Koenen, K. C., & Marshall, R. (2006). The psychological risks of Vietnam for U.S. veterans: A revisit with new data and methods. *Science, 313*, 979-982.

Egendorf, A., Kadushin, C., Laufer, R. S., Rothbart, G., & Sloan, L. (1981). *Legacies of Vietnam: Comparative Adjustment of Veterans and Their Peers*. Washington, D.C.: Government Printing Office.

Erel, O., & Burman, B. (1995). Interrelatedness of marital relations and parent-child relations: A meta-analytic review. *Psychological Bulletin, 118*(1), 108-132.

Evans, L., Cowlishaw, S., Forbes, D., Parslow, R., & Lewis, V. (2010). Longitudinal analyses of family functioning in veterans and their partners across treatment. *Journal of Consulting and Clinical Psychology, 78*(5), 611-622.

Evans, L., McHugh, T., Hopwood, M., & Watt, C. (2003). Chronic posttraumatic stress disorder and family functioning of Vietnam veterans and their partners. *Australian and New Zealand Journal of Psychiatry, 37*, 765-772.

Frewen, P. A., Dozois, D. J., Neufeld, R. W., & Lanius, R. A. (2008). Meta-analysis of alexithymia in posttraumatic stress disorder. *Journal of Traumatic Stress, 21*(2), 243-246.

Frye, J. S., & Stockton, R. A. (1982). Discriminant analysis of post-traumatic stress disorder among a group of Viet Nam veterans. *American Journal of Psychiatry, 139*(1), 52-56.

Gallagher, J. G., Riggs, D. S., Byrne, C. A., & Weathers, F. W. (1998). Female partners' estimations of male veterans' combat-related PTSD severity. *Journal of Traumatic Stress, 11*(2), 367-374.

Galovski, T., & Lyons, J. A. (2004). Psychological sequelae of combat violence: A review of the impact of PTSD on the veteran's family and possible interventions. *Aggression and Violent Behavior, 9*, 477-501.

Gimbel, C., & Booth, A. (1994). Why does military combat experience adversely affect marital relations? *Journal of Marriage and the Family, 56*, 691-703.

Glynn, S. M., Eth, S., Randolph, E. T., Foy, D. W., Urbaitis, M., Boxer, L., et al. (1999). A test of behavioral family therapy to augment exposure for combat-related posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 67*(2), 243-251.

Gottman, J. M. (1979). *Marital Interaction: Experimental Investigations*. New York: Academic Press.

Gottman, J. M. (1993). The roles of conflict engagement, escalation, and avoidance in marital interaction: A longitudinal view of five types of couples. *Journal of Consulting and Clinical Psychology, 61*(1), 6-15.

Gottman, J. M., Gottman, J. S., & Atkins, C. L. (2011). The Comprehensive Soldier Fitness program: family skills component. *American Psychologist, 66*(1), 52-57.

Gottman, J. M., & Krokoff, L. J. (1989). Marital interaction and satisfaction: A longitudinal view. *Journal of Consulting and Clinical Psychology, 57*(1), 47-52.

Gouin, J. P., Glaser, R., Loving, T. J., Malarkey, W. B., Stowell, J., Houts, C., et al. (2009). Attachment avoidance predicts inflammatory responses to marital conflict. *Brain, Behavior, and Immunity, 23*(7), 898-904.

Graham, J. M., Liu, Y. J., & Jeziorski, J. L. (2006). The Dyadic Adjustment Scale: A reliability generalization meta-analysis. *Journal of Marriage and the Family, 68*(3), 701-717.

Green, B. L., Lindy, J. D., Greace, M. C., & Gleser, G. (1989). Multiple diagnosis in posttraumatic stress disorder: The role of war stressors. *Journal of Nervous and Mental Disease, 177*, 329-335.

Greenberg, L. S., & Johnson, S. M. (1986). Affect in marital therapy. *Journal of Marital and Family Therapy, 12*(1), 1-10.

Hawkins, J. (1968). Associations between companionship, hostility, and marital satisfaction. *Journal of Marriage and the Family, 30*(4), 647-650.

Heavey, C. L., Layne, C., & Christensen, A. (1993). Gender and conflict structure in marital interaction: A replication and extension. *Journal of Consulting and Clinical Psychology, 61*(1), 16-27.

Hendrix, C. C., Jurich, A. P., & Schumm, W. R. (1995). Long-term impact of Vietnam war service on family environment and satisfaction. *Families in Society, 76*, 498-506.

Heyman, R. E. (2001). Observation of couple conflicts: Clinical assessment applications, stubborn truths, and shaky foundations. *Psychological Assessment, 13*(1), 5-35.

Heyman, R. E. (2004). Rapid Marital Interaction Coding System (RMICS). In P. Kerig & D. H. Baucom (Eds.), *Couple Observational Coding Systems* (pp. 67-93). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Heyman, R. E., Chaudhry, B. R., Treboux, D., Crowell, J., Lord, C., Vivian, D., et al. (2001). How much observational data is enough? An empirical test using marital interaction coding. *Behavior Therapy, 32*(107-122).

Heyman, R. E., Hunt-Martorano, A. N., Malik, J., & Slep, A. M. (2009). Desired change in couples: gender differences and effects on communication. *Journal of Family Psychology, 23*(4), 474-484.

Heyman, R. E., & Vivian, D. (1993). Rapid Marital Interaction Coding System, Ver. 1.7, July, 2000. Retrieved September 29, 2009, from http://www.psychology.sunysb.edu/ftrlab-/docs/RMICSMAN.PDF

Hoge, C. W., Auchterlonie, J. L., & Milliken, C. S. (2006). Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *Journal of the American Medical Association, 295*(9), 1023-1032.

Hoge, C. W., Castro, C. A., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine, 351*(1), 13-22.

Holtzworth-Munroe, A., Smultzer, N., & Stuart, G. L. (1998). Demand and withdraw communication among couples experiencing husband violence. *Journal of Consulting and Clinical Psychology, 66*(5), 731-743.

Hooley, J. M. (2007). Expressed emotion and relapse of psychopathology. *Annual Review of Clinical Psychology, 3*, 329-352.

Howe, G. W., Dagne, G., & Brown, C. H. (2005). Multilevel methods for modeling observed sequences of family interaction. *Journal of Family Psychology, 19*(1), 72-85.

Huston, T. L., & Vangelisti, A. L. (1991). Socioemotional behavior and saitsfaction in marital relationships: A longitudinal study. *Journal of Personality and Social Psychology, 61*(5), 721-733.

Hyer, L., Woods, M. G., Summers, M. N., Boudewyns, P., & Harrison, W. R. (1990). Alexithymia among Vietnam veterans with posttraumatic stress disorder. *Journal of Clinical Psychiatry, 51*(6), 243-247.

Idstad, M., Ask, H., & Tambs, K. (2010). Mental disorder and caregiver burden in spouses: the Nord-Trondelag health study. *BMC Public Health, 10*, 516.

Jacob, T., Tennenbaum, D. L., & Krahn, G. (1987). Factors Influencing the Reliability and Validity of Observation Data. In T. Jacob (Ed.), *Family Interaction and Psychopathology: Theories, Methods, and Findings*. New York: Plenium Press.

Johnson, S., & Greenberg, L. (Eds.). (1994). *The Heart of the Matter: Perspectives on Emotion in Marital Therapy*. New York: Brunner/Mazel Inc.

Jordan, B. K., Marmar, C. R., Fairbank, J. A., Schlenger, W. E., Kulka, R. A., Hough, R. L., et al. (1992). Problems in families of male Vietnam veterans with posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 60*(6), 916-926.

Kalra, H., Kamath, P., Trivedi, J. K., & Janca, A. (2008). Caregiver burden in anxiety disorders. *Curr Opin Psychiatry, 21*(1), 70-73.

Karney, B. R., & Bradbury, T. N. (1995). The longitudinal course of marital quality and stability: A review of theory, method, and research. *Psychological Bulletin, 118*(1), 3-34.

Khaylis, A., Polusny, M. A., Erbes, C. R., Gewirtz, A., & Rath, M. (2011). Posttraumatic stress, family adjustment, and treatment preferences among National Guard soldiers deployed to OEF/OIF. *Military Medicine, 176*(2), 126-131.

King, D. W., King, L. A., Foy, D. W., Keane, T. M., & Fairbank, J. A. (1999). Posttraumatic stress disorder in a national sample of female and male Vietnam veterans: risk factors, war-zone stressors, and resilience-recovery variables. *Journal of Abnormal Psychology, 108*(1), 164-170.

Knobloch, L. K., & Solomon, D. H. (2003). Manifestations of relationship conceptualizations in conversation. *Human Communication Research, 29*(4), 482-515.

Kubany, E. S., Gino, A., Denny, N. R., & Torigoe, R. Y. (1994). Relationship of cynical hostility and PTSD among Vietnam veterans. *Journal of Traumatic Stress, 7*(1), 21-31.

Kulka, R. A., Schlenger, W. E., Fairbank, J. A., Hough, R. L., Jordan, B. K., Marmar, C. R., et al. (1990). *Trauma and the Vietnam War Generation: Report of Findings from the National Vietnam Veterans Readjustment Study*. New York: Brunner/Mazel Inc.

Lavner, J. A., & Bradbury, T. N. (2010). Patterns of Change in Marital Satisfaction Over the Newlywed Years. *Journal of Marriage and the Family, 72*(5), 1171-1187.

Levenson, R. W., & Gottman, J. M. (1985). Physiological and affective predictors of change in relationship satisfaction. *Journal of Personality and Social Psychology, 49*(1), 85-94.

Litz, B. T. (1992). Emotional numbing in combat-related post-traumatic stress disorder: A critical review and reformulation. *Clinical Psychology Review, 12*, 417-432.

Litz, B. T., & Keane, T. M. (1989). Information processing in anxiety disorders: Application to the understanding of post-traumatic stress disorder. *Clinical Psychology Review, 9*, 243-257.

Litz, B. T., Schlenger, W. E., Weathers, F. W., Caddell, J. M., Fairbank, J. A., & LaVange, L. M. (1997). Predictors of emotional numbing in posttraumatic stress disorder. *Journal of Traumatic Stress, 10*(4), 607-618.

Lyons, M. A. (2001). Living with post-traumatic stress disorder: the wives'/female partners' perspective. *Journal of Advanced Nursing, 34*(1), 69-77.

MacDonald, C., Chamberlain, K., Long, N., & Flett, R. (1999). Posttraumatic stress disorder and interpersonal functioning in Vietnam War veterans: A mediational model. *Journal of Traumatic Stress, 12*(4), 701-707.

Manne, S., Ostroff, J., Sherman, M., Heyman, R. E., Ross, S., & Fox, K. (2004). Couples' support-relate communication, psychological distress, and relationship satisfaction among women with early stage breast cancer. *Journal of Consulting and Clinical Psychology, 72*(4), 660-670.

Markman, H. J. (1979). Application of a behavioral model of marriage in predicting relationship satisfaction of couples planning marriage. *Journal of Consulting and Clinical Psychology, 47*(4), 743-749.

Markman, H. J. (1981). Prediction of marital distress: A 5-year follow-up. *Journal of Consulting and Clinical Psychology, 49*(5), 760-762.

Markowitz, J. C., Milrod, B., Bleiberg, K., & Marshall, R. D. (2009). Interpersonal factors in understanding and treating posttraumatic stress disorder. *Journal of Psychiatric Practice, 15*(2), 133-140.

Marshall, R. P., Jorm, A. F., Grayson, D. A., & O'Toole, B. I. (1998). Posttraumatic stress disorder and other predictors of health care consumption by Vietnam veterans. *Psychiatric Services, 49*(12), 1609-1611.

Meis, L. A., Barry, R. A., Kehle, S. M., Erbes, C. R., & Polusny, M. A. (2010). Relationship adjustment, PTSD symptoms, and treatment utilization among coupled National Guard soldiers deployed to Iraq. *Journal of Family Psychology, 24*(5), 560-567.

Meis, L. A., Erbes, C. R., Polusny, M. A., & Compton, J. S. (2010). Intimate relationships among returning soldiers: the mediating and moderating roles of negative emotionality, PTSD symptoms, and alcohol problems. *Journal of Traumatic Stress, 23*(5), 564-572.

Mental Health Advisory Team (MHAT VI) Operation Iraqi Freedom 07-09, chartered by the Office of the Surgeon General Multi-National Forces-Iraq and Office of the Surgeon General United States Army Medical Command. Available on

http://www.armymedicine.army.mil/reports/mhat/mhat_vi/MHAT_VI-OIF_Redacted.pdf

Milliken, C. S., Auchterlonie, J. L., & Hoge, C. W. (2007). Longitudinal assessment of mental health problems among active and reserve component soldiers returning from the Iraq war. *Journal of the American Medical Association, 298*(18), 2141-2148.

Monson, C. M., Fredman, S. J., & Adair, K. C. (2008). Cognitive-behavioral conjoint therapy for posttraumatic stress disorder: application to operation enduring and Iraqi Freedom veterans. *Journal of Clinical Psychology, 64*(8), 958-971.

Monson, C. M., Schnurr, P. P., Stevens, S. P., & Guthrie, K. A. (2004). Cognitive-Behavioral Couple's Treatment for posttraumatic stress disorder: initial findings. *Journal of Traumatic Stress, 17*(4), 341-344.

Monson, C. M., & Taft, C. T. (2005). PTSD and intimate relationships. *PTSD Research Quarterly, 16*(4), 1-7.

Monson, C. M., Taft, C. T., & Fredman, S. J. (2009). Military-related PTSD and intimate relationships: From description to theory-driven research and intervention development. *Clinical Psychology Review*.

Montemayor, R., Eberly, M., & Flannery, D. J. (1993). Effects of pubertal status and conversation topic on parent and adolescent affective expression. *Journal of Early Adolescence, 13*(4), 431-447.

Nemiah, J. C., & Sifneos, P. E. (1970). Psychosomatic illness: A problem in communication. *Psychotherapy and Psychosomatics, 18*, 154-160.

Newton, T. L., Kiecolt-Glaser, J. K., Glaser, R., & Malarkey, W. B. (1995). Conflict and withdrawal during marital interaction: The roles of hostility and defensiveness. *Personality and Social Psychology Bulletin, 21*(5), 512-524.

Nezu, A. M., & Carnevale, G. J. (1987). Interpersonal problem solving and coping reactions of Vietnam veterans with posttraumatic stress disorder. *Journal of Abnormal Psychology, 96*(2), 155-157.

O'Toole, B. I., Marshall, R. P., Schureck, R. J., & Dobson, M. (1998). Posttraumatic stress disorder and comorbidity in Australian Vietnam veterans: risk factors, chronicity and combat. *Australian and New Zealand Journal of Psychiatry, 32*(1), 32-42.

Penk, W. E., Robinowitz, R., Roberts, W. R., Patterson, E. T., Dolan, M. P., & Atkins, H. G. (1981). Adjustment differences among male substance abusers varying in degree of combat experience in Vietnam. *Journal of Consulting and Clinical Psychology, 49*(3), 426-437.

Purves, D. G., & Erwin, P. G. (2004). Post-traumatic stress and self-disclosure. *The Journal of Psychology, 138*(1), 23-33.

Ray, S. L., & Vanstone, M. (2009). The impact of PTSD on veterans' family relationships: an interpretative phenomenological inquiry. *International Journal of Nursing Studies, 46*(6), 838-847.

Rehman, U. S., Janssen, E., Newhouse, S., Heiman, J., Holtzworth-Munroe, A., Fallis, E., et al. (2010). Marital satisfaction and communication behaviors during sexual and

nonsexual conflict discussions in newlywed couples: a pilot study. *Journal of Sex and Marital Therapy, 37*(2), 94-103.

Renshaw, K. D., Rodebaugh, T. L., & Rodrigues, C. S. (2010). Psychological and marital distress in spouses of Vietnam veterans: importance of spouses' perceptions. *Journal of Anxiety Disorders, 24*(7), 743-750.

Renshaw, K. D., Rodrigues, C. S., & Jones, D. H. (2008). Psychological symptoms and marital satisfaction in spouses of Operation Iraqi Freedom veterans: relationships with spouses' perceptions of veterans' experiences and symptoms. *Journal of Family Psychology, 22*(4), 586-594.

Riggs, D. S. (1993). Relationship problems and dating aggression: A potential treatment target. *Journal of Interpersonal Violence, 8*(1), 18-35.

Riggs, D. S., Byrne, C. A., Weathers, F. W., & Litz, B. T. (1998). The quality of the intimate relationships of male Vietnam veterans: Problems associated with posttraumatic stress disorder. *Journal of Traumatic Stress, 11*(1), 87-101.

Riley, W. T., Treiber, F. A., & Woods, M. G. (1989). Anger and hostility in depression. *Journal of Nervous and Mental Disease, 177*(11), 668-674.

Roberts, L. J. (2000). Fire and ice in marital communication: Hostile and distancing behaviors as predictors of marital distress. *Journal of Marriage and the Family, 62*, 693-707.

Roberts, W. R., Penk, W. E., Gearing, M. L., Robinowitz, R., Dolan, M. P., & Patterson, E. T. (1982). Interpersonal problems of Vietnam combat veterans with symptoms

of posttraumatic stress disorder. *Journal of Abnormal Psychology, 91*(6), 444-450.

Rogge, R. D., Bradbury, T. N., Hahlweg, K., Engl, J., & Thurmaier, F. (2006). Predicting marital distress and dissolution: refining the two-factor hypothesis. *Journal of Family Psychology, 20*(1), 156-159.

Ruscio, A. M., Weathers, F. W., King, L. A., & King, D. W. (2002). Male war-zone veterans' perceived relationships with their children: The importance of emotional numbing. *Journal of Traumatic Stress, 15*(5), 351-357.

Sabourin, T. C., & Stamp, G. H. (1995). Communication and the experience of dialectical tensions in family life: An examination of abusive and nonabusive families. *Communication Monographs, 62*(3), 213-242.

Sharpley, C. F., & Cross, D. G. (1982). A psychometric evaluation of the Spanier Dyadic Adjustment Scale. *Journal of Marriage and the Family, 44*, 739-741.

Shehan, C. L. (1987). Spouse support and Vietnam veterans' adjustment to post-traumatic stress disorder. *Family Relations, 36*, 55-60.

Sierles, R. S., Chen, J. J., Messing, M. L., Besyner, J. K., & Taylor, M. A. (1986). Concurrent psychiatric illness in non-Hispanic outpatients diagnosed as having posttraumatic stress disorder. *Journal of Nervous and Mental Disease, 174*, 171-173.

Simpson, J. A., Rholes, W. S., & Nelligan, J. S. (1992). Support seeking and support giving within couples in an anxiety-provoking situation: The role of attachment styles. *Journal of Personality and Social Psychology, 62*(3), 434-446.

Smith, L., Heaven, P. C. L., & Ciarrochi, J. (2008). Trait emotional intelligence, conflict communication patterns, and relationship satisfaction. *Personality and Individual Differences, 44*, 1314-1325.

Solomon, Z., Waysman, M., Levy, G., Fried, B., Mikulincer, M., Benbenishty, R., et al. (1992). From front line to home front: A study of secondary traumatization. *Family Process, 31*, 289-302.

Sondergaard, H. P., & Theorell, T. (2004). Alexithymia, emotions and PTSD; findings from a longitudinal study of refugees. *Nordic Journal of Psychiatry, 58*(3), 185-191.

Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and the Family, 38*, 15-28.

Spanier, G. B., & Thompson, L. (1982). A confirmatory analysis of the Dyadic Adjustment Scale. *Journal of Marriage and the Family, 44*, 731-738.

Taft, C. T., King, L. A., King, D. W., Leskin, G. A., & Riggs, D. S. (1999). Partners' ratings of combat veterans' PTSD symptomatology. *Journal of Traumatic Stress, 12*(2), 327-334.

Taft, C. T., Street, A. E., Marshall, A. D., Dowdall, D. J., & Riggs, D. S. (2007). Posttraumatic stress disorder, anger, and partner abuse among Vietnam combat veterans. *Journal of Family Psychology, 21*(2), 270-277.

Tarrier, N., Sommerfield, C., & Pilgrim, H. (1999). Relatives' expressed emotion (EE) and PTSD treatment outcome. *Psychological Medicine, 29*(4), 801-811.

Verbosky, S. J., & Ryan, D. A. (1988). Female partners of Vietnam veterans: Stress by proximity. *Issues in Mental Health Nursing, 9*, 95-104.

Walsh, F. (2007). Traumatic loss and major disasters: Strengthening family and community resilience. *Family Process, 46*(2), 207-227.

Weathers, F. W., Huska, J. A., & Keane, T. M. (1991). PCL-M for DSM-IV. Retrieved September 29, 2009, from http://www.northeastcenter.com/PTSD_checklist_military_version%20_PCL_M.htm

Weathers, F. W., Litz, B. T., Herman, D. S., Huska, J. A., & Keane, T. M. (1993). *The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility*. Paper presented at the International Society for Traumatic Stress Studies.

Yap, M. B. H., Allen, N. B., Leve, C., & Katz, L. F. (2008). Maternal meta-emotion philosophy and socialization of adolescent affect: The moderating role of adolescent temperament. *Journal of Family Psychology, 22*(5), 688-700.

Yehuda, R., Steiner, A., Kahana, B., Binder-Brynes, K., Southwick, S. M., Zemelman, S., et al. (1997). Alexithymia in Holocaust survivors with and without PTSD. *Journal of Traumatic Stress, 10*(1), 93-100.

Zatzick, D. F., Marmar, C. R., Weiss, D. S., Browner, W. S., Metzler, T. J., Golding, J. M., et al. (1997). Posttraumatic stress disorder and functioning and quality of life outcomes in a nationally representative sample of male Vietnam veterans. *American Journal of Psychiatry, 154*(12), 1690-1695.