

SUBTHRESHOLD PTSD: A COMPARISON OF DEPRESSION AND
ALCOHOL PROBLEMS IN CANADIAN PEACEKEEPERS WITH
DIFFERENT LEVELS OF TRAUMATIC STRESS

by

JEFFREY SCOTT YARVIS

(Under the Direction of Patrick Bordnick)

ABSTRACT

A growing literature addressing the issue of subthreshold posttraumatic stress disorder (PTSD) has appeared in recent years. However, only a small portion of this growing literature base represents empirical investigations of subthreshold PTSD and its implications. Further, the reliance on the categorical and diagnostic models of psychiatric disorders has led to a lack of investigations into the study of the posttraumatic sequelae that fall short of full criteria for PTSD. Next to the number of symptoms as the main criterion for defining a subthreshold disorder, this investigation seeks to define the extent of impairment, which has been considered the most salient criterion for defining a subthreshold anxiety disorder. Substantial disability, depression and alcohol use as well as a great need for health care has been well studied for veterans with PTSD, but these associations have not been well studied in the subthreshold population. Few studies have examined the role of comorbidity and impairment in veterans with subthreshold PTSD. This study found statistically significant differences between groups of peacekeepers with full and no PTSD on measures of depressive symptoms, alcohol use disorders, and number of physical problems and found statistically significant differences between the subthreshold and

no PTSD groups of peacekeepers on depression and number of physical health problems. On each outcome measure the peacekeepers with full PTSD had the most severe scores on the outcome measures, followed by the subthreshold group, and the no PTSD group. The results of this study suggest subthreshold PTSD represents a distinct construct warranting further investigation.

INDEX WORDS: Social Work, Trauma, Peacekeeping, PTSD, Alcohol, Depression, Subthreshold

SUBTHRESHOLD PTSD: A COMPARISON OF DEPRESSION AND
ALCOHOL PROBLEMS IN CANADIAN PEACEKEEPERS WITH
DIFFERENT LEVELS OF TRAUMATIC STRESS

by

JEFFREY SCOTT YARVIS

B.A., Indiana University-Bloomington, 1988

M.Ed., Cambridge College, 1992

M.S.W., Boston College, 1994

A Dissertation Submitted to the Graduate Faculty of The University of Georgia
in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2004

©2004

Jeffrey Scott Yarvis

All Rights Reserved

SUBTHRESHOLD PTSD: A COMPARISON OF DEPRESSION AND
ALCOHOL PROBLEMS IN CANADIAN PEACEKEEPERS WITH
DIFFERENT LEVELS OF TRAUMATIC STRESS

by

JEFFREY SCOTT YARVIS

Major Professor: Patrick Bordnick

Committee: Betsy Vonk
Michelle Lease

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
May 2004

DEDICATION

To Laura Yarvis and our children, Jacob and Olivia.

You all are my island. Laura, throughout this process there is no one who sacrificed more physically and emotionally than you. Your incessant belief in my ability and your tireless support knows no boundaries. You worked harder than I to keep things going, raising two amazing babies, now toddlers, without causing me distraction from this endeavor. For all those reasons and because I love you beyond any imagining ever thought possible, this dissertation is as much yours as mine.

ACKNOWLEDGEMENTS

Patrick Bordnick, Ph.D., Distinguished Chair. Thank you, Patrick, for your mentorship, unwavering confidence in me, and incredible patience. Your insight into this difficult process has helped me immensely and I will always be grateful to you for that. I consider you more than a valued colleague.

David Pedlar, Ph.D., Director, Research Directorate, Veterans Affairs, Prince Edward Island, Canada. I would like to thank David for waiting two years for me to begin school, inviting me up to PEI, showing me what hospitality and generosity of spirit truly mean; and for making to time to meet with me and talk by phone as needed. Most of all, I would like to thank David and his wonderful research staff at the Veteran's Affairs Canada for providing access to the data contained within this dissertation. I look forward to on-going collaborations.

Gordon Asmundson, Ph.D. Thank you Gordon for your feedback and support. Without the tremendous research you have done with the 1999 VAC data and the keen insight you bring to the studies you have done, this study would have been much more primitive. I admire you greatly and hope you will honor me with future collaborations.

COL Virgil J. Patterson, III, Ph.D. and COL Griffin David Lockett. As the current and former social work consultants to the U.S. Army Surgeon General, without your support this PhD would not have been possible. I am honored and humbled that each of you saw me worthy of such an award. I only hope to give back to the army as much as I have been given.

COL James W. Stokes. MD. Sir, you have inspired my career in combat stress prevention and mentored me along the way. I could not ask for a better friend and better

example of a visionary. I could never adequately express my gratitude to you for all the doors your work has opened for me. Thank you.

LTC Marc Chapin, Ph.D. Sir, you have been a great mentor and friend. Your candor and support were most essential at times I did not feel worthy of meriting this program. Thank for believing in me and for supporting me at every turn of this process. I am ever indebted to you.

M. Elizabeth Vonk, Ph.D. Betsy, your kindness and supportive listening have helped me persevere through this process. Thank you for your helpful feedback and criticism. You let me rant whenever I needed to vent. I am blessed to have you as both a committee member and as the director of the Ph.D. program.

A. Michelle Lease, Ph.D. Michelle, you have taught me so much during the courses with you and throughout our discussions. Most of all you I appreciated how you exceeded your role as committee member and valued colleague by always seeming to be as much a friend as a guide.

Christina Spivey. My terrific classmate and battle buddy. I admire you greatly and feel fortunate to have you in my life. Thank you so much for your wonderful ability to listen to my rants and ravings, which helped me keep my sanity and process so much of this project. Thanks for your selfless support of my efforts. You are a dear friend.

Robert Weaver. My dear friend you paced me through this marathon and motivated me to study when I was on the uphill side of this program.

Ellen Cox. Thanks for helping me fight my way through statistics and for all your positive energy, love, and affection.

The eight other doctoral students in the class of 2001 that I did not already mention. Thank you for your tireless support and friendship. With a group like you, how could any of us fail?

To the statistics professionals that kept me honest in my running, analysis and, interpretation of the results. To Dr. Mary Meyer, Ph.D., Hu Ping, and Marlow Lemons in the statistics department who taught me how think about statistics. To Dr. Stephen Olejnik at the Ed Psych Dept. who challenged my limits and truly taught me how to conceptualize the procedures contained herein. And finally to Chris Domaleski at Emory University for volunteering his time and teaching what a defendable statistic is.

My parents and in-laws. For my mother Arlene Haskin for her time spent editing and making suggestions. For my Dad and Anne who gave me great opportunity and limitless emotional support. For my in-laws Barry and Dyana who gave me kudos whenever I needed to hear something positive and John and Sofia who believed in me from the start.

TABLE OF CONTENTS

	<u>Page</u>
ACKNOWLEDGEMENTS	v
LIST OF TABLES	xi
LIST OF FIGURES	xii
LIST OF EXHIBITS	xiii
GLOSSARY OF ABBREVIATED TERMS	xiv
CHAPTER	
I INTRODUCTION	1
Organization of the Dissertation	2
Roles of Social Workers	3
Background	5
Statement of the Problem	6
History of Modern Theories of Posttraumatic Stress Disorder (PTSD)	9
Selected Models of Posttraumatic Stress	12
Social Learning Theory	16
II REVIEW OF THE LITERATURE	19
Models of PTSD	20
The Categorical Evolution of PTSD	26
The Threshold Problem	31
Initial Research Ideas and Concerns	52

	Hypotheses.....	54
	Summary.....	55
III	METHODOLOGY.....	58
	Introduction.....	58
	Analysis Strategy.....	74
	Study Summary.....	76
IV	RESULTS.....	78
	Research Questions.....	78
	PTSD Ratings and Comparisons.....	79
	Sample Demographics.....	79
	Alcohol Use Disorders.....	81
	Depressive Symptoms.....	83
	Health Problems.....	85
V	DISCUSSION.....	87
	Alcohol Use Disorders.....	89
	Depression.....	92
	Health.....	93
	Subthreshold PTSD.....	95
	Summary.....	97
	Limitations.....	98
	Implications for Social Work Practice.....	102
	Conclusion.....	102
	REFERENCES.....	104

APPENDICES

A	DSM- IV DIAGNOSTIC CRITERIA FOR PTSD 309.81	138
B	PCL-M	140
C	CES-D	143
D	AUDIT	145
E	DESCRIPTIVES	148
F	ALCOHOL USE DISORDERS	151
G	DEPRESSIVE SYMPTOMS	155
H	PHYSICAL HEALTH PROBLEMS	159

LIST OF TABLES

Table 1	Summary Descriptive Statistics on Veteran Demographic Internal-variables.....	149
Table 2	Descriptive Summary Statistics on Veterans Demographic Categorical-variables.....	150
Table 3	Means and Standard Deviations of PTSD Status on Alcohol Use Disorders	152
Table 4	ANOVA Summary Table for PTSD Status on Alcohol Use Disorders	152
Table 5	Multiple Comparisons for PTSD Status on Alcohol Use Disorders.....	153
Table 6	ANCOVA Summary Table for PTSD Status and Age on Alcohol Use Disorders.....	153
Table 7	Means and Standard Deviations of PTSD Status on the CES-D	156
Table 8	ANOVA Summary Table for PTSD Status on Depressive Symptoms	156
Table 9	Multiple Comparisons for PTSD Status on Depressive Symptoms	157
Table 10	ANCOVA Summary Table for PTSD Status on Depressive Symptoms	157
Table 11	Means and Standard Deviations of PTSD Status on Number of Physical Health Problems.....	160
Table 12	ANOVA Summary Table for PTSD Status on Number of Physical Health Problems	160
Table 13	Multiple Comparisons for PTSD Status on Physical Health Problems.....	161

LIST OF FIGURES

Figure 1	Means of Veterans' Alcohol Use Disorder Scores by PTSD Status	154
Figure 2	Means of Veterans' Depressive Symptoms Scores by PTSD Status.....	158

LIST OF EXHIBITS

Exhibit 1	Chronology of the Historical Roots of Posttraumatic Stress Disorder	10
Exhibit 2	Summary of Recent PTSD Studies that Test Morbidity and Related Issues of Health Status.....	44
Exhibit 3	Conceptual Model of Subthreshold PTSD as a Predictor of Depression and Alcohol Problems	51
Exhibit 4	Operationalization.....	53
Exhibit 5	Determining PTSD and Subthreshold PTSD by Criteria.....	67

GLOSSARY OF ABBREVIATED TERMS

ANS – Autonomic nervous system

ANOVA-Analysis of Variance

APA – American Psychiatric Association

ASD – Acute stress disorder

AUDIT – Alcohol Use Disorders Identification Test

CAGE – Simple screening test for alcohol-related problems as follows; **C**ut down on
Drinking; **A**nnoyed by criticism about drinking habits; **G**uilty feelings about
Drinking; **E**ye opener drink needed in the morning.

CAPS – Clinician Administered PTSD Scale

CER – Conditioned emotional response

CES-D – Center for Epidemiological Studies – Depression Scale

CF – Canadian Forces

CFA – Confirmatory factor analysis

CISD – Critical Incident Stress Debriefing

CS – Conditioned stimulus

DSM – Diagnostic and Statistical Manual of Mental Disorders

DUI – Driving Under the Influence

EMDR – Eye movement desensitization-reprocessing

FM – Field Manual

ICD – The International Statistical Classification of Diseases and Related Health

Problems

ISTSS – The International Society for the Study of Traumatic Stress

MAST- Michigan Alcoholism Screening Test

MDD – Major Depressive Disorder

MMPI – Minnesota Multiphasic Personality Inventory

MVA – Motor vehicle accident

NATO – North Atlantic Treaty Organization

NE – Norepinephrine

NVVRS – National Vietnam Veterans Readjustment Study

PCL-M – Posttraumatic Stress Disorder Checklist-Military Version

PEI – Prince Edward Island

PILOTS – Published International Literature on Traumatic Stress

PTSD – Posttraumatic Stress Disorder

SCID – Structured Interview for DSM

SEM – Structural equation modeling

SIG – Special interest group

SPSS – Statistical Package for Social Sciences, software by SPSS, Inc.

TFT – Thought Field Therapy

UCR – Unconditioned response

UCS – Unconditioned stimulus

UN – United Nations

VA – Veterans Administration of the United States

VAC – Veterans Affairs Canada

WHO – World Health Organization

CHAPTER I

INTRODUCTION

Posttraumatic stress disorder (PTSD) is a serious problem for the military and for social workers involved with such clients. Clinical impressions have made it increasingly clear that soldiers serving as peacekeepers may experience harmful personal consequences for mental health and well-being. The research in this field focuses primarily on the presence of posttraumatic stress disorder in peacekeeping personnel (Mehlum, 1998). Current data suggest that approximately 10 – 20 percent of armed forces personnel deployed for combat, peacekeeping, or humanitarian disaster relief present with posttraumatic stress disorder following their tour of duty (Bramsen, Dirkzwager, & van der Ploeg, 2000; Bramsen, Dirkzwager, van Esch, & van der Ploeg, 2001; Ehlich, Roemer, & Litz, 1997; Kessler, Sonnega, Bromet, & Nelson, 1995; Litz, Orsillo, Friedman, Ehlich, & Batres, 1997; Mehlum & Weisaeth, 2002; Schlenger et al., 1992; Ward, 2002). In addition, a considerable proportion (i.e., 10 – 25 percent) of those not meeting threshold diagnostic criteria for PTSD experience significant subthreshold symptoms, yet rarely receive empirical attention. Several studies suggest sub-clinical populations warrant closer examination (Asmundson, Stein, & McCreary, 2002; Asmundson, Wright, McCreary, & Pedlar, 2003; Fairbank, Schlenger, Saigh, & Davidson, 1995) given the multiple stressors and potentially threatening situations to which deployed military personnel are exposed. The sharp increase in the number of deployments since the end of the cold war in 1989 has also been associated with increased psychological problems in military personnel (Lewis, 2003)

Recent studies on the impact of military peacekeeping operations have compared and documented just how serious the psychological problems associated with such duties are (Arincorayan, 2000; Asmundson, Frombach et al., 2000; Asmundson, Stein et al., 2002; Asmundson et al., 2003; Ballone et al., 2000; Bartone & Asler, 1998; Bramsen et al., 2001; Deahl et al., 2000; Ehlich et al., 1997; Hall, Bicknell, & Cipriano, 1997; Kodama, Nomura, & Ogasawara, 2000; Lamerson & Kelloway, 1996; Litz, 1996; Litz, Orsillo et al., 1997; Martinez, Huffman, Castro, & Adler, 2000; Mehlum & Weisaeth, 2002; Passey, 1995; Thoresen & Mehlum, 1999; Yarvis, 2000). These investigations sought to identify factors that contribute to the potentially harmful nature of peacekeeping operations on psychological well-being, as well as the long-term psychological consequences for veterans and their impact on military health care delivery systems. This research has assisted military planners and health care providers in comprehending the thresholds of traumatic experiences from deployment and individual posttraumatic reactions. There is, however, a scarcity of empirical research, examining the taxonomic issues of posttraumatic stress disorder and its sub-clinical forms. Research is needed to determine whether these post-deployment reactions are a precursor to full symptomatic levels warranting the diagnosis of posttraumatic stress disorder. The intention of the present study, therefore, is to examine the impact of full and subthreshold PTSD on health status by comparing it to measures of depression and alcohol use. Furthermore, this study will offer a theoretical model of PTSD (full and subthreshold) and comorbid psychiatric conditions that are applicable to traumatized groups in general.

Organization of the Dissertation

A comprehensive review of the conceptual and empirical literature on posttraumatic stress and the clinical implications of its sub-clinical forms will be conducted. Demographic

factors that moderate this relationship will also be explored. Given that PTSD has received considerable attention by behaviorally oriented researchers since its inclusion in the American Psychiatric Association's (APA) classification of mental disorders, it is conceptually appropriate to examine this problem from the perspective of the taxonomic literature. Following the review of literature, a behavioral model of traumatic stress as it relates to PTSD will be proposed, along with specific hypotheses that this investigation will seek to test. Saigh (1992) contends that most studies about PTSD have followed psychodynamic or atheoretical approaches that are antithetical to behavioral research and efficacious social work practice. In view of this, and relying on a presentation of an expanded, empirically driven literature base, this study provides a behavioral approach to the study of trauma research. The comorbid psychiatric conditions of interest, alcohol use disorders and depression, are commonly associated with PTSD. On-going research on these problems provides empirical data from which social workers can determine the extent of impairment and determine the treatment and support needed for affected victims.

Roles of Social Workers

Historically social workers have played a significant role in the assessment and research of PTSD (Figley, 1978). Social workers have been contributing to the trauma literature and the understanding of PTSD since World War II, and today social work students are exposed to anxiety disorders as part of their psychopathology curriculum. However, social work's knowledge base for psychopathology is compromised by the atheoretical, unsystematic, and somewhat fragmented method in which research findings in human psychopathology are used (Thyer & Wodarski, 1998). Research studies of pathogenic processes, e.g., the development of PTSD, can be straightforward or extremely complex. The study of PTSD is complicated because it is often just one of a constellation of problems an individual might be experiencing in his/her

life. Social workers researching PTSD need to assess the following in addition to PTSD diagnostic criteria: alcohol and drug use, depression, impact of trauma, marital and family distress, and general psychopathology (Bordnick, Graap, & Vonk, in press).

Individual and systemic models examining the relationship between peacekeeping stressors and physical, psychological, and behavioral manifestations have been abundantly discussed in the trauma literature. While many earlier studies of military mental health problems in veterans' care centers were conducted by social work researchers, social work has lost its leadership role, as only a small percentage of recently published research in the major professional journals on trauma has been published by professional social workers. In response to this shortcoming, this study proposes that social workers must seek to achieve the following objectives to advance the profession in trauma and mental health publications:

1. Improve the relationship between trauma victims and their families, relief and military organizations, and communities.
2. Help veterans and other victims of trauma transition back to normal life or new occupations.
3. Educate professional trauma responder organizations with social work values and principles such as valuing diversity and balancing recovery with occupational demands.
4. Generate knowledge in the area of trauma social work that will inform policy and efficacious practice.

Social workers can draw upon abundant military medical literature addressing the constructs of interest, PTSD, subthreshold PTSD, depression and alcohol abuse to move beyond individual-

level interventions based on unproven models of treatment into empirically supported interventions for entire organizations (Lewis, 2003).

In this climate of mass trauma and potential terrorism, social workers must resist trauma prevention models that have become popular but lack empirical support. Instead, social workers must engage in the rigorous study of understanding stress, trauma and its contagion in specific environments with various populations and cultures. Only then will sound research be conducted with respect to the understanding of trauma and the models that describe it.

Background

Social workers and other mental health professionals have displayed considerable interest in individuals' reactions to traumatic events and the proper diagnosis of those individuals. It is difficult to know if subthreshold PTSD is a problem, however, because it has not been adequately studied. The scarcity of empirical studies of PTSD and its subthreshold forms may be due in part to on-going taxonomic issues associated with PTSD.

A burgeoning amount of literature has been produced with respect to the diagnostic boundary or nosological positioning of PTSD (Davidson & Foa, 1991; Davidson, Hughes, Blzer, & George, 1991; Helzer, Robins, & McEvoy, 1987; Kulka et al., 1991). Still more studies have debated the overlap of criteria associated the diagnosis of PTSD and those for other psychiatric diagnoses. These comorbidity studies have been inconsistent because they were dependent on the way in which PTSD was defined (Davidson & Foa, 1991). Nonetheless, studies such as Davidson and Foa (1991) do provide impetus for discussions of subthreshold psychiatric disorders. PTSD and its diagnostic cutoffs must be studied to better understand psychiatric morbidity and the clinical impact of traumatic reactions. It is important to clarify that posttraumatic phenomena are not limited to psychiatric diagnoses or decision-making algorithms

as defined by professional reference manuals such as the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR)* (American Psychiatric Association, 2000). Some clinicians have suggested focus on the basic groupings of the clusters is important to treatment planning for posttraumatic reactions (Wilson, Friedman & Lindy, 2001), suggesting that sub-clinical symptoms may cause impairment and need specific forms of intervention before they become chronic.

Statement of the Problem

Since the introduction of posttraumatic stress disorder to the psychiatric nomenclature, most research has focused on methods to define, assess, and treat the disorder. However, defining the disorder has been difficult and remains the subject of debate despite the fact that there is a current definition used for diagnosis and classification by the DSM-IV-TR and the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10)* (WHO, 1992). The identification threshold of PTSD is hard to pinpoint and has created a gap in the literature. Research on proper and specific treatments has proved difficult, particularly in combat and peacekeeping veterans (Shalev, Bonne, & Eth, 1996). According to Forbes, Creamer, Hawthorne, Allen and McHugh (2003), many studies have reported significant residual symptomatology after treatment and considerable heterogeneity of response to treatment, with the majority of trauma victims gaining little from most models of intervention.

A critical component of treatment for PTSD is early intervention. So important is early intervention that the International Society for Traumatic Stress Studies (ISTSS) created a special interest group (SIG) specifically aimed at early intervention in the late 1990s. The purpose of the group is to find efficacious means of preventing the potentially irreversible symptoms in sufferers with full PTSD. This purpose signifies that the ISTSS recognizes there are difficulties

associated with treating full PTSD, particularly in its chronic form. One such difficulty is the heterogeneity of response to treatments. As a current member of the SIG this researcher was surprised that research with people with persistent, yet less intense reactions or sub-clinical trauma symptoms have not been considered as a relevant component of early intervention to date. This researcher proposes that subthreshold PTSD be accounted for in the reexamination of levels of impairment and the continuing development of prevention and treatment models. Subthreshold PTSD is clinically relevant if the course of PTSD can be altered before impairment is permanent. Little is known about the extent of impairment in this sub-clinical group or the process whereby victims of trauma transition to reactions of greater intensity and duration.

It has been suggested that the negative effects of subthreshold posttraumatic stress disorder are nearly identical to those with full PTSD, with the only difference being that some of the criteria for full PTSD have not been satisfied for diagnosis, yet partial or sub-threshold disorders have been largely ignored by researchers. Recent studies by Zlotnick, Franklin, and Zimmerman (2002) and Marshall et al. (2001) suggest a similar problem for using universal diagnoses to conceptualize operational definitions of stressors, stress reactions and stress-related disorders. The varying qualities of the criteria and the symptoms that make up those criteria expose a “labile, polymorphic” disorder (Solomon, 1993, p. 104), characterized by high variability when defined in empirical studies and rapid changes in temporal manifestation from one period to the next. The heart of the threshold debate lies in the true difficulty of establishing a one-size-fits-all diagnostic yardstick. Like with most clinical settings, military mental health personnel in most armies use the standard functional gauge established by the DSM-IV-TR (APA, 2000) for the diagnosis and treatment of PTSD. Sub-threshold PTSD becomes relevant to

both military commanders and clinical practitioners when the soldier or patient ceases to function effectively.

In order to look at subthreshold PTSD, the current DSM criteria for posttraumatic stress disorder will be discussed followed by a history of the taxonomic evolution of the disorder. This will be followed by a discussion of the debate concerning thresholds for diagnosis.

Posttraumatic stress: DSM-IV-TR Diagnostic Criteria

The inclusion of PTSD in the third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III), (APA, 1980) marked the formal recognition of a specific syndrome etiologically linked to traumatic events. The diagnostic criteria for PTSD provided a standardized means for assessing the effects of trauma and were initially validated with Vietnam veterans (Zimering, Caddell, Fairbank, & Keane, 1993). With the publication of the DSM-III (APA, 1980), the common symptoms experienced by a wide variety of persons were first grouped under a single diagnostic category (van der Kolk, 1996). The DSM-III has since undergone three revisions (DSM-III-R, DSM-IV, and DSM-IV-TR). The current version, DSM-IV-TR (APA, 2000), resulted from a review of the available literature relative to clinical phenomenology, epidemiology, and relation to other disorders, as well as a series of multisite clinical and community trials (Saigh & Bremner, 1999).

As defined in the DSM-IV-TR, PTSD typically develops following exposure to an occurrence that is threatening or is perceived to be threatening to the well-being of oneself or another person.

Symptoms are grouped into 3 clusters: re-experiencing the event (e.g., intrusive thoughts), avoidance and emotional numbing (e.g., restricted affect), and hyperarousal (e.g., marked sleep disturbance and hypervigilance). To satisfy criteria for diagnosis, a person must

have the following symptoms or experiences: exposure to an actual or perceived threat, feelings of intense fear or helplessness, at least one re-experiencing symptom, at least three avoidance and numbing symptoms, and at least two-hyperarousal symptoms. Finally, they must be bothered by these symptoms for more than one month; and must be significantly distressed or impaired in social, occupational, or other functioning (Asmundson, Coons, Taylor, & Katz, 2002). Recent findings indicate that lifetime PTSD prevalence rates for the general population are at 9.2 percent with full PTSD and 2.2 percent with subthreshold PTSD, for an overall rate of more than 11 percent (Manzer, 2003); in certain at-risk groups (for example, survivors of sexual assault, motor vehicle accidents, and combat), the rates can be substantially higher (APA, 2000). A full listing of the DSM-IV-TR criteria for PTSD can be found in Appendix A.

PTSD now exists as a formalized and clearly defined psychiatric diagnosis. The evolution of the diagnosis highlights the historical, political, and social momentum to normalized an individual's symptoms following adversity. During the formative years of PTSD as a diagnosis many theorists created models to explain stress and embarked on empirical studies that would explore the neurobiology of stress. The following is a terse look at the history and conceptualization of PTSD.

History of Modern Theories of Posttraumatic Stress Disorder (PTSD)

The diagnosis of posttraumatic stress disorder was created to fill a gap in the prevailing psychiatric understanding by acknowledging that extremely traumatic events could produce chronic clinical disorders in normal individuals. The idea that stress could contribute to psychiatric symptoms has its roots in early disaster literature, and the notion that stress stimulates psychiatric illness in normal individuals predates formal nosologic classifications systems

(Kaplan & Sadock, 1998). A chronology of the history behind PTSD is summarized in Exhibit

1.

Exhibit 1

Chronology of the Historical Roots of Posttraumatic Stress Disorder

- 1666 - Diary of Samuel Pepys captures his posttraumatic reactions to the Great Fire of London.
- 1812 - Combat stress reactions among Swiss soldiers documented by Napoleon's field surgeons.
- 1865 - Military surgeons document combat trauma as Da Costa's syndrome, nostalgia, or soldier's irritable heart.
- 1885 - Charcot recognizes that "railway spine" was a functional disorder characterized by paralysis and chronic pain after railway accidents.
- 1889 - Oppenheim coins the term "traumatic neurosis" to describe a "molecular derangement of nerve tissue."
- 1893 - Freud suggests that paralysis and other neurotic symptoms in women were antecedents to "hysteria."
- 1919 - Frederick Mott and Ernest Southard document the neurological and psychological effects of war. "Shell shock" described by T.W. Salmon.
- 1943 - Adler describes "post-traumatic mental complications" in the survivors of the Boston Coconut Grove Fire.
- 1945 - Grinker and Spiegel enumerates symptoms of "combat neuroses" in "returnees" from World War II.
- 1952 - DSM-I with diagnosis of Gross Stress Reaction addressed the "severe physical demands or extreme stress such as in combat or in civilian catastrophe" (p.40) in response to problems observed in survivors of World War II.
- 1962 - Buchenwald Syndrome documented in concentration camp survivors.
- 1968 - the APA's Committee on Nomenclature and Statistics omits gross stress reaction and introduces "transient situational disturbance" in the DSM-II.
- 1974 - Burgess and Holmstrom introduce the idea of Rape Trauma Syndrome.
- 1975 - Delayed Stress Syndrome introduced by Horowitz and Solomon after study of veterans who had served in Southeast Asia.
- 1980 - Posttraumatic stress disorder established DSM-III.
- 1987 - DSM-III-R.
- 1992 - ICD 10 establishes different criteria for posttraumatic reaction than DSM-III-R.
- 1994 - Acute stress disorder established along with DSM-IV.
- 1999 - First large comorbidity study of subthreshold PTSD by Marshall et al..
- 2000 - DESNOS-Disorder of Extreme Stress Not Otherwise Specified established in DSM-IV-TR.
- 2001 - Zlotnick et al. asks the question, "does subthreshold PTSD have any clinical relevance?"

Modern theories of PTSD begin with the 19th century concept of traumatic neurosis. From the middle of the century, railway accidents resulted in increased litigation by injured persons suffering from chronic pain and paralysis. The development of the specialty of neurology initially attributed these apparent neurological deficits to spinal cord injury. However, clinical and autopsy evidence, revealing little correspondence between tissue destruction (usually absent) and degree of disability began to accumulate. By 1885 it was recognized that “railway spine” was a functional disorder (Jones, 1995).

Charcot’s demonstration of the onset of paralysis and other symptoms in “hysterical” women suggested to Freud in 1893 a psychological etiology of hysteria (Laughlin, 1967). Charcot retained his belief in the prevailing idea of a neurological cause of hysteria and its manifestations. In 1889, Charcot’s student, Oppenheim, coined the term *traumatic neurosis* to describe what he believed was a “molecular derangement” of nerve tissue (Robitscher, 1971). Initially Freud accepted this notion, postulating with Breuer in their work, *Studies in Hysteria*, an organic “hypnoid state” that made one vulnerable to hysterical symptoms when stimulated by a traumatic event (Strachey & Freud, 1957). Freud held that the traumatic event in hysteria was sexual trauma. Later, when evidence accumulated that cast doubt on the presence of actual sexual trauma, he postulated that fantasized sexual trauma could produce hysteria (Freud, 1955a). Additionally, Freud attributed war neurosis to conflicts in ego structures (id, ego, superego) and instinctual drives (libido, destrudo) (Freud, 1955b).

The idea that psychological trauma could produce apparent physical disabilities became generally recognized, especially with the appearance of numerous “shell shock” casualties during World War I (Salmon, 1929). The pendulum swung from considering traumatic neuroses as neurologically based to considering them to be of purely psychological causation. Eventually

traumatic neurosis was mostly subsumed under conversion or somatoform disorders, but many individuals whose symptoms took the form of mood and behavioral disturbances did not fit this categorization (Jones, 1995). Today the signs and symptoms of PTSD are described in terms of an anxiety disorder (APA, 1980, 1987, 1994, 2000).

In summary, change in the conceptualization of PTSD has created research barriers. One notable discrepancy existing in the literature pertains to the nature and sources of normal and traumatic stress; specifically, how the construct of stress is conceptualized and operationalized (Lewis, 2003; Bride, 2001; Danieli, Rodley, & Weisaeth, 1996; Danieli, 1998; Lamerson & Kelloway, 1996). For theoretical clarity, past theories of stress are critiqued, definitions of stress are discussed, and the underlying theoretical framework of this study is presented. The following section provides a brief, general overview of theories frequently associated with posttraumatic stress.

Selected Models of Posttraumatic Stress

Psychodynamic Model

Traditional psychodynamic models of posttraumatic stress have been used to explain the process of stress transmission and traumatization. Psychodynamic theory examines the extent to which a traumatic incident influences a person's perception of self or others. This model seeks to characterize environmental factors that influence subsequent stress response, such as the importance of early childhood trauma and early psychological conflicts (Krystal, 1988). Affective responses result when conscious or unconscious representations of oneself or others are altered by trauma, resulting in conflict in the representations of self and others. The traumatized individual then mobilizes his/her psychological defenses to cope with these discrepant meanings and emotions. With time, trauma responses continue, and the individual

may regress to using primitive defenses, including splitting (either thinking all people are good or bad) and dissociation (Marmar et al., 1994). The trauma victim will lose control of sense of self and be observed to have affective instability. Unresolved early conflicts may evoke traumas from earlier developmental periods associated with attachment and protection issues, thereby reactivating the traumatic effects. Consequently, maladaptive coping pushes the trauma victim into a tendency to repeat maladaptive relationship patterns resulting in unstable interpersonal relationships (Resick, 2001).

A variety of psychodynamically oriented treatment approaches have been applied to PTSD patients, including individual and group therapy in different institutional settings. The problem with this model and its associated therapies is that no obvious thread ties together the different psychodynamic interventions, and no systematic rationale connects the type of therapy to PTSD (Rothbaum & Foa, 1996).

General Adaptation Syndrome

In the twentieth century one of the most important influences in the study of stress was the work of Hans Selye. The earliest conception of stress defined stress as a response. Response-based theories of stress stem from Selye's early medical research, which noted that stress was a “nonspecific response of the body to any demand placed on it” (Selye, 1956, p.1), and observed that any adverse event could trigger a biological response. Selye’s definition was guided by his medical research in which he categorized common responses to a variety of events termed “stressors.” The stress response, which he described as a general adaptation syndrome, was characterized by many of the precursors to the vegetative symptoms of affective disorders, such as melancholy, loss of motivation, loss of appetite and loss of energy. Underlying his presuppositions was the assumptions that stress symptoms were somewhat universal and could

therefore be generalized to the nature of the stressor (Lewis, 2003). Seyle described the general adaptation syndrome with three stages: alarm and mobilization, resistance, and exhaustion. In the first stage, the autonomic nervous system (ANS) and the endocrine system are engaged as a sympathetic reaction to the “flight-fright” (Cannon, 1914) response causing muscle groups and respiratory and circulatory systems to give the body additional energy for acute stress situations. During the second stage the body’s physiological responses continue as long as necessary to combat the effects of the stressors. In the third stage, the body is fatigued from operating at this higher energy level and comes down from this level as stressors subside. Seyle’s conceptualization of stress was a foundation for the incorporation of the biological model, the transactional theory of stress, and learning theories associated with stress into models of posttraumatic stress.

Biological Model

The biological model is not new to the study of trauma. In 1918, Meakins and Wilson (1918) studied the physiological responses of shell-shocked veterans. Kardiner (1941) labeled traumatic stress as psychoneurosis, identifying a connection between psychological and physiological responses to stress. When researchers began studying traumatic stress and PTSD, they made the assumption that the biological processes would reflect normal responses to stress. This idea stemmed from Seyle’s (1956) General Adaptation Syndrome. However, while the normal stress response is an acute reaction that rapidly reverts to homeostasis, the biological responses to PTSD reflect chronic or potentially permanent changes with increasing reactivity over time.

Studies utilizing the biological model of PTSD made such conclusions possible. Biological studies have allowed for independent tests of the distinctness of the disorder and its

similarity to neurobiological changes observed following traumatic events. For example, one of the major symptom clusters of PTSD is associated with physiological reactivity (hypervigilance). Thus a number of studies have been conducted using arousal as a marker for PTSD, with research targeting ANS activity, heart rate and blood pressure in traumatized groups (mostly Vietnam veterans) and non-traumatized (control) groups. In early studies, a number of investigations did find that PTSD subjects had higher heart rates and states of arousal than non-PTSD groups (e.g., Adler, 1943; Meakins & Wilson, 1918; Salmon, 1929). However, some more recent studies have found this not to be the case (e.g., Pittman, Orr, Forgue, Altman, & deJong, 1990; Prins, Kaloupek, & Keane, 1995; Shalev, Freedman, & Peri, 1998).

In reviewing studies of baseline arousal, Prins et al. (1995) observed that there were a number of methodological differences that could account for these findings. Further comparisons to other anxiety disorders found there were no differences (Pittman et al., 1990). Other shortcomings of the biological model were noted. Prins et al. (1995) suggested that rather than a biological difference, these investigations were picking up greater anticipatory anxiety in subjects with PTSD or other forms of anxiety than healthy comparison subjects. Shalev et al. (1998) looked at several variables associated with PTSD in a controlled study. They confirmed Seyle's idea about heart rate, however they observed that other biological responses to acute stress might condition an individual to adapt to the alarm response and that coronary responses did not serve to maintain the PTSD symptoms over time in the majority of PTSD cases.

Transactional Theories of Stress

Numerous transactional theories target Seyle's assumptions. Lazarus and Folkman (1984) assert that response-based conceptualizations do not provide a theoretical foundation to derive potential stressors or describe PTSD, observing a lack of systematic ways to prospectively

identify stressors (p. 14). Cooper, Dewe, and O'Driscoll (2001) argued that theories emphasizing the stress response ignore important contextual and environmental factors, such as intensity, frequency, and duration of the stimulus, often discussed in the PTSD literature (Lerner, 1976, 1991; Robinson & Lee, 2000). Lazarus and Folkman (1984) believed that there is no objective way to predict psychological stress without reference to properties of the individual in their context. To date, however, there is not an empirical investigation that supports the transactional stress model. Despite the lack of empirical strength, Lazarus and Folkman's response-based definitions of stress do have heuristic value in the overall traumatic stress literature by describing taxonomies of common physiological (van der Kolk, 1996), psychological (Solomon, 1993), and behavioral stress reactions (Rothbaum & Foa, 1996).

Diathesis-Stress Model

The diathesis-stress model is an amalgam of all the models discussed. In the strictest sense, it purports that individuals are genetically vulnerable (diathesis), or have had early childhood experiences or brain abnormalities that render them vulnerable to psychological trauma (stress) (Deykin & Buka, 1999). The attraction to genetic investigations of PTSD is compelling. This research attempts to explain individual predispositions to traumatization and different patterns of stress response. While there is increasing genetic evidence that parental PTSD renders children vulnerable to PTSD (Danieli, 1998), without a valid and empirical model of effect there should be concerns about overestimating genetic factors associated with PTSD.

Social Learning Theory

Behavioral Models

Although there are numerous psychosocial theories advancing and explaining the etiology of PTSD, cognitive behavioral models have the strongest evidentiary support and are

more widely accepted in the scientific community than the other models (Deville & Spence, 1999; Bisson, Jenkins, Alexander, & Bannister, 1997). The behavioral model of PTSD, as posited by Keane, Zimering, and Caddell (1985), puts forth that traumatized individuals acquire conditioned fears of a wide variety of trauma-related stimuli. Subsequently, they avoid these stimuli. Through the processes of higher-order conditioning and stimulus generalization, the number of feared stimuli continues to increase even after the trauma has occurred.

Cognitive Models

The cognitive model of PTSD articulated by Foa, Steketee, and Rothbaum (1989) suggests that PTSD occurs when the traumatic incident reinforces negative beliefs concerning one's safety and competence. Individuals with PTSD subscribe to the cognitive distortion that the world is completely dangerous and therefore live their lives in constant fear. These individuals may also perceive themselves as incompetent and are unlikely to confront challenging situations. Other cognitive models focus on basic cognitive processes such as memory and attention (e.g., Litz & Keane, 1989). According to this model, PTSD progresses and/or is maintained when actual trauma or threat-related material receives preferential information processing by an individual over less threatening information. Maladaptive processing of this kind leads to distorted ways of perceiving and comprehending their environment (Lilienfeld, Lynn, & Lohr, 2003).

Scientific research has revealed a number of efficacious treatment procedures for the amelioration of PTSD symptoms. Most are based on social learning (behavioral) models and involve procedures that have withstood rigorous scientific experimentation. By the same token, there are a number of models that possess terminology associated with science, but are not based on empirically supported scientific theory. These models failed to withstand empirical scrutiny

and determine the results of their effects. As a result, poorly supported models pose a threat to the understanding of the classification of PTSD and cloud understanding of the extent of impairment caused by PTSD. In the next chapter the models are discussed in terms of their formulations of PTSD. In the simplest terms, PTSD is discussed through each model as a stress response. When evaluating each model's conceptualization of how symptoms move from the abstract to the observable, consider that PTSD includes processes that: (1) attenuate and perpetuate maladaptive and prolonged psychological stress responses within the individual, observed as anxiety, tension, and levels of distress; and (2) appear to maintain maladaptive psychobiological processes. These processes include hyperarousal, hypervigilance, startle responses, sleep disturbance, cognitive distortions, and affective instability ranging on a continuum from anger to depression to varied forms of anxiety. For each of the models pertaining to PTSD, it is important that the processes can be both observed and measured.

Studies relying on unproven models of traumatic stress and dependence on the current diagnostic classification of posttraumatic stress disorder led to neglected study of posttraumatic sequelae that fall short of full criteria for PTSD. In the next chapter illustrations and presentations of the impact of subthreshold traumatic stress are presented. Therefore this study will add to the knowledge base by studying risk for depression and hazardous alcohol use associated with subthreshold PTSD. Rather than describing a model of peacekeeping stress, this study represents one of the first investigations that utilizes a model that could be used to explain disability and impairment in any population with full and subthreshold PTS.

CHAPTER II

REVIEW OF THE LITERATURE

A review of the literature was conducted to determine how posttraumatic stress disorder has been defined, which models of PTSD best capture the construct, and how prevalent PTSD and comorbid conditions are. This review focused on empirically supported studies of PTSD in various populations and empirically supported models that best describe it. As detailed in Chapter One, numerous models of stress attempt to capture the process of PTSD and define the boundary between normal and pathological trauma responses, including, but not limited to: psychodynamic, general adaptation syndrome, biological, transactional, and behavioral, and various combinations of these models. Despite past and current research, empirical support for clear definitions of PTSD is still lacking (Lilienfeld et al., 2003). Currently, there appears to be more pseudoscience than science with regard to conceptualizing PTSD and the diagnostic cutoffs separating normal stress responses from maladaptive stress responses (Lilienfeld et al., 2003; Lewis, in press; Yarvis & Spivey, 2003). Indeed, there is no consensus on a model and many of them exist to explain PTSD in only one particular population (Lamerson & Kelloway, 1996; Weisaeth, 1994; Bartone & Asler, 1998; Goodwin, 1987). In an extensive review of the trauma literature, no one model or classification of PTSD has been scientifically proven to be completely more predictive of clinical impairment in individuals. The following is a critical review of several models that claim to explain the process of PTSD and the empirical status of each model.

Models of PTSD

Psychodynamic Model

The psychodynamic model is an acceptable standard to many mental health practitioners. Described in many forms and hybrids by social workers, psychologists, clergy, and occupational therapists, the psychodynamic model has been used to describe numerous mental health processes. The number of psychodynamic models has increased dramatically over the last few decades (Lilienfeld et al., 2003). It has been estimated that there are now over 250 distinct psychodynamic models of therapy, which are described and discussed in more than 10,000 books (Wampold, 2001). The very abundance of psychodynamic models has yielded an authoritative effect, as numerical superiority is often taken to equal theoretical and empirical superiority in the absence of clear empirical support (Smith, Glass, & Miller, 1980). The efficacy of these numerous psychodynamic models is currently unknown, however. Several models claiming to be psychodynamic correspond to specific treatments asserted to prevent or alleviate PTSD, including Eye Movement Desensitization-Reprocessing (EMDR) (Shapiro, 1995), Thought Field Therapy (TFT) (Callahan & Callahan, 1996), and Critical Incident Stress Debriefing (CISD) (Mitchell & Everly, 1997). Lilienfeld and colleagues (2003) conducted an extensive review of the efficacy literature and found that the majority of psychodynamic models and their corresponding interventions do not stand up to scientific scrutiny. Two studies (Cryer & Beutler, 1980; Perl, Westin & Peterson, 1985) reported some benefit using psychodynamic approaches; however, they lacked objective measurement and control groups. Lilienfeld et al. (2003) submit that the psychodynamic models have the trappings of science, however they point out that the “empirical” studies conducted and promoted by supporters of these models have severe methodological problems. On the contrary, they reference numerous empirical studies that

show that these models do not fully describe the effect of trauma, and in some cases their corresponding treatments do more harm than no treatment (e.g., Bisson et al., 1997). One study sampling veterans observed no progress using psychodynamic psychotherapy for a period of 19 months (Grigsby, 1987). Furthermore, there is evidence that PTSD symptoms can increase with the use of this model (Turner & Frank, 1981). While this approach is often appealing to social workers and other mental practitioners, there is little empirical support of the efficacy of psychodynamic models or therapies.

General Adaptation Syndrome and Transactional Models

Initially Seyle's observation, that any adversity could provoke a biological stress response (1956) provided scientific validity to the conception of PTSD. His work was a step in the right direction because his studies were based on scientific observations rather than the sociopolitical agenda of some trauma victims' advocates to produce etiologic factors. Seyle's model of stress, the General Adaptation Syndrome, was the harbinger of many other models of stress. However, even Seyle, when defending his general adaptation syndrome, conceded he knew very little about the possible relationship between stress and disease (Doublet, 2000).

Other transactional models were developed that are compatible with Seyle's notions of stress. These models provide indirect support of PTSD as a normative stress response by demonstrating a contextual relationship between adverse life events and the development of psychiatric and physical symptoms. These models view individuals as systems in relation to their environment. The ecological transactional models classify themselves as multidimensional and integrative models of stress (Lerner, 1976, 1991; Brofenbrenner, 1979; Robinson & Lee, 2000). Incorporating terms often used in scientific study, such as organisms and interactions, along with unproven post-modern theoretical explanations, these models criticize response-based

definitions of traumatic stress as unidimensional and reductionist (Danieli, 1998). To Lerner (1976), exposure to adverse stimuli as a contributor to traumatic stress syndrome stemmed from the identification of limitations of the response-based theories. Positing his theory of developmental contextualism, Lerner (1976, 1991) wrote about human beings as “integrated organisms” having “reciprocal interactions” with their environment and being vulnerable to harmful stimuli in the environment. He hypothesized that the psychological functioning and development of the human organism is affected by both internal (developmental) and external (environmental) conditions. Therefore, Lerner’s definitions of traumatic stress sought to identify those internal and external conditions that shifted an organism off its developmental trajectory and disrupted homeostasis. To date, however, no empirical study exists isolating those internal and external conditions responsible for describing the phenomenon described by Lerner (1976) and Robinson and Lee (2000).

Biological Models

Biological explanations of the effect of trauma on the individual are compelling. The development of medications to combat the effects of posttraumatic stress disorder has seen progress over the last fifteen years. Current research tends to focus on the neurobiological aspects of trauma and their effects. For example, serotonin reuptake inhibitors (SSRIs) have been found helpful in reducing PTSD symptoms (Resick, 2001). However, there is a danger in inferring biological mechanisms based on treatment effects. Another interesting finding in PTSD samples pertains to plasma cortisol levels. People with PTSD have been observed to have lower cortisol levels and a higher number of glucocorticoid receptors than people with other psychiatric morbidities or no diagnosis (Yehuda, Boisoneau, Lowry, & Giller, 1995). This finding suggests that the nature of acute traumatic reactions may be modified by a range of factors in addition to

severity of traumatic exposure, such as history of prior trauma. Another study by Resnick, Yehuda, Pitman, and Foy (1995) supports the connection between PTSD and plasma cortisol levels. They observed that female rape victims with a prior rape history were three times more likely to develop PTSD than women raped for the first time. In that study, prior rape history was associated with significantly lower cortisol levels than in women without an assault history. All of the biological research points to evidence that PTSD does influence the biological make-up of the individual and that the stress response includes a number of neurochemicals that impact or are impacted by various regions of the brain. However, research to date does not show a clear mechanism or model by which the transmission of PTSD can be described, nor does the current research isolate the connection between an abstract concept, such as prior exposure, to a specific biological marker like plasma cortisol level.

Numerous studies targeting the neuroendocrine system have been conducted. These studies usually involve comparison studies of traumatized groups versus non-traumatized groups. In a sample of veterans, as expected in those with chronically increased sympathetic nervous system activity, there was evidence that the levels of epinephrine and norepinephrine (NE) was higher in combat veterans with PTSD than in veterans with other psychiatric disorders or no diagnosis (Kosten, Mason, Giller, Ostroff, & Harkness, 1987; Yehuda, Southwick, Giller, Ma, & Mason, 1992). Just as the amount of chemicals can vary, there can be a varying number of receptor sites. It has been observed in samples of both traumatized veterans and children with PTSD that, following exposure to traumatic stimuli, each has fewer alpha-2-adrenergic receptor binding sites per platelet compared to control subjects (Perry, 1994). The goal of the receptor research was to identify distinct biological responses to trauma, and the findings were similar to the research on plasma cortisol levels. The results suggest that acute responses to stress are not

homogenous and depend on variables other than those associated with exposure to trauma. However, comparable receptor studies demonstrated that people with depression and generalized anxiety had fewer receptor sites than PTSD subjects (Yehuda, Perry, Southwick and Giller, 1990) obscuring conclusions about the PTSD group in Perry's 1994 study.

Social Learning Theory

Mowrer's two factor theory (1947) of classical and operant conditioning was conceptualized to account for post-trauma symptoms (Becker, Skinner, Abel, Axelrod, & Chicon, 1984; Keane et al., 1985). Mowrer used classical conditioning to explain high levels of distress and fear observed in trauma victims.

Observations of trauma behavior and the behavioral model of PTSD were rooted in experimental psychology (Bandura, 1978). As researchers and behavioral therapists began to conduct research on rape victims and Vietnam veterans in the 1970s, they began to recognize learning theory as both an explanatory and measurable model for the symptoms they were observing. In this model, the traumatic event is the unconditioned stimulus (UCS) that evokes extreme fear, the unconditional response (UCR). The trauma (UCS) becomes associated with cues in the environment, previously neutral stimuli, which are present during the traumatic event, which then become the conditioned stimuli (CS). For example, at the time of an assault, a victim is alone, in the dark, and in a forest hiding beneath a rotting oak tree. Now thinking about being alone, in the dark, smelling a rotting odor, or seeing a forest would be conditioned stimuli that could elicit a conditioned emotional response (CER) (Resick, 2001). A combination of two or more of these stimuli could elicit a stronger, perhaps even overwhelming response. Whenever any of these cues are in the victim's environment, the CS prompts fear, which has transformed into the conditioned emotional response (CER). Next, through processes known as stimulus

generalization and higher order conditioning, other related stimuli are conditioned to evoke the same response. Evidence of stimulus generalization and higher order conditioning was reported in a sample of Canadian peacekeepers in Rwanda in 1994. Several trauma victims of the Rwanda operation came to fear and avoid objects, such as vehicles with rust, or developed an inability to eat meat because it stimulated experiences with human remains (CANFORGENS, 1998).

Typical classical conditioning models demonstrate that the link between CS and CER would extinguish over time. Operant conditioning can explain why this process does not occur with PTSD. Operant conditioning illustrates the development of avoidance symptoms and maintenance of fear over time despite the fact that the UCS, the traumatic stressor, does not recur. The memory of trauma and other cues (CS) elicit fear and anxiety (CER). These cues are avoided and the consequence is a reduction of fear or anxiety. In this way, avoidance of the CS are negatively reinforced, blocking extinction of the link between the trauma cues (CS) and the fear (CER) as would normally be expected without repetition of the trauma itself. If the victim generalizes the traumatic experience to other contexts, the victim is not going to learn that these other environments are indeed safe, and the PTSD symptoms may become chronic with time.

Wagner and Linehan (1998) noted social learning theory can account for dissociative symptoms of PTSD as well. They proposed that the primary function of dissociative behavior was to regulate exposure cues that are related to the traumatic experience. Dissociation during trauma reduces exposure to harmful cues, and dissociation after trauma reduces generalization to those cues.

Evidentiary support for specific behavioral interventions is cited in numerous studies of direct therapeutic exposure (either in vivo, imaginal, or virtual reality exposure) to harmless but

feared stimuli for the purpose of reducing anxiety (Boudewyns & Shipley, 1983). Independent research teams have completed controlled clinical trials with positive findings regarding efficacy (Boudewyns & Hyer, 1990; Cooper & Clum, 1989; Keane, Fairbank, Caddell, & Zimering, 1989; Rothbaum & Foa, 1999; Rothbaum, Hodges, Ready, Graap, & Alarcon, 2001; Foa, Rothbaum & Furr, 2003). One controlled study showed that behavioral methods reduced PTSD symptoms, as well as, alcohol abuse symptoms in Vietnam veterans (Keane & Kaloupek, 1982).

The Categorical Evolution of PTSD

Assigning categories or classification is a fundamental human activity that people use to understand their world. In psychopathology, the goal of classification is an attempt to use similarities and differences among individuals who behave in deviant or abnormal ways in order to understand their behavior. According to Blashfield (1984), there are five purposes of classification of psychiatric disorders:

1. Forming a nomenclature to provide mental health professionals a common language.
2. Providing a platform for information retrieval.
3. Providing a shorthand clinical representation of the patient.
4. Stimulating useful predictions in the determination of appropriate interventions.
5. Creating a platform for conceptualizing models of psychopathology.

For psychiatry and social work classification of disorders is accomplished through the DSM-IV-TR and the ICD 10. According to Blashfield (1984) three general criticisms target these classification systems. First, the diagnosis of mental disorders has been proven unreliable as shown by empirical evidence. Second, there is still a leaning toward the medical model. The third criticism is that labeling renders the process self-fulfilling.

Currently there is an on-going debate about PTSD and its classification. Defining the contributing stressors associated with the disorder and different levels of impairment is problematic and contributes to the on-going taxonomic debates pertaining to normal versus full posttraumatic response syndromes. Historically, stress reactions have been loosely defined and have not been empirically tested, leading to poorly supported discussions of sub-clinical issues. These nebulous operational definitions of stressors led to a number of early attempts on the part of mental health professionals to formulate an orderly taxonomy of posttraumatic stress. Some attempts were based on dominant manifestations (Cavenar & Nash, 1976); others were based on severity of symptoms (Bartemeier, 1946) or prognosis (Bailey, Williams, Kormora, Salmon, & Fenton, 1929). All, however, relied on clinical impressions and lacked a quantitative component. Empirical shortcomings are an on-going problem for studies of psychiatric diagnoses. Emil Kraepelin sometimes called the “father” of modern psychiatry, and whose classifications of mental health were the precursors of the DSM and ICD classifications still used today, set the stage for some of the on-going classification problems. Arguably the reliance on diagnostic classifications put forth by him suffer when put to scientific scrutiny because Kraepelin and his followers continuously changed the thresholds associated with different diagnoses. (Blashfield, 1984; Pilgrim & Bentall, 1999). Sliding scales of psychiatric classification continue to alter the conceptual and predictive validity of accepted psychiatric disorders, and the influence of unproven models continues to alter the way in which PTSD is classified. The following is a review of the categorical changes to date.

The first edition of the American Psychiatric Association *Diagnostic and Statistical Manual of Mental Disorders (DSM-I)*, published in 1952 (APA) included trauma reactions, such as combat stress reactions (CSR), anxiety from motor vehicle accidents, and disaster responses

under Gross Stress Reaction, which corresponded to the *International Statistical Classification* 1948 revision to Acute Stress Maladjustment (WHO). In DSM-I, Gross Stress Reaction was reserved for “conditions of great or unusual stress in which a normal personality may utilize established patterns of reaction to deal with overwhelming fear” (APA, 1952, p. 40). The diagnosis was “justified only in situations in which the individual has been exposed to severe physical demands or extreme emotional stress, such as in combat or civilian catastrophe (fire, earthquake, explosion, etc.)” (APA, 1952, p.40). In many instances, this diagnosis applied to more or less “normal persons who have experienced intolerable stress” (APA, 1952, p.40).

The second edition of the *Diagnostic and Statistical Manual (DSM-II)* (APA, 1968) substituted the term Adjustment Reaction of Adult Life for Gross Stress Reaction. It was part of the general category of Transient Situational Disturbances, defined as follows: more or less transient disorders of any severity (including those of psychotic proportions) that occur in individuals without any apparent underlying mental disorders and that represent an acute reaction from overwhelming environmental stress (APA, 1968, pp 48-49). It states in terms of prognosis that “if the patient has good adaptive capacity, his symptoms usually recede as the stress diminishes. If, however the symptoms persist after the stress is removed, the diagnosis of another mental disorder is indicated” (APA, 1968, p. 49).

This represented a most unfortunate change because it created the impression that therapeutic intervention should be focused on removing the individual from the stressful environment, when in fact only a brief respite from the stressors is needed (FM8-51, 1994; Yarvis, Vonk, & Bordnick, under review). The implication is that the outcome is dependent solely on the individual’s innate adaptive capacity rather than allowing therapy to facilitate

recovery of that adaptive capacity. Contrast this impression with that given in DSM-I: “When promptly and adequately treated, the condition may clear rapidly” (APA, 1952, p.40).

In the third edition of the *Diagnostic and Statistical Manual (DSM-III)* published in 1980, (APA), the clinician can place an individual with some symptoms of trauma resulting in mild interfering problems in the Adjustment Disorder category. This new category suggests evidence of clinical impairment from a partial or sub-threshold posttraumatic stress disorder. As in DSM-II, prognosis is stated to be dependent on removing the stressor: “It is assumed that the disturbance will eventually remit after the stressor ceases” (APA, 1980, p. 299).

Posttraumatic stress disorder, among other criteria, lists a “recognizable stressor that would evoke significant symptoms of distress in almost everyone” (APA, 1980, p.238). By dividing PTSD into acute (onset or duration of symptoms less than six months following the onset of the traumatic event), chronic (duration of symptoms six months or more) and delayed (onset at least six months after the traumatic event), the impression is given that one is dealing with a lengthy disturbance due to psychological trauma.

In the DSM-III-R (APA, 1987), the revision of DSM-III (APA, 1980), and DSM-IV, the 1994 edition (APA), there is a requirement for symptoms to last longer than a month. Presumably this was intended to make a distinction from transient adjustment disorders; however, this rule introduces an unnecessary disjunction to the clinical and theoretical understanding of PTSD as an exaggeration of normal responses to psychic trauma. The notion of “normal responses” sets the stage for the on-going taxonomic debate about when and where these responses become clinically relevant.

Widening the gap between normal and pathological, the International (ICD) and American (DSM) classifications of trauma, initially evolving similarly, had significantly

different conceptions of posttraumatic reactions by the time DSM-III-R (APA, 1987) and ICD 10 (WHO, 1992) were established. The new diagnosis of PTSD was associated with other anxiety disorders by the DSM-III, whereas ICD-10 divided traumatic reactions into three sub-categories ranging from normal stress reactions to enduring personality changes after a catastrophe (van der Kolk, McFarlane, & Weisaeth, 1996). The single diagnosis of PTSD remained with DSM-III-R and DSM-IV because research underscored the fact that the eventuation of chronic symptoms suggested persistent biological changes (Yehuda & McFarlane, 1995).

DSM-IV added a new category of stress disorder, Acute Stress Disorder (ASD), for symptoms that occur during or soon after the trauma, last for at least 2 days, and can cause clinically significant distress or impairment. If impairment persists beyond four weeks, it becomes Acute PTSD (APA, 1994). According to the diagnosis ASD, the DSM-IV now assumed when the temporal criteria are met for acute PTSD all of the symptom criteria for PTSD are met as well. In fact, the DSM-IV also notes that some symptomatology following exposure to extreme stress is ubiquitous and *often* does not require any diagnosis (APA, 1994). The other change DSM-IV made was shortening the time of chronic PTSD to three months post-trauma, although “delayed onset” is still after six months. The newest version of the DSM, DSM-IV-TR (APA, 2000), considers the notion of the clinical relevance of a subthreshold posttraumatic stress disorder, but the questions about clinical thresholds remain.

In summary, DSM-I, having been published shortly after the Korean War and based in large part on the U.S. Army psychiatric nomenclature growing out of the World War II experience, established a foundation for discussions about classifications of traumatic reactions, which has persisted in subsequent editions of the DSM. The problem with its conceptualization of posttraumatic stress was that most of the research to date was done with combat veterans. A

lack of familiarity with military stress reactions and its applicability to civilian samples only clouded understanding of PTSD. While the DSM-III was developing, scholars were influenced, in part, by the popular need to view Vietnam veterans as damaged by their experiences in the war and as appropriate recipients of psychiatric care. Such a concern may have led to the acceptance of posttraumatic stress disorder and delayed PTSD for a larger cohort of behaviors (such as addictive and aggressive acts) than had previously been considered as sequelae of psychological trauma. The result was the continuation of “all or none” labels for traumatic disorders for trauma victims. However, at this time the crisis intervention movement was underway and early intervention in trauma was gaining impetus. Research on rape victims, survivors of accidents, and child and spouse abuse victims forced scholars to revisit the demarcation points between normal and pathological, exposing some gray areas and fueling a threshold debate (Everly & Lating, 1995).

The Threshold Problem

The addition of posttraumatic stress disorder to the psychiatric nosology in the DSM-III (APA, 1980) reflected recognition by the psychiatric community that individuals that *are* exposed to situations of extreme stress may react to these situations in maladaptive ways (Yarvis, 2000). Current post-trauma reactions are viewed as maladaptive when they are characterized by persistent re-experiencing of the critical event, avoidance of places, people, or things associated with the event, psychic numbing, and hyperarousal (APA, 2000). Ruscio, Ruscio, and Keane (2002) point out that these taxonomic formations fail to address whether the symptoms of PTSD demarcate a homogenous clinical entity that can separate normal reactions from extreme stress and posttraumatic stress disorder. Brett (1996), O'Donohue and Elliott (1992), and Robins (1990) assert that the constellation of PTSD symptoms represents the extreme end of a normal

distribution of stress reactions, a distribution that can have only a bi-polar division of normal and pathological states by a somewhat arbitrary cutoff (e.g., Davis, 1999; Robins, 1990). Belenky (1987) argues instead that maladaptive stress reactions can and should be distinguished from normal stress reactions and their associated sequelae. This scholarly debate has been complicated by moral and political disagreement over possible stigmatizing effects (Davis, 1999) versus legitimizing effects (Scott, 1990) of a diagnostic category that distinguishes between normal and pathological reactions to trauma (Marshall & Pierce, 2000).

According to Ruscio et al. (2002), the major issue contributing to the threshold problem (Horowitz, Weiss, & Marmar, 1987) centers on the debate about the characteristics signifying normal versus abnormal responses to an exposure to a traumatic event (O'Donohue & Elliott, 1992; Robins, 1990; Schwartz, Eilenberg, & Thompson-Fullilove, 1995). Normality is often mentioned because it is “normal” to experience some of the symptoms associated with PTSD after experiencing a traumatic event (Rothbaum, Foa, Riggs, Murdock, & Walsh, 1992; Steinglass & Gerrity, 1990). Supporting the need for attention to subthreshold populations, some studies found very few trauma victims to be completely asymptomatic even one or more years after the critical event, whether that event was peacekeeping (Mehlum & Weisaeth, 2002; Asmundson, Bonin, Frombach & Norton, 2000; Mehlum, 1998; CANFORGENS, 1998), combat (Kang, Natelson, Mahan, Lee, & Frances, 2003; Solomon, Kotler, & Milkulincer, 1988), prisoners of war (Gold et al., 2000), refugee (Sabin, Cardozo, Nackerud, Kaiser, & Varese, 2003), torture (Ramsay, Gorst-Unsworth, & Turner, 1993), rape (Veronen & Kilpatrick, 1983), Holocaust (Danieli, 1998), or natural disaster (Steinglass & Gerrity, 1990). PTSD symptom levels reported by trauma victims are often significantly higher than those who have not been exposed to trauma; however, the number and intensity of the symptoms often remain below

diagnostic thresholds for the full disorder (Asmundson, Stein, et al., 2002; Asmundson, Wright, McCreary, & Pedlar, 2003; Steinglass & Gerrity, 1990; Veronen & Kilpatrick, 1983).

Concurrently, these subthreshold presentations of PTSD are often associated with clinical and psychosocial impairment (Kulka, Schlenger, Fairbank, et al., 1990; Stein, Walker, Hazen, & Forder, 1997; Weiss et al., 1992; Zlotnick et al., 2002) and with help-seeking behaviors similar to individuals who meet all the criteria for PTSD (Asmundson, Stein, et al., 2002; Stein et al., 1997). These findings raise questions about clinical significance of subthreshold PTSD and the diagnostic thresholds used to determine full PTSD (Zlotnick et al., 2002; Davidson & Foa, 1991; Rothbaum & Foa, 1993; Ruscio et al., 2002; Stein et al., 1997).

Two viewpoints have gained impetus from the heightened attention to taxonomic issues. In their empirical research, Asmundson, Stein, et al. (2002), Ramsay et al. (1993), Stein et al. (1997), and Yehuda and McFarlane (1995) suggest that the boundaries between normal stress reactions and the extreme of full PTSD may not be as distinguishable as previously thought. Some go so far as to question whether or not PTSD should be viewed as a distinct entity from normal stress reactions. Rothbaum et al. (1992) note that the initial presentation of symptoms of trauma victims who develop chronic PTSD overlaps the presentations of the victims who spontaneously recover. This example challenges the notion of a syndrome comprised of three categories of discreet criteria. Additional support is drawn from evidence that certain symptoms of PTSD persist even when other symptoms have lessened or extinguished (Asmundson, et al., 2000; Neal, Hill, Hughes, Middleton, & Busuttill, 1995; Rothbaum et al., 1992). Such evidence “should challenge our notions about where (and indeed, whether) dividing lines should be drawn,” (Stein et al., 1997, p. 1119).

This “threshold dilemma” (Horowitz et al., 1987) has fundamental implications for the ways in which PTSD (full and subthreshold) are constructed and assessed. Knowledge about the clinical significance of subthreshold disorders fosters an understanding of the boundaries separating normal stress reactions from debilitating ones. Recent investigations of the structure of PTSD promoted more accurate theoretical formulations about the nature and origins of PTSD (Helmchen & Linden, 2000; Schutzwohl & Maercker, 1999; Pincus, Davis, & McQueen, 1999; Flett, Vrendenberg, & Krames, 1997; Haslam, 1997; Gangestad & Snyder, 1985).

Implications. Increasing the knowledge base pertaining to the taxonomy of PTSD has important implications for the determination of prevalence of those left untreated because they have not met the criteria for full PTSD. Furthermore, this research has implications for clinicians, health insurers, hospital administrators and policy makers. Little is known about subthreshold PTSD. To date only a few of the studies which exist in the PILOTS (Published International Literature on Traumatic Stress) data base, the largest data base and internet library in existence dedicated to the study of trauma (<http://dciswww.dartmouth.edu:50080/v3?db=105&conn=2078917053&page=d>), have looked into the clinical relevance of sub-threshold PTSD and its associations with impairment and distress (Blanchard, Hickling, et al., 1996; Marshall et al., 2001; Schutzwohl & Maercker, 1999; Stein et al., 1997; Zlotnick et al., 2002). Thoughtful examination will show that the complexity of the phenomenon of PTSD and subthreshold PTSD will raise more questions than science can answer at the present time. The fact that there are 16,925 articles published in the PILOTS database (and could well be approaching 20,000 by the time this dissertation is published) speaks to the on-going need to explore subthreshold PTSD in terms of scientific

research, epidemiology, and the urgency of understanding the problem (Wilson, Friedman, & Lindy, 2001).

Sub-threshold Posttraumatic Stress Disorder

Reliance on the categorical taxonomy of psychiatric diagnoses has caused study of posttraumatic sequelae falling short of the identification threshold of full criteria for PTSD to be neglected. Recent studies by Zlotnick et al. (2002) and Marshall et al. (2001) suggest that using universal diagnoses to conceptualize stressors, stress reactions and stress-related disorders omits a part of the traumatized population at substantial risk for depression, suicide, and substance abuse associated with subthreshold PTSD. Solomon's (1993) empirical studies of subthreshold PTSD observed as combat stress reactions noted high variability in operational definitions of stress reactions when the length of time with post trauma symptoms was considered in individual respondents. For example, in Sabin et al.'s (2003) study, 11 percent of the respondents were observed to have PTSD 20 years after their traumatic exposure(s); in the same sample, another 11 percent missed the diagnostic threshold by one criterion. Solomon (1993) and Sabin et al. (2003) force consideration of whether or not the diagnosis of PTSD is fluid with respect to time.

Prevalence

PTSD in Civilian Samples

Epidemiological studies indicate that posttraumatic stress disorder has become a global health issue. Recent findings observe lifetime PTSD prevalence rates in selected populations range from 1.3 percent in Germany to 37.4 percent in Algeria (Van Amerigen, 2003). An analysis of a community sample (n=3006) from Canada reveals prevalence rates of PTSD of 3.1 percent (94/3006) current (1-month) and 11.3 percent (340) lifetime. Traumatic exposure sufficient to cause PTSD was reported by 75.7% (2275) of respondents (Van Amerigen, 2003).

PTSD in Military Samples

War is a fertile breeding ground for trauma and trauma research (Everly & Lating, 1995). Current data suggests that approximately 10–20 percent of armed forces personnel deployed for combat, peacekeeping, or humanitarian disaster relief present with posttraumatic stress disorder (PTSD) following their tour of duty (Bramsen et al., 2000; Bramsen et al., 2001; Ehlich et al., 1997; Kessler et al., 1995; Litz et al., 1997; Mehlum & Weisaeth, 2002; Schlenger et al., 1992; Ward, 2002). During the post-Cold War period of 1990-1999, when operations other than war were at their height, there were 1,380 hospitalizations and 18, 597 ambulatory visits for treatment of active duty U.S. soldiers for PTSD (Hoge et al., 2002). Currently, one in five Canadian soldiers in the Afghan theater is reported as having traumatic stress reactions (Ward, 2002). Similar studies using samples of peacekeepers observed a prevalence of full PTSD above 20 percent six months after re-deployment (Asmundson et al., 2003; Passey, 1995). These findings are consistent with those from studies from the Vietnam War (Weiss et al., 1992; Zimering et al., 1993). Estimates for various peacekeeping exposure groups from different countries and different conflicts fall within a 95 percent confidence interval of the National Vietnam Veterans Research Study (NVVRS) (Schlenger et al., 1999). Given the prevalence of PTSD in military samples, one should expect a certain percentage of peacekeepers with subthreshold PTSD.

Subthreshold PTSD

In a Canadian investigation, Stein et al. (1997) observed respondents meeting sub-clinical criteria for PTSD reported impairment of social, occupational, and family functioning that was similar to that reported in individuals with full PTSD. Stein conservatively defined subthreshold PTSD as having at least one symptom in each DSM-IV symptom category. The prevalence of full PTSD in this study was 1.7 percent for men; 5.0 percent for women, and for subthreshold

PTSD 2.2 percent for men and 5.7 percent for women. This pattern has been found in other “high risk” groups (Marshall et al., 2001):

Refugees. Sabin et al. (2003) found that Guatemalan refugees in Mexico reported a lifetime prevalence of full PTSD 11 percent (males and females combined), with another 11 percent missing just one criteria for diagnosis of full PTSD.

Vietnam veterans. The National Vietnam Veterans Readjustment Study (Weiss et al., 1992) found that the lifetime prevalence for full PTSD was 30.9 percent for male and 26 percent for female veterans and subthreshold PTSD was 22.5 percent for males and 21.2 percent for female veterans. (In this case, subthreshold PTSD was distinguished from full PTSD if two of three symptom clusters were met (e.g. re-experiencing intrusions, avoidance, hyperarousal) or if most of the criteria were met in each category (Marshall et al., 2001).

Political prisoners. Defining subthreshold PTSD as meeting criteria for re-experiencing and for either avoidance or hyperarousal, another study of former political prisoners evaluated for PTSD reported 31 percent of respondents with full PTSD and another 29 percent with subthreshold PTSD (Schutzwohl & Maercker, 1999).

Motor vehicle accident (MVA) victims. With delineations between full and subthreshold PTSD defined in a comparable manner to the aforementioned study, Blanchard, Jones-Alexander, Buckley, and Forneris (1996) found that 132 victims of MVAs studied 1-4 months after the accident had incidence rates of full and subthreshold PTSD of 39.2 percent and 28.5 percent, respectively.

Aircraft disaster. In a Dutch study, Carlier and Gersons (1995) found that six months after a plane crash, 26 percent of the individuals met full criteria and another 20 percent met two of three screening criteria for PTSD.

Community sample. Marshall et al.'s (2001) study noted 9 percent had full PTSD and another 18.9 percent had subthreshold PTSD in a large community sample.

Out-patient psychiatric patients. The most recent study on subthreshold PTSD noted that in 1,000 patients, 156 (12 percent) met criteria for full PTSD, 84 (7 percent) for subthreshold PTSD, and 460 (35.4 percent) for trauma histories (Zlotnick et al., 2002).

Prevalence and Temporal Differences

In each of the studies mentioned, comparable results held form despite the temporal differences (i.e., 20 years later in Sabin et al., 2003, or 1-4 months later in Schutzwahl and Maercker, 1999). Furthermore, in the studies of Canadian peacekeepers by Asmundson, Stein et al. (2002) and Asmundson et al. (2003), the severity of the psychopathology of respondents with subthreshold PTSD paralleled the experimental groups with full PTSD, but to a lesser degree, and was more impaired than the non-deployed or non-traumatized control group. Furthermore, two Croatian veteran's studies of 3,217 personnel showed 16.22 percent with current PTSD and 25 percent with subthreshold PTSD one year after the war (Komar & Vukusic, 1999), and the rate of current PTSD increased to 24 percent just one year later (Kozaric-Kovacic, 1999), suggesting that some of the subthreshold group had developed full PTSD. In Weiss et al. (1992) reported a lifetime prevalence of full PTSD in 30.9 percent of males and 26 percent in females, with a lifetime prevalence of subthreshold PTSD of 22.5 percent and 21.2 percent respectively. One point seven million respondents reported symptoms of PTSD while 49 percent (830,000) of the respondents in the study still reported experiencing significant symptoms associated with PTSD in 1992. The contribution of sub-threshold PTSD would add another 350,000 veterans potentially in need of treatment (Weiss et al., 1992). Other studies with samples of veterans

support this claim (Asmundson et al., 2003; Passey, 1995; Mehlum & Weisaeth, 2002; Southwick et al., 1995).

Another consideration when comparing PTSD prevalence figures from different studies is that the different estimates are based on varying methodological approaches to the operationalization and diagnosis of a PTSD case. For example, Mehlum and Weisaeth (2002), Litz, Schlenger et al., (1997), and Passey (1995) report higher prevalence rates among peacekeepers, while Bramsen et al. (2001) reports relatively low prevalence figures in peacekeeping military personnel. None of these studies account for their methodological approach and are thus difficult to make inferences from.

A previous study by Zlotnick et al. (2002) found that patients with full PTSD were not significantly different from those with current subthreshold PTSD in terms of the levels of social and work impairment (i.e. both had made at least one suicide attempt). Further, patients with subthreshold PTSD did not differ significantly from those with some trauma history and no PTSD. This is inconsistent with the findings of a previous study in which they were found to be significantly different in patient and military groups (Stein et al., 1997). Psychiatric morbidity also served as a means of comparing full and subthreshold PTSD.

In the presence of major depressive disorder (MDD), Zlotnick, Warshaw, and Shea (1999) found patients with full PTSD did not significantly differ from those with subthreshold PTSD on an index of trauma ($X^2=9.79$, $df=1$, $P=.374$). The findings in Zlotnick et al. (1999) have several limitations. This study used impairment/distress levels as criteria for determining the definition of subthreshold PTSD. This coupled with treatment-seeking psychiatric patients explains why there was no significant difference between the subthreshold group and groups reporting no PTSD or the historically traumatized groups. These results may not necessarily be

generalized to other populations. Finally, this study used cross-sectional data to examine the construct of subthreshold PTSD and did not address the predictive validity of the construct or provide an empirical rationale for the decision to treat subthreshold PTSD.

It must be reiterated that most PTSD studies use other psychiatric problems to predict PTSD and impairment (van der Kolk et al., 1996), but few, including Zlotnick et al. (1999) compare subthreshold PTSD on measures of psychiatric morbidity. Asmundson, Stein, et al. (2002) and Asmundson et al. (2003) represent studies that demonstrate that PTSD can be compared on other health problems in traumatized individuals. In these studies, there is evidence that subthreshold PTSD does not significantly differ from PTSD and that it may significantly differ from the individuals with no PTSD replicating the results found in Stein et al. (1997). However, these studies did not directly address subthreshold PTSD.

The point to emphasize from the studies to date is that subthreshold PTSD, despite its varying operational definitions and temporal differences (Schutzwohl & Maercker, 1999), is about as prevalent as full PTSD and is indeed associated with substantial psychological and social impairment.

The second point and the main thrust for the present study is that to the best of this author's knowledge only three previous investigations (i.e., Asmundson et al., 2003; Marshall et al., 2001; Zlotnick et al., 2002), cited and addressed comorbidities while noting subthreshold PTSD in their samples. This is key because the level of impairment in the other studies may not be attributable to PTSD alone. High rates of comorbid disorders have been observed with PTSD (Breslau, Davis, Andreski, & Peterson, 1991; Breslau, Davis, Peterson, et al., 2000; Helzer et al., 1987; Kessler et al., 1995; Kulka et al., 1990; Kulka, Schlenger, Fairbank, Marmar, & Weiss, 1991). These studies of

trauma survivors consistently show that PTSD is associated with increased psychiatric morbidity and associated impairment.

Comorbidity and Impairment

Since the identification of PTSD as a diagnosable syndrome (APA, 1980), numerous studies have demonstrated a high degree of associated impairment and disability in civilian and veteran populations with PTSD (Asmundson, Stein, et al., 2002; Beckham et al., 1997; Beckham et al., 1998; Blanchard, Buckley, Hickling, & Taylor, 1998; Blanchard, Hickling, et al., 1996; Brady, 1997; Breslau et al., 2000; Brown & Wolfe, 1994; Clum, Calhoun, & Kimerling, 2000; Ferrada-Noli, Asberg, Ormstad, Lundin, & Sundbom, 1998; Kang et al., 2003; Litz, Orsillo, et al., 1997; Marshall et al., 2001; Mehlum & Weisaeth, 2002; Neal et al., 1995; Riggs, Byrne, Weathers, & Litz, 1998; Sabin et al., 2003; Schnurr & Spiro, 1999; Sharp & Harvey, 2001; Sherman, Turk, & Okifuji, 2000; Wagner, Wolfe, Rotnitsky, et al., 2000; Westerink & Giarratano, 1999). Epidemiological and clinical research (chiefly with combat veterans) suggests that PTSD co-occurs with some other Axis I disorder in 60 to 100 percent of cases (Helzer et al., 1987; Saigh, 1992).

In the National Comorbidity Study (Kessler et al., 1995), 88.3 percent of men and 79 percent of women with a lifetime history of PTSD met criteria for at least one other disorder. Numerous investigations using varying models document the association between PTSD symptoms and poor health in civilians and veterans (for reviews see Kang et al., 2003; Resnick, Acierno, & Kilpatrick, 1997; Schnurr & Jankowski, 1999). PTSD symptoms are associated with greater reporting of physical health problems and symptoms (Beckham et al., 1998; Engel, Liu, McCarthy, Miller, & Ursano, 2000; Kimerling, Clum, & Wolfe, 2000; Wagner et al., 2000; Zatzick, Marmar, & Weiss, 1997). They are also strongly associated with current pain and pain-

related disability (Beckham et al., 1997), poorer functional outcomes (Kimerling et al., 2000; Wagner et al., 2000), and increased healthcare consumption (Marshall, Jorm, & Grayson, 1998). For veterans, these findings appear to hold irrespective of location of the trauma (e.g., Vietnam, Bosnia, The Persian Gulf, Somalia, Armenia, United States) or circumstances (disaster, peacekeeping, combat).

Marshall et al.'s (2001) study of a large community sample found that the higher the rates of impairment, the higher the numbers of PTSD symptoms. Nearly 28 percent of the respondents in Marshall et al.'s (2001) study had at least one PTSD symptom, and they found that the rates of comorbidity, impairment, and suicidality were both statistically and clinically significant in the symptomatic groups. For example, the rates of impairment, comorbid anxiety disorder, and comorbid depression were 31.5 percent, 68.5 percent and 90.7 percent higher, respectively, among respondents with four PTSD symptoms than those subjects with no PTSD symptoms. Marshall et al.'s (2001) finding of high comorbidity in subthreshold PTSD (average of 2.7 other diagnoses) extends the findings of Kessler et al. (1995) in which 43 percent of men and 59 percent of women who met full criteria for PTSD also met criteria for three or more disorders.

Depression and Alcohol Problems Associated with PTSD

The extent to which the functional status of individuals with PTSD is influenced by comorbid depression and alcohol use has received recent empirical attention. The single most common comorbid diagnosis is some form of substance abuse or dependence, (e.g., 26.2 percent for alcohol abuse and 34.3 percent for drug abuse, Kessler et al., 1995). The theory behind this finding is that substance abuse or dependence serves to subdue intrusive cognitions, promote sleep, or lower arousal states (Keane, Gerardi, Lyons, & Wolfe, 1988).

PTSD is also frequently associated with the occurrence of depression; for example, 47.9 percent in a sample of Vietnam veterans (Kessler, et al., 1995). Similar findings were replicated more with more recent investigations (Blanchard et al., 1998; Breslau et al., 2000; Mollica, McIness, & Sarajliac, 1999; Shalev et al., 1998) and with increased alcohol consumption (Bray, Fairbank, & Marsden, 1999; Brown & Wolfe, 1994; Grice, Brady, & Dustan, 1995; Mehlum, 1998; Zlotnick et al., 1999). In female victims of sexual assault with chronic PTSD, the adverse effects of PTSD extend beyond those accounted for by depressive symptoms (Zoellner, Goodwin, & Foa, 2000). Others, however, have found that it is the combination of PTSD and depressive symptoms that yields the poorest functional outcomes, whether in Bosnian refugees living in Croatia (Mollica et al., 1999) or young female victims of sexual assault (Clum et al., 2000).

The studies of Clum et al. (2000), Mollica et al. (1999), and Zoellner et al. (2000) provide a foundation from which to expand testing of individual and combined influences of PTSD symptoms and related factors on health status. There have, to the best of this author's knowledge, been only three empirical investigations of this done with samples similar to the one used in this study. Features of these studies are summarized in Exhibit 2.

In the first investigation, Schnurr and Spiro (1999) used path analysis to test the extent to which smoking and alcohol abuse account for the relationship between PTSD symptoms and self-reported physical health in older male veterans who served in WWII or Korean conflicts. Their results indicated that: (1) PTSD had a direct influence on physical health status, (2) smoking had a small but significant direct influence on health status, (3) alcohol use was unrelated to health status, and (4) neither smoking nor alcohol abuse mediated the relationship between PTSD symptoms and health status. This study's findings are limited by the non-

Exhibit 2

Summary of Recent PTSD Studies that Test Morbidity and Related Issues of Health Status.

Study	N	Method	Outcome Measure	Concept Measured	Purpose
Schnurr & Spiro (1999)	921 Male peacekeepers	Path analysis	Mississippi Scale for Combat-related PTSD, the Combat Exposure Scale, CAGE, dichotomous questions (yes/no) on smoking behavior, & the SF-36 Questionnaire for general physical health	Smoking and alcohol abuse	Test the extent to which smoking and alcohol abuse account for the relationship between PTSD symptoms and self-reported physical health
Asmundson, Stein, & McCreary (2002)	1187 Male peacekeepers	Structural Equation Modeling (SEM)	Posttraumatic Stress Disorder Checklist (PCL-M) and Quantity & Frequency Index of Alcohol Use	Depression and Alcohol Abuse	Test the relationship of PTSD and health status through the mediating effects of depression & alcohol abuse
Asmundson, Wright, McCreary, & Pedlar (2003)	Study 1: 400 Male peacekeepers Study 2: 768 Male peacekeepers	Confirmatory Factor Analysis	PCL-M and General Health Status Questionnaire (GHQ)	Chronic Pain	Compare competing models of PTSD symptom structure through the mediating effects of chronic pain

experimental nature of the data. As is the case with perhaps all studies of PTSD, it did not provide concrete evidence that PTSD *causes* poor health. However, Schnurr and Spiro (1999) suggest that PTSD has a noteworthy association with subsequent health status and therefore provides important conceptual information for the current study.

The second study, by Asmundson, Stein, et al. (2002), used structural equation modeling (SEM) to address the issue of the relationship between PTSD and health status in UN and NATO peacekeepers, with consideration for the potential mediating effects of depression and alcohol use. They used multivariate SEM to evaluate the predictions that: (1) PTSD symptoms directly influence health status, (2) PTSD symptoms indirectly influence health status through their effects on depression, and (3) PTSD symptoms indirectly influence health status through their effects on alcohol consumption. Their results indicated that PTSD directly explained 11 percent of the variability in poor health, and participants that had previously deployed on peacekeeping missions were significantly more depressed, drank more and more heavily, and perceived their health to be poorer than non-deployed participants. Deployed participants also scored significantly higher on all subscales of the Posttraumatic Stress Disorder Checklist-Military Version (PCL-M) than did the non-deployed participants (Asmundson, Stein, et al., 2002). Asmundson, Stein, et al. (2002) had several limitations. First, predictions were evaluated by determining the extent to which they were consistent with existing data, rather than experimental manipulation. This is a major limitation of the SEM approach. The second major limitation of the study was that measures used were not sufficient to draw conclusions about PTSD, major depressive disorder, or alcohol use /dependence, although the purpose of this study was to evaluate signs and symptoms rather than psychiatric diagnoses.

The third study, by Asmundson et al. (2003), used confirmatory factor analysis (CFA) to determine the association of PTSD symptom structure with chronic musculoskeletal (e.g. chronic neck and back) pain. In two studies, they found that PTSD symptoms in their sample could be adequately conceptualized using either a hierarchical two-factor or four-factor inter-correlated model. Chronic pain has a minimal influence on overall factor structure and can be predicted from PTSD. The four clusters of PTSD symptom structure were statistically supported by this study, although there were some notable methodological limitations. The determination of chronic pain was limited to a few self-report questions regarding pain and chronicity and may not thoroughly delineate what aspects of the chronic pain experience are clearly related and predictive of PTSD symptom structure. However, the findings of the third study do have heuristic value. The significance of the findings with respect to the current study is the evidence in the factor analysis suggesting that the PTSD symptom clusters outlined in current diagnostic criteria (APA, 2000) may not provide the best conceptualization of PTSD symptom structure. Asmundson, et al.'s (2003) study, along with other studies by Buckley, Blanchard, and Hickling (1998), King, Leskin, King, and Weathers (1998), and Taylor, Kuch, Koch, Crockett, and Passey (1998) lends itself to the taxonomic debate pertaining to PTSD. While this study will not directly focus on the delineation between full versus subthreshold PTSD, it will look at the clinical relevance of subthreshold PTSD as an influence on other mental health problems.

A study by McQuaid, Pedrelli, McCahill, and Stein (2001) supports empirical investigation of subthreshold PTSD as a predictor of comorbid psychiatric problems. They studied respondents with trauma histories associated with assault and found that some 86 participants not diagnosed with full PTSD with trauma histories were diagnosed with major

depressive disorder (MDD), (8.3-13.9 percent) including 5.3 percent with subthreshold PTSD and another 1.5 percent with lifetime PTSD.

In summary, the presence of psychiatric comorbidity is another issue that poses a problem for the current conceptualization of PTSD as a normative response. As noted the prevalence of comorbid conditions has been investigated with a number of traumatized groups with PTSD. Earlier this study presented evidence of temporal differences associated with the onset of PTSD. Therefore, there may be a discrepancy in the number of months following a traumatic event prior to the onset of full PTSD, yet the empirical evidence of comorbidity suggests current impairment in various samples (Green, Lindy, Grace, & Leonard, 1992; de Girolamo & McFarlane, 1996). Regardless, the findings of those studies suggest that it is the exception rather than the rule for individuals to meet full diagnostic criteria for PTSD and not have some kind of secondary pathological process occurring (Friedman & Yehuda, 1996).

Subthreshold PTSD and Comorbidity: Empirical Evidence

It is one thing to point out that previous studies show that subthreshold PTSD exists and is prevalent (indeed as prevalent as full PTSD) (Asmundson, Stein, et al., 2002; Asmundson et al., 2003; Marshall et al., 2001; Stein et al., 1997; Zlotnick et al., 2002); but it is another to demonstrate that it is meaningful from an empirical standpoint (Stein et al., 1997). Stein et al. (1997) mentions that no studies show that subthreshold PTSD rivals full PTSD in terms of the disabling affects associated with other psychiatric problems, and their study did not address comorbidity. They did, however, find that persons with subthreshold PTSD had significantly greater occupational problems than those with mild or no trauma histories. Since it is known from a recent epidemiological survey that approximately 80 percent of individuals with PTSD

meet criteria for at least one other psychiatric diagnosis (Brady, 1997) a brief review of the empirical literature comparing PTSD to depression and alcohol problems follows.

Even when studying full PTSD, there remains a need for research on comorbid conditions with certain traumatized populations (Saigh & Bremner, 1999). Numerous empirical studies observed the deleterious effects of combat-related PTSD and full PTSD to broadly studied areas of social, functional and psychiatric morbidity (Bleich, Koslowsky, & Lerer, 1997; Brady, 1997; Carey, Stein, Nompumelelo, & Seedat, 2003; Ferrada-Noli et al., 1998; Forbes et al., 2003; Giaconia et al., 2000; Helzer et al., 1987; Kozaric-Kovacic & Kocijan-Hercigonja, 2001; MacDonald, Chamberlain, Long, & Mirfin, 1999; MacDonald, Pereira-Laird, Chamberlain, Mirfin, & Long, 1998; Mehlum, 1998; Schnurr, Friedman, & Rosenberg, 1993; Shalev et al., 1998; Stein & Kennedy, 2001; Zatzick et al., 1997). PTSD is distinctive among psychiatric disorders in terms of its effect on health and warrants continued research with populations susceptible to traumatic exposures.

Veterans

Veterans are arguably the most studied population with respect to PTSD. In samples of veterans, posttraumatic stress disorder is often associated with considerable comorbidity, most frequently depression, anxiety, and alcohol and substance use (Forbes et al., 2003). In a recent study of combat veterans, Kozaric-Kovacic and Kocijan-Hercigonja (2001), found that of 237 soldiers, 78 (32.9 percent) had MDD, 76 (32.0 percent) had dysthymia, 146 (61.6 percent) abused alcohol, and 25 (10.5 percent) abused drugs. The Kozaric-Kovacic and Kocijan-Hercigonja (2001) findings pertaining to alcohol abuse replicate three past studies cited by Meisler (1996) of outpatient veterans in which 60-80 percent (Keane, Gerardi, et al., 1988) and 44 percent (n= 5,338) met criteria for alcohol abuse (Fontana, Rosenheck, Spencer, & Gray,

1995). And, in a study of in-patient veterans, 91 percent met the lifetime criteria for substance abuse disorder (Boudewyns, Woods, Hyer, & Albrecht, 1991). Kulka et al. (1990), using the NVVRS epidemiologic data reported that 73 percent of veterans with PTSD met criteria for lifetime alcohol abuse or dependence. These somewhat different, yet high prevalence rates may reflect the differences in populations and assessment methodologies.

Peacekeepers

It is known that the evidence of comorbidity in subjects with PTSD differs in different types of investigations (Green, 1994). For peacekeepers, just as with the aforementioned studies of combat-related PTSD, the nature of service in dangerous military operations seems to have comparable effects in terms of escalating alcohol and depression problems following such missions (Mehlum, 1998; Thoresen & Mehlum, 1999). Mehlum (1998) reported that nearly one half of 1,624 veterans sampled reported that their alcohol consumption increased. In a peacekeeping study from New Zealand, increased psychological distress was reported only months after the deployment (MacDonald et al., 1999). More specifically, Asmundson, Stein, et al. (2002) and Boisvert, McCreary, Wright, and Asmundson (2003) found that Canadian peacekeepers demonstrated greater amounts of depression and poorer health after deployment. In a study of 15,931 Norwegian U.N. peacekeepers serving in Lebanon from 1978-1991, mortality due to suicide increased by 43 percent (Thoresen & Mehlum, 1999). One interpretation of these results is that stress factors and socially disintegrative processes, such as alcohol abuse, might produce depressive problems associated with suicide. This theory is also supported in a study of refugees with PTSD in which 57 percent of 117 PTSD cases engaged in suicidal behavior (Ferrada-Noli et al., 1998). In another study, veterans with 100 percent lifetime PTSD and 87 percent current PTSD had extensive comorbidity with MDD, most

prevalent 95 percent lifetime, 50 percent current, respectively, (Bleich et al., 1997). In summary, therefore, the likelihood of comorbidity with psychiatric disorders, such as depression and alcohol problems, is significantly increased with lifetime PTSD. Accurate assessment of comorbidity may depend on empirical evaluation of subthreshold PTSD for optimal soldier sustainment and optimal psychotherapeutic and pharmacotherapeutic treatment (Vonk, 2002).

The results of this study will provide organizational planners, researchers, policy makers and health care administrators and clinicians with additional knowledge that can be incorporated into government doctrine, occupational and operational stress prevention activities and veterans' treatment programs. In order to make this study applicable to organizations outside the military the model used to study peacekeeping stress had to be addressed.

The unique aspect of this study is the model. With increasing data suggesting peacekeepers may incorporate significant exposure to traumatic events, researchers have identified specific models of peacekeeping stress (Weisaeth, 1994. Lamerson & Kelloway, 1996). However, these models do not consider that other variables have impacted on the peacekeeper's level of trauma and are not easily applied to other traumatized populations. This study proposes a model that could compare depression and alcohol problems on subthreshold PTSD and full PTSD in any traumatized population.

Conceptual Model for the Study

The elements of social learning theory established the conceptual foundation for a model that explains how alcohol and depression problems could be compared on subthreshold PTSD. The variables identified and compared in the model (represented in Figure 1) were analyzed and defined in the literature review. Cognitive-behavioral formulations of PTSD include the cognitive element of "meaning" of the traumatic event. Foa et al., (1989) posited that the

etiological variable that distinguishes PTSD from other anxiety disorders is the attribution of dangerous meaning to stimuli that were previously associated with safety. Kolb (1988), drawing on classical and operant models, highlighted the importance of the conditioned emotional response (CER). He identified an elicited acute response to the perceived life-threatening event as the key ingredient in the development of PTSD. The intense and repeated exposure to such a stimulus, either real or perceived to be real, leads to psychophysical responses, including symptoms of each PTSD cluster per the DSM-IV-TR (APA, 2000). The trauma victim's cognitive protective mechanisms are assumed to completely break down (Kolb, 1988). When this breakdown occurs, PTSD results from over-stimulation of the neuronal networks in the limbic system. However, Kolb's model does not suggest the possibility of partial breakdowns in cognitive functioning resulting in subthreshold impairment.

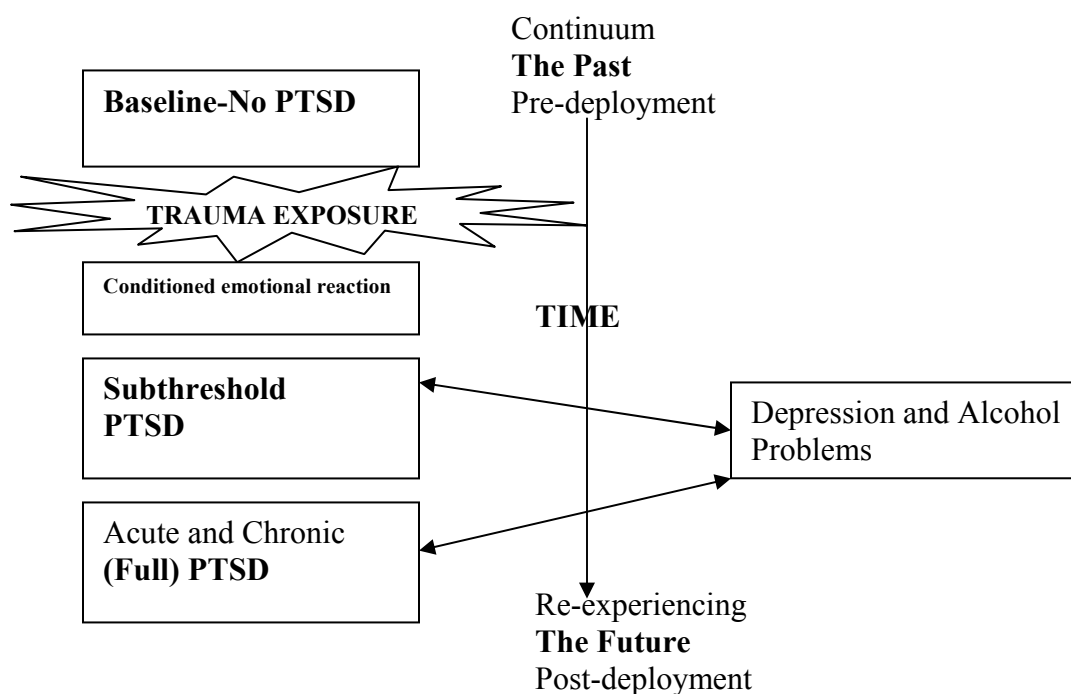


Exhibit 3 Conceptual Model of Subthreshold PTSD as a Predictor of Depression and Alcohol Problems.

This investigation is examining the possibility that there are degrees of thresholds of response to a traumatic event. Using the theoretical framework of CER in the behavioral model of stress and accounting for individual difference, it would appear that there are different behavioral degrees of readiness to respond to trauma. Behaviorally, these differences are accounted for by levels of hyperarousal, preparedness to respond, and altered appraisal processes to include threat appraisal. Therefore, some people who have subthreshold responses over time are impaired as damage as is done to cognitive defense structures. Evidence of impairment may manifest as alcohol problems, depression, or other affective disorders. With time and repeated exposure to harmful stimuli associated with the critical event, these individuals could develop full PTSD.

Initial Research Ideas and Concerns

Psychological trauma is a theoretical concept. Reviewing literature has revealed to this investigator that three overarching thoughts should be considered in peacekeepers and from which a hypothesis can be derived.

- 1) Is a peacekeeper's extent of physical or psychological impairment related to the level or extent of trauma?
- 2) Do posttraumatic stress symptoms influence affect and behaviors such as drinking alcohol?
- 3) Are the ways in which full and subthreshold posttraumatic stress symptoms are exhibited in peacekeepers significant in terms of overall clinical impairment when compared with depressive and alcohol-related problems?

Theoretical hypothesis: there will be a (positive relationship) between the peacekeeper's degree (subthreshold) of posttraumatic stress and the degree of impairment as exhibited by level of depression and hazardous drinking.

Exhibit 4

Operationalization

1. Concept name for Y-Degree of Hazardous drinking	1. Concept name for Y-Degree of Depression	1. Concept name for X-Subthreshold PTSD
2. Explication: Theoretical definition of hazardous drinking. "Drinking that causes direct negative consequences on mental health or physical health or social or occupational functioning." (Babor, de la Fuente, & Saunders, 1992).	2. Explication: Theoretical definition of depression. Affective instability marked by depressed mood most of the day, diminished interest in pleasure, weight loss, insomnia, psychomotor agitation, fatigue, guilt, & poor concentration (APA, 1994).	2. Explication: Theoretical definition of symptoms of posttraumatic stress. Symptoms are grouped into three clusters, including re-experiencing the event, avoidance and emotional numbing, and hyperarousal. To meet the diagnosis for PTSD a person must have a certain number of symptoms from each cluster per the DSM-IV-TR and an exposure to a traumatic event (APA, 2000). Subthreshold PTSD occurs when two out of three diagnostic criteria are met for PTSD and one of those clusters is for re-experiencing.
3. Empirical definition: Alcohol Use Disorders Identification Test (AUDIT) (Babor et al., 1992), measures quantity & frequency of alcohol consumption, harmful drinking, & hazardous drinking.	3. Empirical definition: Center for Epidemiologic Study of Depression Scale (CES-D) (Radloff, 1977), is "designed to measure current level of depressive symptomatology, with emphasis on affective component, depressed mood" (p.385).	3. Empirical definition: The Posttraumatic Stress Disorder Checklist –Military Version (PCL-M), Weathers, Litz, Herman, Huska, and Keane (1993), measure symptom severity in relation to military experiences and used to determine diagnosis.
4. Rules of correspondences: The theoretical concept of hazardous drinking is abstract in number two and does not become observable until the use of the AUDIT in number three, which quantifies the signs and characteristics of hazardous alcohol use. Therefore there is a logical flow between numbers two and three. No mixing of theoretical and empirical definition occurs. Intra-scale scale reliability ranges from .80-.98 internationally, King & Bordnick (2002).	4. Rules of correspondence: The theoretical definition is abstract only and the empirical definition is observable until the use of the CES-D, which has been widely used to assess depressive symptoms in community populations of varying age, sex, ethnicity, and language. Therefore there is a logical flow between numbers two and three. No mixing of theoretical and empirical definition occurs. Radloff (1977) reported internal consistency of items of the CES-D ($\alpha = .84$)	4. Rules of correspondence: The concept of posttraumatic stress and its defining symptoms remains abstract in number two and do not become observable until the use of the PCL-M scale in number three, which quantifies those symptoms. Therefore there is a logical flow between numbers two and three, but no mixing of theoretical and empirical definitions occurs. The internal consistency reported was $\alpha = 0.97$ (Weathers et al. 1993).

<p>5. From September – November 1999, 1968 Veterans of Canadian peacekeeping operations were surveyed as part of a Veterans Health Care Needs Survey to address needs and gaps in health care delivery services within Veterans Affairs Canada. All respondents were assured of confidentiality and remained anonymous.</p>	<p>5. From September – November 1999, 1968 Veterans of Canadian peacekeeping operations were surveyed as part of a Veterans Health Care Needs Survey to address needs and gaps in health care delivery services within Veterans Affairs Canada. All respondents were assured of confidentiality and remained anonymous.</p>	<p>5. From September – November 1999, 1968 Veterans of Canadian peacekeeping operations were surveyed as part of a Veterans Health Care Needs Survey to address needs and gaps in health care delivery services within Veterans Affairs Canada. All respondents were assured of confidentiality and remained anonymous.</p>
---	---	---

Exhibit 4 above describes the variables of interest for this study. It demonstrates the process by which each construct moves from the abstract to the observable and measurable. This conceptualization and operationalization process lends itself to the formulation of hypotheses and the development of methodology.

Hypotheses

Based upon the literature review and the conceptual model depicted in figure 1, the following hypotheses are proposed:

Hypothesis 1

In general, groups of peacekeepers with full, subthreshold or no PTSD will score differently when compared on the AUDIT. Specifically, full and subthreshold PTSD will be show statistically significant mean differences from the no PTSD group when compared on the AUDIT for alcohol use disorders.

Hypothesis 2

In general, groups of peacekeepers with full, subthreshold or no PTSD will score differently when compared on the CES-D. Specifically, full and subthreshold PTSD will be show statistically significant mean differences from the No PTSD group when compared on the CES-D for depressive symptoms.

Hypothesis 3

In general, groups of peacekeepers with full PTSD will have the highest mean scores on the outcome measures, those with no PTSD will have the lowest mean scores on the outcome measures, and those with subthreshold PTSD will score between the previous two groups.

Potential implications: Subthreshold PTSD veterans may represent an untreated population who without intervention will have increased medical problems, impacting military, veterans, and civilian health care systems. The main function of the analysis will amount to comparing the data pertaining to PTSD status, which will take into account the extent to which subthreshold PTSD impacts alcohol use and depression. The following are the variables whose relationships will be tested using an analysis of variance (ANOVA).

y Independent variable (PTSD status) x Dependent variables (Depression, alcohol problems).

The results on the PCL-M will show that peacekeepers with subthreshold PTSD will evidence a higher degree of impairment on the CES-D and AUDIT than peacekeepers failing to meet criteria for subthreshold or full PTSD and that the degree of impairment in the subthreshold PTSD group will parallel those in the full PTSD group.

Summary

A growing body of literature addressing the issue of subthreshold posttraumatic stress disorder (PTSD), often referred to as “partial” or “sub-clinical PTSD,” has appeared in recent years. However, only a small portion of this growing literature base represents empirical investigations of subthreshold PTSD and its implications. Further, the reliance on the categorical and diagnostic models of psychiatric disorders has led to a lack of investigations into the study of the posttraumatic sequelae that fall short of full criteria for PTSD. Next to the number of symptoms as the main criterion for defining a subthreshold disorder, this investigation seeks to

compare the extent of impairment, considered the most salient criterion for assessing a subthreshold posttraumatic stress disorder. Substantial disability via depression and alcohol use, as well as a great need for health care, is well studied in veterans with PTSD, but these associations are not well studied in the subthreshold population. Few studies have examined the role of comorbidity and impairment in veterans with subthreshold PTSD.

A problem with reliance on a “taxometric” (Ruscio et al., 2002) or categorical model of psychiatric disorders is that scant attention is given to disability and impairment in individuals with PTSD symptom presentations that fall short of meeting full criteria. Subthreshold PTSD may result from partial recovery from the full syndrome or from the onset of symptoms after a traumatic experience. For methodological reasons, clinical trials and epidemiological studies rarely examine subthreshold PTSD (Pincus et al., 1999). One of the reasons sub-clinical PTSD is rarely studied is that data is often abandoned when they do not meet diagnostic thresholds, before it can be determined if there is any clinical relevance (Card, 1987).

The purpose of the present study is to investigate whether or not PTSD status (full, subthreshold or No PTSD) impacts variables pertaining to health status, specifically by observing the extent of alcohol use disorders and depressive symptoms in a sample of Canadian veterans.

This study is one of the first to investigate of the extent that psychological problems are impacted by subthreshold PTSD and the first to look at comorbidity with subthreshold PTSD in a military population. Marshall et al. (2001) and Stein et al. (1997) both note that the conspicuous paucity of literature on comorbidity has limited the interpretation of findings in subthreshold PTSD to date. This investigation suggests that comorbidity is common and the knowledge base

of psychiatric comorbidity can be improved upon by observing the effects of subthreshold PTSD versus full PTSD.

CHAPTER III

METHODOLOGY

Introduction

This dissertation attempts to answer the primary research question: “to what extent are depression and alcohol problems affected by PTSD status?” This investigation is based on secondary analyses of data from a study conducted by research personnel in the Veterans’ Care Needs Project using a sample of Canadian Forces personnel. The following research was made possible with permission from the Department of National Defense Canada and the Research Directorate of Veterans Affairs Canada, Prince Edward Island. The Veterans Affairs Canada provided access to the data contained within this investigation. The information used was extracted from a survey conducted in September through December 1999 by the Review of Veterans’ Care Needs project, Veterans’ Affairs Canada.

Overview

At the end of the twentieth century the VAC client base had changed, with the number of Canadian Forces (CF) pensioners increasing annually for eight years by 9 percent. To address the needs of CF personnel, a mail-out survey was conducted in 1999 as part of the Veterans’ Care Need Project.

Sampling

The dataset received from the VAC contained 1968 observations (1856 male, 112 female veterans) consisting of 411 variables from a questionnaire given to Canadian military personnel in Fall 1999. This survey was restricted to VAC CF pensioners living in Canada and was

originally conceptualized to address gaps in support and services. Creativ+, a Montreal based firm, performed general tabulation of the initial survey data, which was available in a November 1999 report entitled “Overview of VAC’s CF Clients Care Needs.” Creativ+ reported a response rate of 72 percent, and 96 percent of the respondents filled out the questionnaire on their own. This response rate would be considered acceptable by most standards (Fink, 1995). As in most surveys, it is possible that those who did not respond to the survey differed in some meaningful way from those who did respond. However, given that the proportion of non-responders was acceptably small and that there was no apparent restriction in range in responses to survey questions, the current sample of respondents will be considered, for the purposes of this study, to be representative of the VAC CF population in general (Asmundson, 2000). In-depth analyses of the survey data will be conducted to determine if the needs of veterans with PTSD or its subthreshold forms are being met by evaluating extent of depressive symptoms and alcohol use. Overall, this voluntary questionnaire solicited information about socio-demographic status and military service and how the physical and mental health care needs of the veterans were being met.

Methods and Design

In 1999, a Canadian Survey Analysis collected data on 1968 Regular Forces Canadian soldiers. Co-morbid depression and alcohol use will be compared for individuals with no PTSD, sub-threshold PTSD, and full PTSD using pre-existing secondary Canadian Regular Forces data without identifying information on its subjects. An analysis of variance will examine the relative contribution of PTSD status by identifying mean differences on co-morbid health concerns such as depression and alcohol use.

Instruments Used in Data Collection

The survey. The survey that was used in the assessment of the VAC's Canadian Forces client care needs was comprised of numerous questionnaires either created specifically for the assessment or drawn and adapted from a variety of sources. The domains below summarize the survey items: (A) Military Service; (B) Demographic Information; (C) Mobility and Transport; (D) Health Status; (E) Employment Status and Career Issues; (F) Release and Retirement Planning, and (G) a "Wrap Up" of items not covered in the statistical analyses.

Instrumentation. The Veterans Care Needs Survey contained the instruments used in this study as they appeared in the Canadian mail-out questionnaire (Appendices B-D). The overall survey was designed to be a multi-dimensional investigation measuring a soldier's experience since entering VAC care with the aforementioned domains, to include deployment stressors and number of deployments/peacekeeping missions. Other pertinent demographic information was collected to include age, gender, education level, marital status, location of residence, military occupation (MOC), current military status, and length of time in service in years.

For the purposes of this study, only selected variables were described. The variable from which data on subthreshold PTSD observed is (ptsda). (PTSDa) served as the independent variable for the ANOVA and depression (CESD) and alcohol problems (AUDIT1), were the dependent variables. Selected demographic variables from the 411 variables in the dataset were evaluated as potential confounding influences on the outcome measures during the analysis. Military demographic variables such as, rank, service status, years of services and number of deployments were selected because it is possible that the nature of a peacekeeper's service could influence his/her mental and physical health status. Other demographic variables known to impact mental health status, such as age, language/ethnic background, income level, marital

status and years of marriage were selected because each of these could create individual differences in the peacekeeper's responses. For conceptual clarity, the above summary variables created the framework from which a respondent's health in that particular domain was determined, e.g. having full PTSD versus having subthreshold PTSD or not having PTSD at all.

Study Scales

One of the objectives of this study is to determine the study sample prevalence or percentage of peacekeepers with full or subthreshold PTSD, depression, and alcohol problems. The instruments used to define cases of PTSD, depression and alcohol problems were the *Posttraumatic Stress Disorder Checklist-Military Version, PCL-M* (Weathers et al., 1993), the *Center for Epidemiologic Studies-Depression Scale, CES-D* (Radloff, 1977), and the *Alcohol Use Disorders Identification Test, AUDIT* (Babor et al., 1992). A description of each of these scales will occur in detail. The corresponding published psychometric properties will be discussed. The psychometric properties for the questionnaires and/or survey items for the sample data, methods for scoring the questionnaires, an outline of normative data, and cutoff scores indicative of clinical states is presented. The measures used helped the VAC identify the various health-related problems in their community of veterans. For health care providers, such as social workers, instruments such as the PCL-M, the CES-D, and the AUDIT aid in the identification of individuals at risk for psychiatric morbidity (King & Bordnick, 2002).

Posttraumatic Stress Disorder Checklist-Military Version (PCL-M)

Scale Description

This scale is an adult self-report and is available through the National Center for PTSD: http://www.ncptsd.org/publications/assessment/adult_self_report.html.

Purpose. According to Weathers et al. (1993), the PCL can be used to assess symptom severity or to determine a PTSD diagnosis. The PCL is a 17 item self-report checklist of PTSD symptoms based closely on the DSM-IV criteria. Slight variations can be made in the wording of PCL items in order to adapt the scale to a population of interest. For example, the military version of the PCL (PCL-M) assesses PTSD symptoms in relation to military experiences. It is this version that was used in the 1999 survey of VAC clients. The instrument's flexibility is in recognition of a need for a valid instrument that could be modified rapidly for use with various traumatized groups. This is important in being able to assess traumatized individuals in a host of different environments and also to allow for assessments of clients in institutions making program changes.

Subscales. Indicators derived from the questionnaire measure PTSD symptoms. The standard procedure for determining PTSD is to compute the questionnaire's subscales. The three subscales of the PCL-M are re-experiencing, avoidance/numbing, and hyperarousal. Accordingly, subthreshold PTSD also will be analyzed from these subscales and will be defined by groupings of respondents that meet the requirements for PTSD in two of three subscales (re-experiencing plus one other).

Scoring. PTSD symptom severity scores are determined by summing the participants' answers to all 17 items. Respondents rate each item from 1 ("not at all") to 5 ("extremely") to indicate the degree to which they have been bothered by that particular symptom over the past month. Thus, total possible scores range from 17 to 85. Weathers et al. (1993) recommended that, when the instrument is used as a continuous measure, a cut-off score of 3 or more for each item is the most appropriate (Forbes, Creamer, & Biddle, 2001). Consistent with the DSM-IV

criteria, persons who score greater than or equal to 3 on at least one Criteria B item (items 1-5; note that the ordering of several questions on the VAC CF survey was changed from the original PCL-M such that Criteria B [items corresponded with items 39 (a), (b), (c), (d), and (o)], 3 Criteria C items [items 6-12 corresponding to 39 (p), (q), and (e), (h) through (i)], and 2 Criteria D items [(items 13-17 corresponding to 39 (j) and (k) through (n)] are classified as having PTSD (Asmundson et al., 1998; Asmundson, 2000). On the PCL-M, the regular forces data has “excellent” internal consistency ($n = 1573$), $\alpha = 0.95$, according to generally accepted practices (Nunnally & Bernstein, 1994; Pedlar, 2003).

Cutoff scores. Weathers et al. (1993) suggested a cutoff score of 50 as a good predictor of PTSD diagnoses when using the PCL as a continuous measure. This recommendation is based on their findings with a sample of Vietnam veterans. However, Blanchard, Jones-Alexander, et al. (1996) suggested a cutoff score of 44 would improve the overall diagnostic efficiency of the PCL in their sample of motor vehicle accident victims. Determining the cutoff for this study and consequently what constitutes subthreshold PTSD will be discussed shortly.

Normative data. None published.

Psychometric properties. The creators of the scale initially validated the psychometric properties of the PCL-M with a sample of male Vietnam veterans ($n=123$). All of these respondents completed the scale on two occasions within a 3-day time span. These authors additionally reported psychometric information on a slightly modified PCL for Operation Desert Storm experiences rather than non-specific deployment experiences. The latter sample consisted of Persian Gulf veterans ($n=1006$). Blanchard, Jones-Alexander, et al. (1996) administered the PCL civilian version to a sample of mostly female respondents ($n=40$). In the first study the test-

retest reliability was .96, $\alpha = 0.93$ for Criteria B symptoms, $\alpha = 0.92$ for Criteria C symptoms, $\alpha = 0.92$ for Criteria D symptoms, with an overall $\alpha = 0.97$ for all items (Weathers et al. 1993). For the second study, $\alpha = 0.90$ for Criteria B symptoms, $\alpha = 0.89$ for Criteria C symptoms, $\alpha = 0.91$ for Criteria D symptoms, and $\alpha = 0.96$ for all items (Weather et al. 1993). Blanchard, Jones-Alexander, et al. (1996) reported similar internal consistency values for the third study (Asmundson, 2000). Consistent with the instrument's purpose, respondents who were subsequently diagnosed with PTSD based on formal diagnostic interviews scored significantly higher on the PCL-M than those who did not receive the PTSD diagnosis (Weather et al. 1993). According to Asmundson (2000), this is evidence of good contrasted-groups validity. Asmundson (2000) also noted the PCL-M has sound convergent validity. Strong correlations have been shown between the overall PCL-M and other scales designated to measure PTSD (i.e. $r = 0.93$ with the Mississippi Scale for Combat-related PTSD (Keane, Caddell, & Taylor 1988); $r = 0.77$ with the PK scale of the MMPI-2; $r = 0.90$ with the Impact of Events Scale (Horowitz, Wilner, & Alvarez, 1979).

The diagnostic efficiency of the PCL-M was determined by comparing it to diagnoses utilizing the Structured Interview for DSM (SCID) (Spitzer, Williams, Gibbon & First, 1992). A cutoff score of 50 on the PCL-M yielded a sensitivity of 0.82, specificity of 0.83, and a $\hat{K} = 0.64$ (Weathers et al., 1993). Blanchard, Jones-Alexander, et al. (1996) noted the overall PCL score correlated significantly with the Clinician Administered PTSD Scale (CAPS) $r = 0.93$ (Blake et al., 1995). With the cutoff score of 50 recommended by Weather et al. (1993), the PCL had a sensitivity of 0.78, a specificity of 0.86, and an overall diagnostic efficiency of 0.83. Using the cutoff score of 44, the PCL posted a sensitivity of 0.94, a specificity of 0.86, and an overall diagnostic efficiency of 0.90.

Operationalizing Sub-threshold PTSD from the PCL-M

The literature suggests that cutoff scores based on the Posttraumatic Stress Disorder Checklist-Military Version (PCL-M) can be used to accurately predict respondents who are likely to meet diagnostic criteria for posttraumatic stress disorder (Asmundson, 2000). However, Asmundson (2000) found that these cutoff scores do not take into account the requirement for diagnosing the “clinical state” of PTSD, meaning that certain DSM symptom criteria be met. More specifically, the DSM-IV-TR (2000) requires, in addition to exposure to or perception of an event that is deemed traumatic, the presence of at least 1 of 5 re-experiencing symptoms (i.e., nightmares, intrusive memories; Criteria B symptoms), 3 of 7 avoidance/numbing symptoms (i.e. avoiding activities that serve as reminders of the traumatic event; feeling distanced from others; Criteria C symptoms), and 2 of 5 hyperarousal symptoms (i.e., hypervigilance, sleep difficulties, Criteria D symptoms). Based on the DSM-IV-TR guidelines respondents meeting or not meeting the requirements for each symptom cluster were coded accordingly under the three variables representing the subscales of the PCL-M, *critb*, *critc*, & *critd*. The following details the process required to group individual scores into clusters and then determine whether or not a respondent has yielded positive results on the subscales to meet full, partial or no diagnosis.

There are precedents in the literature for grouping data from the PCL-M. Investigators (Asmundson, Norton, Allardings, Norton, & Larsen, 1998; Falsetti, Resnick, Resnick, & Kilpatrick, 1993) developed a method for determining correspondence between PTSD symptom data collected by self-report and diagnostic criteria. These methods require that symptoms not only be present but that the DSM symptom criteria are met. For the purposes of this dissertation, I will present the two methods of determining presence of symptoms. In Method A, a symptom will be considered present if the individual indicates being bothered by it at least “a little bit”

(i.e., 2 on the 5 point scale). In Method B, a symptom will be considered present if the individual respondent indicates being bothered by it at least “moderately” (i.e. 3 on the 5 point scale). Method A corresponds to the recommendations of Weathers et al. (1993) for considering one as symptomatic. Consistent with the DSM criteria, persons who score above symptom threshold (i.e. depending on the method adopted) on at least one Criteria B item, 3 Criteria C items, and 2 Criteria D items, will be considered cases of “probable PTSD.”

Two variables in the VAC dataset capture PTSD, (ptsda) and (ptsdb). Method A appears more liberal and the percentages of subthreshold and full PTSD should be higher (this method is based on the Weathers et al. recommendation of a cutoff score of 50). Method B (more conservative) is based on a cutoff score of 44 based on a study of MVA victims by Blanchard, Jones-Alexander, et al. (1996). The Blanchard, Jones-Alexander, et al. (1996) study suggested the cutoff score of 44 would increase the overall diagnostic efficiency of the PCL civilian version. Each of these variables will be determined from the 17 individual items of the PCL-M and split into three levels, PTSD, subthreshold PTSD, and no PTSD. Since this study uses a similar population as was used to validate the PCL-M, Method A will be used to determine full PTSD. There is no published minimum suggested cutoff for subthreshold PTSD based on some summary score of individual items on the PCL-M, therefore the demarcation point will be determined by existing empirical research on the important factors of the symptom clusters.

Past research has shown that it is the re-experiencing symptom that is important to the demarcation between full and subsyndromal PTSD. In military veterans with PTSD, re-experiencing symptoms are significantly associated with current dysfunction and current disability (Beckham et al., 1997). Asmundson et al. (2003) found that symptoms of chronic pain and PTSD are significantly related to one another and, using CFA, determined that it was the re-

experiencing symptom that significantly separated the PTSD and sub-threshold PTSD. Respondents who meet the requisite number of symptoms for at least cluster B plus the criteria for one other symptom cluster (e.g. clusters BC, BD) criteria will be considered to have subthreshold PTSD while those without cluster B, one or none of the symptom criteria (e.g., CD, B, C, D, or none) will be deemed as not having PTSD. Only respondents who meet the criteria for clusters B, C, and D will be classified as having full PTSD. Therefore when the analysis of variance is run, the three levels of PTSD will reflect those respondents coded in the following way: full PTSD = 1, subthreshold PTSD = 2 and No PTSD = 3. Exhibit 5 is an illustration of respondent selection and diagnostic calculation in a survey analysis. Grouping PTSD in this manner allows for ANOVA procedures to be used with the data.

Exhibit 5 Determining PTSD and Subthreshold PTSD by Criteria

Criteria B 1=yes, 2=no pclm items1-5	Criteria C 1=yes, 2=no pclm items 6-12	Criteria D 1=yes, 2=no pclm items13-17	Diagnosis 1=PTSD 2=sub PTSD 3=No Diagnosis
1	1	1	1 BCD
1	1	2	2 BC
1	2	1	2 BD
1	2	2	3 CD
2	2	1	3 D
2	1	2	3 C
1	2	2	3 D
2	2	2	3 N/A

Center for Epidemiologic Studies-Depression Scale, CES-D

Scale Description

The following scale was developed by the Center for Epidemiologic Studies (Radloff, 1977). This is a short, self-reporting scale intended for the general population. The scale is available at the following website:

<http://www.wpic.pitt.edu/research/City/OnlineScreeningFiles/CesdDescription.htm>

Purpose. This scale's purported use simply as an indicator of the degree of depression (Boisvert et al., 2003).

Scale description. The CES-D contains 20 items assessing the extent to which cognitive, behavioral, somatic, and affective symptoms of depression have been experienced over the previous week.

Scoring. Depression scores are determined by adding each of the numbers circled to get a sum. There are, however, "reverse" score items for items 4, 8, 12, and 16 (or Q.40 d, h, l, & p), so that 0 = 3, 1 = 2, 2 = 1, and 3 = 0. Note that these four items reflect positive experiences rather than negative ones, i.e. respondents rate their experience from 0 (Rarely/None of the time) to 3 (Most/all of the time). Then the 20 numbers are added; the score will be in the range of 0 to 60.

Cutoff scores. If the total is 16 or greater, he/she may have experienced some depression in the past week (Radloff, 1977). It is important to note, that scores on the CES-D cannot be used to diagnose the presence or absence of the clinical syndrome of depression (Asmundson, 2000). Sixteen will be the cutoff used in this study.

Psychometric properties. The initial evaluation of the CES-D was done on a community sample ($n = 3935$). These participants were randomly selected from two major U.S. centers via probability sampling. Of these, respondents, 1971 completed the scale again two weeks to 12 months following initial completion. Radloff's (1977) study yielded a test-retest reliability ranging from 0.49 (12 months) to 0.67 (4 weeks). Although these reliability coefficients fall below acceptable standards, according to Nunnally and Bernstein (1994), they have been considered acceptable because the scale focuses on depressive symptoms occurring in a one week time period, and depression in community samples fluctuates over time (Asmundson, 2000). Radloff (1977) reported internal consistency of items of the CES-D ($\alpha = .84$) that exceeds commonly accepted levels. (Nunnally & Bernstein, 1994). Using this scale with the PCL-M was a good choice because Radloff (1977) found that CES-D scores of individuals with psychiatric diagnoses are significantly higher than the scores of individuals without such diagnoses. Asmundson (2000) reported that respondents with elevated CES-D scores (scores > 16) successfully distinguish persons without depression and individuals subsequently diagnosed with depression.

Validity. The CES-D has been shown to have satisfactory convergent validity (Devins & Orme, 1985). Moderate correlations have been found between the CES-D and other scales designed purported to measure depression (Asmundson, 2000), (e.g. $r_s > 0.50$ with the Hamilton rating scale for depression; $r_s > 0.30$ with the Raskin scale, $r_s > 0.40$ with the Lubin Depression Adjective Checklist, $r_s > 0.60$ with the Bradburn Affect Balances Scales-Negative Affect). The discriminant validity of the CES-D has not been well studied. Devins and Orme (1985) suggest that the CES-D scores may reflect psychological distress in general in addition to specific depressive symptoms. Bias has not proven to be problematic for the CES-D scale. Correlations

between the CES-D and the Marlowe-Crowne Social Desirability Scale are small ($r_s < -0.23$) (Radloff, 1977).

Alcohol Use Disorders Identification Test (AUDIT)

Scale Description and Purpose

The AUDIT (Babor et al., 1992) was developed for multinational use by the World Health Organization for multi-national use in primary care settings (King & Bordnick, 2002). The AUDIT contains a core screening assessment and a more extensive, optional clinical screening procedure (not done in this study). The scale and the scoring process can be viewed at the following website: <http://www.canningdivision.com.au/EPC/AlcoholUseDisordersEPC.pdf>

Scoring. The core assessment can be administered by a clinician or self-report and consists of 10 multiple-choice and yes-no questions, 3 on quantity and frequency of alcohol consumption, 3 on harmful drinking, and 4 on hazardous drinking. All of the questions are scored using a 5-point (0-4) Likert scale, for example 0 (“never”) to 4 (“Daily or almost daily”). The 10 items in the core questionnaire are scored from 0 to 4 and summed to yield a total score of 0-40. The 8 clinical screening items are scored from 0 to 3 and yield a total score of 0-24. For detecting an alcohol use disorder as defined by ICD-10 criteria (WHO, 1992), a score of 8 on the highest core questionnaire produced the highest sensitivity, and a score of 10 or more had the highest specificity. A high score on the quantity and frequency items (1-3) indicates hazardous use, a high score on the second three items (4-6) implies alcohol dependence, and a high score on the remaining items (7-10) suggests harmful use (Babor et al., 1992).

Alcohol use/problems via the AUDIT are summarized in the 1999 Regular Forces Dataset by the variables QFINDEX and ALCPROB. The VAC survey included questions pertaining to how frequently alcohol is consumed during a specific time period and how many drinks are consumed on a typical drinking occasion. Another assessment focus was on assessing “alcohol-related” problems with questions pertaining to problems with alcohol and negative consequences related to alcohol consumption (i.e. going to work intoxicated). This kind of assessment focus has been supported in other kinds of studies (e.g. drinking and driving) (McCreary & Sadava, 1998). To be consistent with previous research and the recommendations of the creators of the instrument, the summary variables QFINDEX and ALCPROB were created.

The AUDIT was designed to give an overall score of severity of alcohol problems - information that may prove useful to clinicians planning treatment. However, if used as an epidemiological tool, it can be scored to assess hazardous or harmful use and alcohol dependence. QFINDEX and ALCPROB were created to assess these domains separately (Babor et al., 1992). They summarize frequency of use and dependency respectively and will be assessed based on the data from the VAC survey. For the purposes of this study, the score will be calculated for use in the analysis. QFINDEX was comprised of (i.e., the product of) questions 52-53 and obtained by multiplying the scores of these questions and deals with frequency of use. Question 52 was recoded, as it was initially reversed scored such that “never” corresponds to 0 and “four or more times a week” to 4. The range of this variable will be 0-20 with scores of 4 or more indicating harmful use or abuse, i.e. higher scores indicating greater quantity and/or frequency of consumption. Alcohol-related problems were assessed with seven questions (i.e., question 54, items (a) through (g) related to intoxication, difficulties with stopping drinking,

disruption of normal activities, need to drink in the morning, guilt, memory problems, and self harm or injury to others). Scores on the items of question 54 were recoded such that never corresponded to 0 and “almost daily to daily” to 4. As such the possible range of scores is 0-28, with higher scores indicating more alcohol-related problems (Asmundson, 2000). The 10 questions related to alcohol abuse captured by QFLNDEX and ALCPROB plus question 55 were combined into one SPSS variable, “AUDIT1” after the questions were identified as the elements of the Alcohol Use Disorders Identification Test.

Normative data. A great deal of normative data exists for this instrument. The AUDIT underwent an extensive validation process involving six nations that provided country specific normative data (Saunders, Aasland, Asmundsen, & Grant, 1993). Since its creation, on-going empirical support for the AUDIT’s precision has occurred across different settings, cultures and populations (Allen, Litten, Fertig, & Babor, 1997). The AUDIT now appears in seventeen languages. The current investigation included French and English versions.

Cutoffs. A score of 1 or more on questions 52-53 indicates alcohol consumption at a hazardous level and a total score ≥ 4 will indicate problems associated with frequency and amount of drinking. This is a conservative cutoff as the AUDIT assumes a standard drink is equivalent to 10 g of alcohol, whereas one standard drink in Canada assumes 13.6 g of pure alcohol (Babor et al., 1992). For questions 54 (a-g) and 55, scores above 0 (especially for weekly and daily symptoms) imply the presence of alcohol dependence, therefore, a cutoff of 8, according to the Babor et al. (1992) indicates a dependence problem. In fact they recommend a total score of 8 overall on the two variables combined as liberal indication of both hazardous use and dependence.

Psychometric properties. Questions were selected from a 150-item assessment schedule and the 10 item AUDIT was administered to a sample of personnel (n=1888) from health care facilities on the basis of their representativeness for the three conceptual domains (alcohol consumption, drinking behavior, and alcohol-related problems) and their perceived usefulness for intervention. Since the AUDIT was first published in 1989, studies have observed high internal consistency, suggesting the AUDIT measures what it purports to measure (Powell & McInness, 1994; Hays, Merz, & Nicholas, 1995). Babor et al. (1992) reported a test-retest reliability of $r = .86$ in a sample of non-hazardous drinkers, alcoholics and cocaine abusers. Intrascale reliability coefficients (Chronbach's alpha) were found in a cross-national sample ranging from $\alpha = .80$ in Australia to $\alpha = .98$ in Mexico (King & Bordnick, 2002). Another study replicated the AUDIT's high internal consistency, despite altering word order in the questionnaire (Ivis, Adlaf, & Rehm, 2000).

Validity. The AUDIT performs well compared to other criterion measures and, in some empirical studies, more accurately (Allen et al., 1997; Cherpital, 1995; Clements, 1998; Hays et al., 1995). The AUDIT correlates to the MAST (Selzer, 1971) ($r = .88$) for both men and women, and .47 and .46 for men and women respectively on a separate screening test (Bohn, Baber, & Kranzler, 1995). Correlation with the CAGE was nearly as high (Ewing, 1984) in a sample of ambulatory patients ($r = .78$) (Hays, et al, 1995) and was found to correlate well with measures associated with drinking consequences (Bohn, et al., 1995). The only apparent limitation may be in the AUDIT's ability to distinguish problem (binge) drinkers who generally drink in moderation from drinkers with on-going hazardous use or abuse problems. Despite this limitation, King and Bordnick (2002) report that the AUDIT has numerous empirical studies that

indicate it is a better tool than the CAGE, the MAST or other general screening instruments for detecting potential problem drinkers.

Analysis Strategy

The *VAC CF Care Needs Study* constructed the overall survey to allow for a variety of statistical analyses that could be conducted to identify the current and future needs of the Canadian forces clientele of the Veterans Affairs Canada. Because it contains continuous independent observations, the structure of the questionnaire lends itself to analysis of variance (ANOVA).

Two analyses of the data set using PTSD as a variable have occurred, but both use other statistical measures to determine full PTSD from other variables (Asmundson, Stein, et al., 2002; Asmundson et al., 2003). This will be the one of the first study to use full and subthreshold PTSD to compare other health problems such as depression and alcohol problems and the first using a sample of peacekeepers.

An ANOVA appears to be an appropriate method of analysis because the goal of this study is to compare the relationship between three groupings or levels of an explanatory variable (*ptsda*) and one or more response variables (depression and alcohol problems).

A Case for ANOVA

Analysis of variance is a method for testing hypotheses about means. It is the most widely used method of statistical inference for the analysis of experimental data. As is the case with other assessment procedures, ANOVA has the same goal as any other technique used in statistics: “to find the best fitting and most parsimonious, yet biologically reasonable model to (compare) the relationship between” dependent variables and levels of an independent variable (Hosmer & Lemeshow, 2000, p.1).

By now the goal of this study should be clear. One might guess that the extent of impairment from alcohol and depressive problems depends on the level of symptomatology. For example, hazardous drinking in the subthreshold PTSD group should be comparable to the drinking behaviors in the full PTSD group, and hazardous drinking behaviors in the no PTSD group should be significantly different from the other two PTSD groupings. ANOVA allows us to test this hypothesis. Data will be observed from all three levels of each group across the dependent variables. Group 1 is from the PTSD group; group 2 is from the subthreshold PTSD group; group 3 from no PTSD group. Using other methods such as logistical regression, the groups would likely be found to be broadly similar. However, ANOVA will tell us for example, the range between the smallest and the largest levels of symptoms of group 1 probably includes a large fraction of the symptoms in each group. With great detail provided by ANOVA, the study will likely show that each group is different: has slightly different highs, lows, and hence that each group has a different average (mean) size. Can this difference in average size be taken as evidence that the groups in fact are different (and perhaps that threshold of PTSD causes that difference)? Note that even if there is *not* a "real" effect of symptoms on impairment (the null hypothesis), the groups are likely to have different average degrees of impairment on depression and alcohol problems. The probable range of variation of the averages if our effect/impairment hypothesis is wrong, and the null hypothesis is correct, is given by the standard deviation of the estimated means:

$$\sigma/N^2$$

where σ is the standard deviation of the size of all the levels of PTSD and N is the number of peacekeepers in a group. Thus if the collection of the group means are treated as data and used to

find the standard deviation of those means, and it is "significantly" larger than the above, this provides evidence that the null hypothesis is not correct and instead level of impairment has an effect. This is to say that if some group's average symptom severity is "unusually" large or small, it is unlikely to be just "chance."

The comparison between the actual variation of the group averages and that expected from the above formula is expressed in terms of the F ratio:

$$F = MSB/MSE \quad \text{or}$$

$$F = (\text{found variation of the between group averages}) / (\text{expected variation of the group averages})$$

Thus if the null hypothesis is correct, F should be about 1, whereas "large" F indicates a threshold effect. How big should F be before rejecting the null hypothesis? P reports the significance level. The ANOVA represents a parsimonious fit for the research question and for the data. What differentiates the ANOVA for the purposes of this study from the other models is that the clinical significance of the association of subthreshold PTSD to the outcome variables versus full PTSD and no PTSD can be determined. The ANOVA allows this investigation to ascertain the overall research question; "Is subthreshold PTSD clinically relevant?" This question is might be observed and supported by determining the effect size N^2 of the findings that confirms not only are the results statistically significant, but clinically or meaningfully significant as well.

Study Summary

This study is a secondary data analysis. The proposed analysis is iterative in nature. Therefore the analyses have to be conducted with statistical software, such as SPSS 11.5 and

SAS. All available response data from the Regular Forces Data set pertaining to PTSD, depression, alcohol use, and the selected demographic variables will be used in the study, e.g., x independent variables (PTSD (3 levels-full, sub, no), (age, marital status, years married, number of deployments, years of service, service status, rank, and language/ethnicity) y dependent variables (depression, alcohol problems). As mentioned earlier, the VAC was interested in determining gaps in service delivery and assessing the needs of veterans who are consumers of VAC services.

CHAPTER IV

RESULTS

Objective: To compare the relationship between PTSD status on alcohol use disorders and depressive symptoms. To meet the objective, the following questions are addressed in the statistical analysis:

Research Questions

1. Will groups of peacekeepers with full, subthreshold or no PTSD score differently when compared on the AUDIT?
2. More specifically, will peacekeepers with full and subthreshold PTSD show statistically significant mean differences from the no PTSD group when compared on the AUDIT for alcohol use disorders?
3. Will groups of peacekeepers with full, subthreshold or no PTSD score differently when compared on the CES-D?
4. More specifically, will peacekeepers with full and subthreshold PTSD show statistically significant mean differences from the no PTSD group when compared on the CES-D for depressive symptoms?

Different levels (full, subthreshold and no) of traumatic stress were compared and calculated across two measures of psychiatric problems, the AUDIT (for alcohol problems) and the CESD (for depression) using analysis of variance (ANOVA) with post hoc pairwise comparisons (Bonferonni method).

PTSD Ratings and Comparisons

PTSD was defined as obtaining a score of 50 or higher on the PCL-M, a 17-item questionnaire. Of the 1877 veterans who responded to questions on PTSD, 343 (17.4%) met criteria for full PTSD, 238 met criteria for subthreshold PTSD (12.1%), and 1296 for no PTSD (65.9%). In order to make a true comparison of the PTSD data on the dependent variables only those respondents that possessed observations on all the variables used in the analyses were retained. Reducing the data left only sixty-three women in the analysis with information on all the variables of interest. It was determined that there were too few women in the study to make comparisons by gender. Once women were removed from the study the overall sample size was $n = 1101$. The number sample was now similarly divided on the two dependent variables and the four demographic variables with each having 207 respondents for full PTSD (18.8 %), 148 respondents for subthreshold PTSD (13.4%), and 746 (67.8%) respondents for no PTSD.

Sample Demographics

Summary descriptive statistics on respondent demographic variables are presented in Table 1 (please see Appendix E) and the descriptive summary statistics are presented in Table 2. One (variable) by three (PTSD status) ANOVAs were performed on all respondent continuous variables with post hoc Bonferonni tests, and one (variable) by three (PTSD status) Chi-square tests were conducted for all respondent categorical demographic measures. On the demographic variables pertaining to military service, there were no statistically significant differences on the variables number of deployments, service status, average number of years served, and present rank/rank at release from service. These results suggest that the PTSD status groups were comparable with respect to the demographic variables associated with military service.

The demographic variables pertaining to personal background showed no significant differences on personal income, primary language/ethnic background, and length of marriage; marital status and age, however, were found to be significant.

Most of the sample was comprised of married soldiers (84.8%) and indeed there were significant differences for marital status (X^2 , $p < .001$) on PTSD status (please see Table 2). However, the literature on marital status with respect to PTSD is mixed. Studies have shown marital status as either a protective factor against (e.g. Sabin, et al., 2003) or a source of vulnerability to PTSD (e.g., Black, 1993). Typically, marriage, as well as age, is not related to PTSD status (e.g., Birmes et al., 2001).

On age the overall mean was 49.8 years old with a standard deviation of 10.8 years and a range from 20 to 66 years old. Age increased as PTSD symptoms decreased. For each level of traumatic stress on age the means and standard deviations are: PTSD group (n= 207) $\bar{x} = 44.5$, $SD = 10.4$, subthreshold PTSD group (n= 148) $\bar{x} = 49.0$, $SD = 10.7$, and No PTSD group (n= 746) $\bar{x} = 50.9$, $SD = 10.5$. The one-way ANOVA for age on PTSD showed statistically significant differences, $F(2, 1098) = 33.516$, $p < .001$. Although the mean age by PTSD status was significantly different, this could be a result of the large sample size. The statistical difference was not meaningful, as less than six percent of the sample variance in PTSD status could be explained by age, ($Partial \eta^2 = .058$). However, to rule out confounding variables an ANCOVA and include age as a covariate will be run.

Overall, the results pertaining to the demographic variables suggest that the PTSD status groups were comparable.

The analysis addressed the primary research questions concerning findings of mean differences for PTSD status on the two dependent measures. The dependent variables were

assessed in four parts. First, each is evaluated with a one-way-ANOVA to determine if there are overall main effects for PTSD status on the dependent variable. Second, the means and standard deviations are reported for PTSD status on the dependent measure. Third, when significant main effects were found Post hoc analyses using the Bonferonni method to control for Type I error were done to make pairwise comparisons of PTSD status (using a Bonferroni-corrected alpha, $p=.01667$). Finally, one-way ANCOVAs were done using age as a covariate to determine if age could explain any of the differences on the outcome measures.

Alcohol Use Disorders

The first dependent variable of interest in this study was alcohol use disorders obtained during the Veterans Care Need Survey (1999) using the Alcohol Use Disorders Identification Test (AUDIT) (please refer to Appendix F). For each level of traumatic stress on the AUDIT, the means and standard deviations are: PTSD group ($n= 207$) $\bar{x} = 7.33$, $SD = 5.4$, subthreshold PTSD group ($n= 148$) $\bar{x} = 5.69$, $SD = 3.9$, and No PTSD group ($n= 746$) $\bar{x} = 5.34$, $SD = 3.4$ (please see Table 3). As can be seen in Table 3 and Figure 1, the alcohol use means increased with each level of severity within PTSD status. The ANOVA results indicate alcohol problems ($F_{(2, 1098)} = 20.893$, $p < .001$) differentiated the three PTSD status groups (please see Table 4).

Because main effects were found on the AUDIT, a series of follow-up pairwise comparisons were computed to examine differences between the three groups (full, subthreshold and no PTSD). The values of these comparisons are presented in Table 5. The Bonferroni correction was used to conservatively control for Type I error. PTSD was significantly different from no PTSD on the AUDIT ($p < .001$). Subthreshold PTSD was significantly different from full PTSD on the AUDIT ($p < .001$). Subthreshold PTSD did not differ significantly from the no PTSD group on the AUDIT ($p = .950$).

Finally, a one-way analysis of covariance (ANCOVA) was conducted to determine if age could explain differences on the AUDIT (please see Table 6). The ANCOVA indicated that the relationship between the covariate and the dependent variable (AUDIT) did not differ significantly as a function of PTSD status, $F(1, 1097, .05) = .002, p = .967$. Thus, age was not determined to be an influential factor on alcohol use.

Some perplexing data existed with respect to the analysis of alcohol use disorders. The analysis the alcohol variable was confounded by remarkably low scores on alcohol use in veterans' samples with full or subthreshold PTSD. Table 3 shows low alcohol use mean scores at each level of PTSD. The findings do support the experimental hypothesis that a low to high directional trend in severity should exist when moving from no PTSD to full PTSD; however the scores appear too low when compared to other literature on PTSD and peacekeeping (Mehlum and Weisaeth, 2002; Mehlum, 1998). The clinical cutoff for alcohol use disorders on the AUDIT is a minimum score of 8 and a maximum score of 40. The means of the full PTSD group (7.33) and the subthreshold PTSD group (5.69) respectively, were both below the clinical threshold.

Two prominent observations of the data could explain the low alcohol scores. First, the mode for veterans with full PTSD was a score of zero, which statistically indicates that the majority of the respondents never drink at all. Second, when observing the cumulative frequency for alcohol scores in the full PTSD group nearly 84 percent of the data is accounted for when the minimum clinical cutoff score of 8 on the AUDIT is reached. One plausible explanation for the low scores is social desirability, as the study is observing behaviors of pensioners within the Veterans Affairs Canada. Respondent veterans perceive that they could lose benefits for alcohol-related problems. Similar underreporting of alcohol drinking behavior and abuse has been

observed in recent veterans' research (Calhoun et al., 2000). Therefore no further analyses of the data on the AUDIT will occur.

Depressive Symptoms

The second dependent variable of interest in this study was current depressive symptoms obtained during the Veterans Care Need Survey (1999) using the Center for Epidemiologic Studies-Depression Scale (CESD) (please refer to AppendixG). The results indicate depressive symptoms ($F(2, 1098) = 346.285, p < .001$) differentiated the three PTSD status groups (please see Table 7). For each level of traumatic stress on the CESD the means and standard deviations are: PTSD group (n= 207) $\bar{x} = 25.16, SD = 12.17$, subthreshold PTSD group (n= 148) $\bar{x} = 14.77, SD = 9.73$, and No PTSD group (n= 746) $\bar{x} = 8.53, SD = 6.14$ (please see Table 7). As can be seen in Table 7 and Figure 2, the depressive symptom means increased with each level of severity within PTSD status.

Because a main effect was found on the CESD, a series of follow-up pairwise comparisons were computed to examine differences between the three groups (full, subthreshold and no PTSD). The values of these comparisons are presented in Table 9. The Bonferroni correction was used to conservatively control for Type I error. PTSD was significantly different from no PTSD on the CESD ($p < .001$). Subthreshold PTSD was significantly different from full PTSD ($p < .001$). Finally, subthreshold PTSD was significantly different from the no PTSD group ($p < .001$). These results showed overall significant differences between each level of PTSD status when compared to each other on depression, but the subthreshold group was below the clinical cutoff for depression.

Finally, a one-way analysis of covariance (ANCOVA) was conducted to determine if age could explain differences on the CESD (please see Table 10). The ANCOVA indicated that the

relationship between the covariate and the dependent variable (CESD) remained significant, ($F_{(1, 1097, .05)} = .6.866, p = .009, \text{Partial } \eta^2 = .006$). The low effect size shows that the statistical difference is not a meaningful one. The large sample size may play role in why certain demographic variables were significantly different on the outcome measures.

Perhaps the most compelling finding with respect to age and PTSD on depression is the trends. Other veterans studies of PTSD with respect to depression (and alcohol) problems report no significant differences on variables such as age (and marital status) (Calhoun et al., 2000) or that PTSD peaks at certain ages and remains relatively constant for different age-groups (Blow, Loveland-Cook, Booth, Falcon, & Friedman, 1992). In the current study, trends opposite of what was anticipated were observed with respect to age, PTSD and depression. In the current study younger peacekeepers were more depressed and had higher rates of PTSD. Therefore age does not appear to be a confounding factor.

Evaluations of PTSD status thus far on the dependent variables pertaining to depression and alcohol have demonstrated significant differences. In the case of depressive symptoms, these differences were meaningful. However, not all the results were observed as hypothesized. Surprisingly, the subthreshold PTSD group on both alcohol use disorders and depressive symptoms was statistically significantly different from the full PTSD group on each dependent measure. However, observed trends showed that the subthreshold group means on each dependent measure were more severe than the no PTSD group means. Furthermore, the subthreshold group on the CES-D approached the clinical cutoff for current depressive symptoms. In an effort to support the research findings and trends further with consideration of the low alcohol mean scores, a variable on health problems was selected to evaluate whether or not similar differences with respect to PTSD status could be observed and empirically supported.

Health Problems

For this investigation health problems are operationalized as the total number (range 0-21) of long-term physical health conditions diagnosed by a health professional the respondent-veteran has identified from the Veterans Affairs Client Needs Survey (please refer to Appendix H). As noted in Chapter Two, numerous articles have linked PTSD to poor health and physical pain (Asmundson, Stein, et al., 2002; Hotopf et al., 2003; MacDonald et al., 1999; MacDonald et al., 1998; Mehlum & Weisaeth, 2002; Shigemura & Nomura, 2002; Thoresen & Mehlum, 1999). Therefore, consistent with the study hypotheses, PTSD status should indicate differences between groups when observed on health with full PTSD having the poorest health or greatest reported number of physical health problems.

A one-way analysis of variance demonstrated significant group differences for the levels of PTSD on total number of health problems (SPSS variable nbq36). As expected, the results indicate health problems ($F_{(2, 1098)} = 27.736, p < .001$) did differentiate the three groups (please see Table 12). For each level of traumatic stress on number of physical health problems, the means and standard deviations are: PTSD group (n= 207) $\bar{x} = 3.76, SD = 2.13$, subthreshold PTSD group (n= 148) $\bar{x} = 3.05, SD = 1.83$, and No PTSD group (n= 746) $\bar{x} = 2.66, SD = 1.83$ (please see Table 11).

Because a main effect was found on number of physical health problems, a series of follow-up pairwise comparisons were computed to examine differences between the three groups (full, subthreshold and no PTSD). The values of these comparisons are presented in Table 13. The Bonferroni correction was used to conservatively control for Type I error. PTSD was significantly different from no PTSD on health problems ($p < .001$). Subthreshold PTSD was significantly different from full PTSD ($p < .001$). Finally, subthreshold PTSD was significantly

different from the no PTSD group ($p < .001$). These results showed overall significant differences between each level of PTSD status when compared to each other on number of physical health problems.

The findings of this study suggest that veterans with full and subthreshold forms of PTSD have higher levels of depression and health problems than veterans with no PTSD. When looking at subthreshold PTSD more closely, veterans appear to have higher levels of psychiatric and physical morbidity compared to their normal (no PTSD) counterparts, but not to the extent of those veterans diagnosed with full posttraumatic stress disorder. These findings warrant further discussion.

CHAPTER V

DISCUSSION

PTSD symptoms and poor health in military veterans has been discussed in the literature for the past several years (Asmundson, Stein, et al., 2002; Beckham et al., 1998; Engel et al., 2000; Hotopf et al., 2003; Kimerling et al., 2000; Shigemura & Nomura, 2002; Wagner et al., 2000). Research involving links between alcohol abuse (Brown & Wolfe, 1994; Grice et al., 1995; Mehlum, 1998; Wedding, 1987; Zlotnick et al., 1999) and depression (Boisvert et al., 2003; Breslau et al., 2000; Mollica et al., 1999; Shalev et al., 1998) have been examined in terms of relationship to PTSD symptoms, in the biological and behavioral treatment areas. The primary purpose of this investigation was to extend these findings by comparing groups of peacekeepers with full, subthreshold and no PTSD on mental health by comparing those groups on measures of alcohol use disorders, depression and physical health problems. The main findings of this study will now be discussed, with a secondary emphasis on the relationship of subthreshold PTSD to groups with full PTSD or no PTSD.

The main findings of this study were as follows:

- Peacekeepers with full PTSD were statistically significantly different from those with subthreshold PTSD and no PTSD in level of impairment on the measure of alcohol use disorders.
- Peacekeepers with full PTSD were statistically significantly different from those with subthreshold PTSD and no PTSD in level of impairment on the measure for depressive symptoms.

- Peacekeepers with subthreshold PTSD had generally higher mean levels of impairment than those with no PTSD on all three dependent measures.
- Peacekeepers with current subthreshold PTSD did not significantly differ from those with no PTSD on the AUDIT in degree of alcohol use disorders, but were significantly different than those with full PTSD (however, none of the group means reached the clinical cutoffs for alcohol use disorders).
- Peacekeepers with subthreshold PTSD, compared to those with full PTSD, were significantly different from the no PTSD group on the CESD, suggesting that people with subthreshold PTSD are more depressed compared to those with no PTSD, but were also statistically significantly different from the full PTSD group suggesting they are not as comparable to peacekeepers with full PTSD as hypothesized.
- PTSD influences health status. Peacekeepers with full PTSD had more physical health problems than those with no PTSD and, as one would expect, the older veterans with PTSD had higher means than their younger counterparts.
- Deployed and non-deployed peacekeepers were both represented in the full and subthreshold PTSD groups, suggesting that PTSD could occur as a result of both domestic and foreign service.

Previous research by King and Bordnick (2002) recognized that research on PTSD should put the disorder into the context of the veteran's life. The current study broadened the understanding of PTSD of Canadian veterans of UN peacekeeping missions by comparing groups of veterans with PTSD statuses on alcohol use disorders, depressive symptoms, and physical health problems. The results will now be discussed for the three dependent measures.

Alcohol Use Disorders

Scores on measures of current PTSD symptoms (PCL-M) and alcohol use disorders (AUDIT) were compared across three groups of veterans with varying PTSD statuses. It was hypothesized that peacekeepers with full or subthreshold PTSD would have more severe alcohol use scores. The results were as expected, with the full PTSD group having the highest levels of alcohol use and the subthreshold PTSD group having the second highest mean. However, the means on the AUDIT by PTSD status were lower than expected, and there were no statistically significant differences between the subthreshold PTSD group and the no PTSD group. Reasons for the low scores are explored. Cultural issues, social desirability, and observations made from the data will attempt to explain the results found on the AUDIT.

The results for alcohol use are consistent with other international veterans studies (Bleich, Siegel, Garb, & Lerer, 1986; Lerer et al., 1987; Spivak, Segal, Laufer, Mester, & Weitzman, 2000; Op Den Weld et al., 2002), showing lower alcohol use disorders mean scores than in the United States. This finding may be explained by the lack of Vietnam era veterans in the VAC system. The present data supports the suggestion that the link between military induced-PTSD and alcohol abuse may reflect a cultural norm and that the particularly high association between combat-related PTSD may be unique to the Vietnam experience (Spivak et al., 2000; Lerer et al., 1987).

Past research by McFall, Makcay, and Donovan (1992) showed that PTSD influences alcohol use patterns in veterans. Likewise, this study found significant differences between PTSD status when comparing alcohol use disorders. It was expected that veterans with PTSD and subthreshold PTSD would have clinical levels of alcohol use disorders. This hypothesis was based on the idea that the natural course of alcohol abuse parallels the course of PTSD (Bremner,

Southwick, Darnell, & Charney, 1996) and like combat veterans, Canadian peacekeepers have increased alcohol consumption as PTSD status increased. The hypothesis was not supported because alcohol use was not significantly different between the subthreshold and no PTSD groups. However, expected trends were clearly observable as drinking behavior did increase with severity of PTSD status. However, none of the PTSD status groups reached the clinical threshold for alcohol use disorders. This implies that the impact of PTSD and subthreshold PTSD may not be as strong as previously hypothesized on alcohol use disorders (Brown & Wolfe, 1994; Grice et al., 1995; Mehlum, 1998; Wedding, 1987; Zlotnick et al., 1999). This implication is, however, moderated by the way in which the AUDIT was operationalized and presented on the 1999 Veterans Care Needs Survey. The scores appear arguably low suggesting that veterans consistently underreported alcohol use due to issues associated with social desirability.

Social Desirability

Social desirability is the tendency of individuals to respond in ways that result in a favorable impression on others (Whaley, 2004). Veterans receiving pension benefits arguably are not going to expose themselves to unnecessary scrutiny by the VAC if they perceive that their benefits could be taken from them. Research on peacekeepers has made it increasingly clear that veterans with PTSD report that they drank immediately following exposure to traumatic events to alleviate symptoms and to get sleep; however, they tend to downplay the seriousness of the alcohol abuse that often parallels PTSD (Mehlum, 1998). Furthermore, previous research on Canadian peacekeepers with PTSD showed not only higher rates of alcohol abuse among the peacekeepers with PTSD, but that increased alcohol abuse was predictive of the presence of

PTSD (Passey, 1995). Keane, Girardi, et al. (1988) found that 60 to 80 percent of treatment seeking veterans with PTSD also met the criteria for current alcohol abuse.

While the aim of this study was not to predict alcohol abuse, perhaps it addresses a controversial issue raised by Mehlum (1998). In his large study of Norwegian peacekeepers (N=15, 931) in which alcohol use increased after peacekeeping from 43.5 percent to 115 percent in veterans groups, Mehlum (1998) still struggled with the argument of which comes first, the PTSD or the alcohol abuse despite the robust changes in his respondents. The low AUDIT mean scores in the present study continue Mehlum's (1998) controversy. Perhaps the low mean scores in this study represent supportive evidence that PTSD comes first and that the alcohol use follows. This position has been supported in previous research. McFall et al. (1992), Clark, Lesnick, and Hegedus (1997) and Kessler et al. (1995) found that different levels of trauma and symptom patterns were predictive of PTSD and provided evidence that trauma and PTSD precede the onset of substance abuse disorders. Further support for the self-medication for PTSD hypothesis comes from Bremner et al. (1996). They observed that PTSD symptoms began soon after trauma exposure and that the natural course of alcohol abuse followed the course of PTSD.

Whether or not the stress and trauma experienced by Canadian peacekeepers is accompanied by alcohol problems remains unclear at present and warrants future attention. The present findings do not unequivocally support any one conclusion. Again, the aim of this study was not to predict alcohol abuse, but rather compare groups of peacekeepers with PTSD, subthreshold PTSD on alcohol use and other variables. Statistically significant differences were observed yet alcohol did not show clinical levels of impairment. Research, however, has shown alcohol use

questionnaires correlate with social desirability, suggesting that veterans underreport the severity of their drinking problems (Johnson & Lubin, 1997; Skinner & Allen, 1982).

It was mentioned that there were problems operationalizing alcohol use on the VAC Care Needs Survey (1999). Therefore, the results may be more consistent with research suggesting that alcohol abuse is a not an easily measured construct and that better tangible indicators of abuse such as blood alcohol levels, DUI history, and dependence should be used (Asmundson, Stein, et al., 2002; Bordnick et al., in press).

Past research findings by Skinner and Allen (1982) show that the degree of alcohol dependence on PTSD is directly related to psychopathology and to physical symptoms of the nervous, cardiovascular, and digestive systems of veterans. In the following sections, the current findings on depression and physical health problems showed significant differences with the full PTSD groups having the greatest impairment and these findings support Skinner and Allen (1982).

Depression

Scores on measures of current PTSD symptoms (PCL-M) and depressive symptoms (CESD) were compared. It was hypothesized that peacekeepers with full or subthreshold PTSD would have more severe depression scores. The results were nearly as expected, with the full PTSD group having clinical levels of depressive symptoms and the subthreshold PTSD group approaching clinical levels of depressive symptoms.

These results are consistent with other research findings on depression and veterans. In similar comparison studies, severity of trauma was the best predictor of the severity in the outcome measures for depression (Bleich et al., 1997; Clum et al., 2000; Slusarcick, Ursano, Dineen, & Fullerton, 1999). The comorbid psychological illness most often observed with PTSD

in each of these studies was major depression. Bleich et al.'s (1997) study found major depressive disorder was the most common concomitant disorder, with a lifetime prevalence of 95 percent and current prevalence of 50 percent. In a study by Stein and Kennedy (2001), 42.9 percent of the cases with PTSD had major depressive disorder. This study's findings support observations by McQuaid et al. (2001) in which 23 percent of the respondents who met criteria for full or subthreshold PTSD met the criteria for major depressive disorder. McQuaid et al. (2001) found groups with full PTSD had the highest rates compared on depression followed by groups with subthreshold PTSD. Finally, Asmundson, Stein, et al. (2002), using structural equation modeling (SEM), found that PTSD symptoms contributed to depression in Canadian peacekeepers. Asmundson, Stein, et al. (2002) also found that PTSD influenced health status through depression. In follow-up research, Asmundson et al. (2003) found that PTSD significantly influences chronic pain. This finding lead to these current investigation's interest in PTSD with respect to the number of physical health problems Canadian peacekeepers.

Health

Physical health problems were added to this study after the alcohol variable was observed to be problematic. In this study it has been observed that the full PTSD groups of peacekeepers have had statistically significant differences from both the subthreshold and no PTSD groups on alcohol use disorders and depressive symptoms. It was hypothesized that subthreshold PTSD would not be statistically significantly different from the full PTSD groups and be statistically significantly different from the no PTSD groups. As reported in the results, this was not the case. In both cases subthreshold PTSD was statistically significantly different from the full PTSD group and because of problems with the alcohol data was not statistically significantly different from the no PTSD group on alcohol use. To support the expectation that subthreshold

PTSD will be statistically significantly different from the no PTSD group the variable number of physical health problems was added to the study for a post hoc analysis.

Numerous studies compare PTSD symptoms and poor health in military veterans and others (for reviews see Resnick et al., 1997; Schnurr & Jankowski, 1999). PTSD symptoms are associated with greater reporting of physical health problems and physical symptoms (Asmundson, Stein, et al., 2002; Beckham et al., 1998; Kimerling et al., 2000; Wagner et al., 2000; Engel et al., 2000; Zatzick et al., 1997). They are also strongly associated with current pain and pain-related disability (Asmundson et al., 2003; Beckham et al., 1997), poorer functional outcomes (Kimerling et al., 2000; Wagner et al., 2000), and increased healthcare consumption (Marshall et al., 1998). These findings appear to hold irrespective of theater of conflict (e.g., Vietnam, Persian Gulf, Bosnia). The current study reported similar findings: as PTSD severity increased, so did the number of physical health problems.

Studies by Mollica et al. (1999), Zoellner et al. (2000), and Clum et al. (2000) provided the foundation from which to compare and evaluate influences of PTSD symptoms and related physical factors on health status. There have, to the best of our knowledge, been only two investigations of this sort on military personnel deployed to peacekeeping missions and war zones. The first by Schnurr and Spiro (1999) used path analysis to test the extent to which smoking and alcohol abuse account for the relationship between PTSD symptoms and self-reported physical health in older male veterans who served in WWII or the Korean War. Their results indicated that: (1) PTSD had a direct influence on physical health status, (2) smoking had a small but significant direct influence on health status, (3) alcohol use was unrelated to health status, and (4) neither smoking nor alcohol abuse mediated the relationship between PTSD symptoms and health status. The second by Asmundson, Stein, et al. (2002) found using SEM that PTSD symptoms directly influenced health

status and indirectly influenced depression. They also found that PTSD influenced alcohol use. This investigation extended these findings. When comparing PTSD status on a number of health problems, depressive symptoms, and alcohol use disorders, on each variable the more severe the PTSD the higher the mean score on the outcome measure. Full PTSD had the highest means scores on each, followed by subthreshold PTSD, and no PTSD respectively. Since subthreshold was found to be significantly different in most cases from the no PTSD group on each dependent measure, subthreshold PTSD is discussed further.

Subthreshold PTSD

The secondary emphasis of this study was to look more closely at subthreshold PTSD. The results had several important implications. First, the findings of this study support the findings of research by Zlotnick et al. (2002). Like Zlotnick et al. (2002), the present research demonstrates that subthreshold PTSD is associated with psychological morbidity and is an indicator of impairment in peacekeepers to a lesser degree than full PTSD. Second, on the CESD and health problem variables for subthreshold PTSD, levels of impairment on depression and health problems approached the levels for those peacekeepers with full PTSD as was the case in Boisvert et al. (2003). These results highlight the importance of subthreshold PTSD as a meaningful indicator of psychiatric morbidity. Finally, although the overall findings lend support for the validity of the current diagnostic thresholds for full PTSD, these findings also indicate that subthreshold PTSD is a meaningful diagnosis, because subthreshold PTSD significantly impacts the affect and mental health of the peacekeeping veteran. For example, a substantial proportion (30.3%) of veterans with subthreshold PTSD reported clinical levels of depression. This latter finding supports the notion that clinical problems are indeed associated with subthreshold PTSD and suggests that clinical attention to and intervention for subthreshold

PTSD would be beneficial for veterans. Likewise, the fact that subthreshold symptoms have persisted beyond the veterans' service, appear to occur with near clinical levels of depression, and demonstrate poorer health than those without PTSD and at comparable levels to veterans with full PTSD warrants further attention. Studies involving a temporal model of PTSD are warranted.

The current study has demonstrated that subthreshold PTSD may serve as at least an important indicator of psychological impairment. A past study of subthreshold PTSD supports this theory. Marshall et al. (2001) suggested that the number of comorbid disorders increased with the number of PTSD symptoms. As with this study, symptoms of alcohol use or depression presented by patients with trauma histories may be risk factors in developing full PTSD. More recent attention in the empirical literature supports this contention. A study by Zlotnick et al. (2002) indicated that patients with subthreshold PTSD perceived their symptoms sufficiently distressing enough to warrant treatment.

The current study had both similarities and differences from previous studies, such as the definition of subthreshold PTSD and the nature of the respondents in the sample. Unlike the Zlotnick et al. (2002) sample, subthreshold PTSD in this study was significantly different than with no PTSD on some measure of psychiatric impairment, i.e. the CESD and health. Similar to this study, Asmundson et al. (2003) and Zlotnick et al. (2002) found that patients with subthreshold PTSD had the re-experiencing criterion plus symptoms from one other diagnostic cluster. Since 12.1 percent of the sample met criteria for two of three symptoms clusters and appeared impaired, the issue of whether or not the current diagnostic thresholds for PTSD are too stringent persists. While veterans with full PTSD were more impaired (as expected), the results

of veterans with subthreshold PTSD on depression suggests they should receive clinical attention for symptoms of both depression and PTSD.

In contrast to Zlotnick et al. (2002), this study used military veterans rather than civilian psychiatric patients. Since this study used veterans of potentially dangerous military missions rather than civilian psychiatric patients, it is possible that the reason the subthreshold and no PTSD groups were not always significantly different was an overall baseline of distress existed as indicated by the CESD. The present study did substantiate this in that it used a sample of treatment-seeking veterans that were already VAC pensioners. Therefore, differences between the subthreshold PTSD and the no PTSD groups on the AUDIT, for example, might be less apparent.

Arguments against the importance of subthreshold PTSD could look to the fact that the present study observed that full PTSD was significantly different compared to both subthreshold PTSD and no PTSD on the indices of psychiatric morbidity. This finding suggests that full PTSD impacts the intensity of symptoms of other diagnoses more so than subthreshold PTSD, yet it does not mean that subthreshold PTSD does not have a marked effect on those veterans with comorbidity. What it does suggest is an indicator that the boundary between PTSD and other psychiatric diagnoses is valid.

Summary

When the ANOVA and post hoc procedures were done to analyze the overall impact of PTSD on depression and alcohol, it was found that veterans with PTSD (full and subthreshold) have higher mean scores on alcohol use disorders, depressive symptoms, and physical health problems than those with no PTSD. However, sub-threshold PTSD for peacekeepers receiving treatment needs further study because clearly the subthreshold groups were, unexpectedly,

statistically significantly different from the full PTSD groups. The data show that peacekeepers with subthreshold PTSD have almost the same levels of health problems as those with full PTSD and higher trends toward alcohol use disorders and depression problems than veterans with no PTSD.

Limitations

Generalizability

There are several limitations to this study. The results of this study may not generalize to other traumatized populations, such as the general population, civilian psychiatric patients, or victims of other types of trauma, such as motor vehicle accidents. This study was also limited to male peacekeepers and may not generalize to female soldiers. This sample may not be representative of PTSD prevalence rates in the Canadian forces in general because the sample is comprised of VAC treatment-seeking pensioners. Another limitation is intrinsic to the screening instrument used to capture the construct of PTSD: the question in this investigation's survey version of the PCL-M asking veterans if they experienced a life-threatening event is missing. As a result, it can only be said that peacekeepers meeting subthreshold or full diagnostic levels of PTSD have "probable PTSD," (Asmundson, 2003).

Alcohol Use Data

The alcohol data also appeared problematic. As mentioned in the Results section, the mode of veterans with full and subthreshold PTSD was zero, and nearly 85 percent of the data was represented below the clinical cutoff in the full and subthreshold PTSD groups. Given the fact that the sample is comprised entirely of VAC pensioners, it is the opinion of the research directorate of the VAC, PEI and other researchers familiar with the 1999 Regular Forces Data that social desirability played a part in the consistent underreporting of alcohol use at each

grouping of PTSD in the sample. No social desirability scales were used in the VAC survey so no specific conclusions can be made about social desirability. However, the way the alcohol-related questions appeared in the VAC Clients Needs Survey might have encouraged the respondent to report low scores initially on the AUDIT, allowing them to skip the remainder of the questions pertaining to drinking behavior. The problems potentially associated with the questionnaire might have been avoided if redundant measures on psychiatric morbidity existed to obtain convergent validity. In addition to similar measures, other indicators of alcohol use offer higher correlations to alcohol abuse and dependence than measures of consumption such as the AUDIT, such as blood-alcohol levels or questions on driving records (Mollica et al., 1999).

Procedural Considerations

There were four methodological limitations for the present study. The use of secondary data and retrospective measures may have obscured some of the findings because there is no baseline of how these veterans looked prior to engaging in their peacekeeping missions (i.e., did the exposure to trauma precede peacekeeping?). The lack of data specifying traumatic events and age of onset limits the interpretation of the findings. Without this data, the type and severity of the veterans' traumatic experiences remains uncertain, which impacts the interpretation of the findings on issues, such as the impact of deploying. However, the fact that the symptoms have persisted until the time of the study is worth noting due to the fact that over 30 percent of the sample has probable PTSD or subthreshold PTSD, combined. Furthermore, it has been argued that comorbid anxiety and affective problems are secondary to or impacted by PTSD (Marshall et al., 2001).

The data also suggests that the larger the sample size the larger the variance. The large overall sample size may cause the smallest differences to be significant. The calculation of effect

size during different segments of the analysis was an attempt to further detect meaningful differences. Despite the problem of recording small differences as significant, the large number of subjects should generally be viewed as a strength of the study because of the statistical power generated from large sample sizes. Another limitation comes from the use of post hoc comparisons, such as the Bonferroni Method. Type I errors are more likely with conservative post hoc procedures.

Finally, the use of secondary data to study the concept of subthreshold PTSD does not address the predictive validity of the concept or provide empirical cause to treat subthreshold PTSD. These findings suggest that subthreshold PTSD is an indicator that there are many more impaired veterans due to trauma than perhaps previously thought. Several things must be studied in the future. Longitudinal studies are required to examine whether the presence of subthreshold PTSD prolongs the duration of health-related problems and increases the risk of the onset of full PTSD and other psychiatric disorders. Subthreshold PTSD also appears to have a persistent quality, thus distinguishing it from normal responses to trauma. A study of the temporal aspect of subthreshold PTSD and impairment also needs study. Finally, demographic information was studied to determine how personal characteristics influences the differences within the grouping variable on measures of psychiatric morbidity. The next logical step would be to look at what demographic factors place one at risk for full or subthreshold PTSD.

Future Studies

As mentioned before, the sample used in this study provides limited generalizability for this study's findings. The replication of this study with other samples including United States Armed Forces personnel, women, African-Americans, Latinos, Native Americans, and Asians is warranted in order to provide adequate replication of these findings. Furthermore, samples that

have pre-deployment and post-deployment data would provide more for more precise analyses of the impact of trauma when compared on other measures of psychiatric and physical health. The sample was comprised of treatment-seeking peacekeepers, therefore, future studies should be conducted with non-treatment-seeking peacekeepers in order to ascertain if the current studies findings apply to different segments of the military community.

The PTSD literature with respect to female peacekeepers is sparse compared to the literature on men. Given, the diversity of traumas suffered by women, it is warranted that future studies involving the impact of peacekeeping and PTSD be conducted to see if women are affected differently than men by these factors.

As cited in the literature review, stressors inherent in contemporary peacekeeping deployments are less studied than combat stressors. The changing nature and increased call for peacekeeping operations by nations worldwide has given rise to the need to understand the extent of trauma and its impact on psychological and physical well-being. Other studies, such as Lamerson and Kelloway (1996), have attempted to offer theoretical formulations for traumas experienced by peacekeepers. This current study looked at different levels of trauma on two measures of mental health problems to determine if there were differences between the peacekeepers with full PTSD, subthreshold PTSD, and no PTSD. By studying differences between those who have some symptoms of PTSD versus those with full PTSD, this study offer insight into how early intervention for victims of trauma may be identified. In the following section, the results and limitations are discussed in terms of their implications for social work practice.

Implications for Social Work Practice

Social work's involvement in mental health activity has arguably been prevention-oriented. However, most military social work prevention programs have focused on combat stress control (Yarvis, 2000) and most of the research on peacekeepers and peacekeeping stress to date has been conducted to determine what factors were causing the stress (Lamerson & Kelloway, 1996, Mehlum, 1998; Asmundson et al., 2003) and not about how this stress affects the peacekeepers. Research efforts on early intervention for trauma victims have been focused on analyzing the efficacy of procedures such as critical incidence stress debriefing, marketed to mental health practitioners as useful methods for the prevention of traumatic stress (e.g., Bisson et al., 1997). The current study represents one of the first empirical efforts to show the important implications associated with understanding trauma and its effect on psychological and physical morbidity. The results of the present study suggest that trauma symptoms should be addressed before clinical thresholds of full posttraumatic stress disorder are reached. Therefore, when subthreshold trauma symptoms are concomitant with any increase in depressive symptoms, alcohol use and physical complaints, social work and other mental health practitioners should readily consider the importance of these observations as antecedents to potentially irreversible and chronic traumatic disorders.

Conclusion

The findings of this study are consistent with previous empirical investigations of subthreshold PTSD. It highlights the importance of expanding research beyond the taxometric criteria for PTSD. The study, while showing that the current thresholds for PTSD do indicate greater severity of comorbid psychiatric problems, fuels the on-going debate associated with nosological approaches to sequelae of posttraumatic stress disorder. The present investigation

calls attention to an important military and public health implication that greater numbers of veterans and civilians may experience disability than previously thought because of expanding PTSD rates beyond the threshold of full PTSD. Longitudinal studies are needed which monitor soldiers from entrance into the military through subsequent military experience until retirement. Further, clinical trials of subthreshold PTSD and comorbidity need examination in the near future to further evaluate the relative importance of subthreshold disorders.

REFERENCES

- Adler, A. (1943). Neuropsychiatric complications in victims of Boston's Coconut Grove disaster. *Journal of the American Medical Association, 123*, 1098-1101.
- Allen, J. P., Litten, R. Z., Fertig, J. B., & Babor, T. F. (1997). A review of research on Alcohol Use Disorders Identification Test (AUDIT). *Alcoholism: Clinical and Experimental Research, 21*(4), 613-619.
- American Psychiatric Association. (1952). *Diagnostic and statistical manual of mental disorders*. Washington, DC: Author.
- American Psychiatric Association. (1968). *Diagnostic and statistical manual of mental disorders (2nd ed.)*. Washington, DC: Author.
- American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders (3rd ed.)*. Washington, DC: Author.
- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders (3rd ed., revised)*. Washington, DC: Author.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders (4th ed.)*. Washington, DC: Author.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders (4th ed., text revision)*. Washington, DC: Author.
- Arincorayan, D. F. K. (2000). *Leadership, group cohesion and in coping in relationship to soldiers' stress levels*. Unpublished manuscript.

- Asmundson, G. J. G. (2000). *VAC Canadian Forces survey analysis*. Regina, Saskatchewan: Department of Veterans Affairs.
- Asmundson, G. J. G., Bonin, M., Frombach, I., & Norton, G. R. (2000). Evidence of a disposition toward fearfulness and vulnerability to posttraumatic stress in dysfunctional pain patients. *Behavior Research and Therapy*, *38*, 801-812.
- Asmundson, G. J. G., Coons, M. J., Taylor, S., & Katz, J. (2002). PTSD and the experience of pain: Research and clinical implications of shared vulnerability and mutual maintenance models. *Canadian Journal of Psychiatry*, *47*(10), 930-937.
- Asmundson, G. J. G., Frombach, I., McQuaid, J. R., Pedrelli, P., Lenox, R., & Stein, M. B. (2000). Dimensionality of posttraumatic stress symptoms: A confirmatory factor analysis of DSM-IV symptom clusters and other symptom models. *Behavior Research and Therapy*, *38*, 203-214.
- Asmundson, G. J. G., Norton, R. G., Allardings, M. D., Norton, P. J., & Larsen, D. K. (1998). Post-traumatic stress disorder and work-related injury. *Journal of Anxiety Disorders*, *12*, 57-69.
- Asmundson, G. J. G., Stein, M. B., & McCreary, D. (2002). PTSD symptoms influence health status of deployed peacekeepers and non-deployed personnel. *Journal of Nervous and Mental Disease*, *190*(12), 807-815.
- Asmundson, G. J. G., Wright, K., McCreary, D., & Pedlar, D. (2003). Posttraumatic stress disorder symptoms in United Nations peacekeepers: An examination of factor structure and the influence of chronic pain. *Cognitive Behaviour Therapy*, *32*(1), 26-37.

- Babor, T. F., de la Fuente, J. R., & Saunders, J. (1992). *AUDIT, The Alcohol Use Disorders Identification Test: Guidelines for use in primary health care*. (PSA/92.4). Geneva: World Health Organization.
- Bailey, P., Williams, F. E., Kormora, P. O., Salmon, T. W., & Fenton, N. (Eds.). (1929). *The medical department of the United States Army in the World War* (Vol. 10-Neuropsychiatry). Washington, D.C.: U.S. Government Printing Office.
- Balgopal, P. R. (1989). Occupational social work: An expanded clinical perspective. *Social Work, 34*, 437-442.
- Ballone, E., Valentino, M., Occhiolini, L., Mascio, C., Cannone, D., & Schioppa, F. S. (2000). Factors influencing psychological stress levels of Italian peacekeepers in Bosnia. *Military Medicine, 165*(12), 911-915.
- Bandura, A. (1978). Self-efficacy: Toward a unifying theory of behavior change. *Psychological Review, 84*, 191-215.
- Bar-On, R., Solomon, Z., Noy, S., & Nardi, C. (1986). The clinical picture of combat stress reactions in the 1982 war in Lebanon: Cross-war comparisons. In N. A. Milgram (Ed.), *Stress and coping in time of war: Generalizations from the Israeli experience* (pp. 103-109). New York: Bruner/Mazel.
- Bartemeier, L. H. (1946). Combat exhaustion. *Journal of Nervous and Mental Disease, 104*, 359-425.
- Bartone, M. P. T., & Asler, A. B. (1998). Dimensions of psychological stress in peacekeeping operations. *Military Medicine, 163*(9), 587-593.
- Becker, J. V., Skinner, L. J., Abel, G. G., Axelrod, R., & Cichon, J. (1984). Sexual problems of sexual assault survivors. *Women and Health, 9*, 5-20.

- Beckham, J. C., Crawford, A. L., Feldman, M. E., Kirby, A. C., Hertzberg, M. A., Davidson, J. R., et al. (1997). Chronic posttraumatic stress disorder and chronic pain in Vietnam veterans. *Journal of Psychosomatic Research, 43*(4), 379-389.
- Beckham, J. C., Moore, S. D., Feldman, M. E., Herzberg, M. A., Kirby, A. C., and Fairbank, J. A. (1998). Health status, somatization and posttraumatic stress disorder severity in Vietnam combat veterans with posttraumatic stress disorder. *The American Journal of Psychiatry, 155*, 1565-1569.
- Belenky, G. L. (1987). Varieties of reaction and adaptation to combat experience. *Bulletin of the Menninger Clinic, 51*, 64-79.
- Birmes, P., Carreras, D., Ducassé, J., Charlet, J., Warner, B. A., Lauque, D., et al. (2001). Peritraumatic dissociation, acute stress, and early posttraumatic stress disorder in victims of general crime. *Canadian Journal of Psychiatry, 46*(7), 649-651.
- Bisson, J. I., Jenkins, P. L., Alexander, J., & Bannister, C. (1997). A randomized controlled trial of psychological debriefing for victims of acute harm. *British Journal of Psychiatry, 171*, 78-81.
- Black, W. G. (1993). Military-induced family separation. *Social Work, 38*, 273-280.
- Blake, D. D., Weathers, F. W., Magy, L. M., Kaloupek, D. G., Gusman, F. D., Charney, D. S., et al. (1995). The development of a clinician-administered PTSD scale. *Journal of Traumatic Stress, 8*, 75-90.
- Blanchard, E. B., Buckley, T. C., Hickling, E. J., & Taylor, A. E. (1998). Posttraumatic stress disorder and comorbid depression: Is the correlation an illusion? *Journal of Anxiety Disorders, 12*, 21-37.

- Blanchard, E. B., Hickling, E. J., Barton, K. A., Taylor, A. E., Loos, W. R., & Jones-Alexander, J. (1996). One year prospective follow-up of motor vehicle accident victims. *Behavioral Research on Therapy, 34*, 775-786.
- Blanchard, E. B., Jones-Alexander, J., Buckley, T. C., & Forneris, C. A. (1996). Psychometric properties of the PTSD Checklist (PCL). *Behavior Research and Therapy, 34*, 669-673.
- Blashfield, R. K. (1984). *The classification of psychopathology : Neo-Kraepelinian and quantitative approaches*. New York: Plenum Press.
- Bleich, A., Siegei, B., Garb, R., & Lerer, B. (1986). Post-traumatic stress disorder following combat exposure. *British Journal of Psychiatry, 149*, 365-369
- Bleich, A., Koslowsky, A. D., & Lerer, B. (1997). Post-traumatic stress disorder and depression: An analysis of comorbidity. *British Journal of Psychiatry, 170*, 479-482.
- Blow, F. C., Loveland-Cook, C. A., Booth, B. M., Falcon, S. P., & Friedman, M. (1992). Age-related psychiatric comorbidities and level of functioning in alcoholic veterans seeking outpatient treatment. *Hospital and Community Psychiatry, 43*(10), 990-995.
- Bohn, M. J., Babor, T. F., & Kranzler, H. R. (1995). The Alcohol Use Disorders Identification Test (AUDIT): Validation of a screening instrument for use in medical settings. *Journal of Studies on Alcohol, 56*, 423-432.
- Boisvert, J. A., McCreary, D., Wright, K., & Asmundson, G. J. G. (2003). Factor validity of the Center for Epidemiologic Studies Depression (CES-D) Scale in military peacekeepers. *Depression and Anxiety, 17*, 19-25.
- Bordnick, P., Graap, K., & Vonk, M. E. (In press). Evaluating post traumatic stress disorder in a clinical setting. In A. Roberts & K. Yeager (Eds.), *Handbook of practiced-focused research and evaluation*. Oxford: Oxford University Press.

- Boudewyns, P. A., & Hyer, L. A. (1990). Physiological response to combat memories and preliminary treatment outcome in Vietnam veteran PTSD patients treated with direct therapeutic exposure. *Behavior Therapy, 21*, 63-87.
- Boudewyns, P. S., & Shipley, R. H. (1983). *Flooding and implosive therapy*. New York: Plenum Publishing.
- Boudewyns, P. A., Woods, M. G., Hyer, L. A., & Albrecht, J. W. (1991). Chronic combat-related PTSD and concurrent substance abuse: Implications for treatment of this frequent "dual diagnosis." *Journal of Traumatic Stress, 4*, 549-560.
- Brady, K. T. (1997). Posttraumatic stress disorder and co-morbidity: Recognizing the many faces of PTSD. *Journal of Clinical Psychiatry, 58* (suppl 9): 12-5.
- Bramsen, I., Dirkzwager, A. J. E., & van der Ploeg, H. M. (2000). Pre-deployment personality traits and exposure to trauma as predictors of posttraumatic stress symptoms: A prospective study of former peacekeepers. *American Journal of Psychiatry, 157*, 1115-1119.
- Bramsen, I., Dirkzwager, A. J. E., van Esch, S. C. M., & van der Ploeg, H. M. (2001). Consistency of self-reports of traumatic events in a population of Dutch peacekeepers: Reasons for optimism. *Journal of Traumatic Stress, 14*(4), 733-740.
- Bray, R. M., Fairbank, J. A., & Marsden, M. E. (1999). Stress and substance use among military women and men. *American Journal of Drug and Alcohol Abuse, 25*, 239-256.
- Bremner, D. J., Southwick, S., Darnell, A., & Charney, D. S. (1996). Chronic PTSD in Vietnam combat veterans: course of illness and substance abuse. *American Journal of Psychiatry, 153*(3), 369-375.

- Breslau, N., Davis, G. C., Andreski, P., & Peterson, E. L. (1991). Traumatic events and posttraumatic stress disorder in an urban population of young adults. *Archives in General Psychiatry, 48*, 216-222.
- Breslau, N., Davis, G. C., Peterson, E. L., and Schultz, L. R. (2000). A second look at comorbidity in victims of trauma: The posttraumatic stress disorder - major depression connection. *Biological Psychiatry, 48*, 902-909.
- Brett, E. A. (1996). The classification of posttraumatic stress disorder. In B. A. van der Kolk, A. C. McFarlane, & L. Weisaeth (Eds.), *Traumatic stress: The effects of overwhelming experience on mind, body, and society*. New York: Guilford Press.
- Bride, B. E. (2001). *Psychometric properties of the secondary traumatic stress scale*. Unpublished Doctoral dissertation, The University of Georgia, Athens, GA.
- Brofenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Brown, P. J., & Wolfe, J. (1994). Substance abuse and post-traumatic stress disorder comorbidity. *Drug and Alcohol Dependency, 35*, 51-59.
- Buckley, T. C., Blanchard, E. B., & Hickling, E. J. (1998). A confirmatory factor analysis of posttraumatic stress symptoms. *Behavior Research and Therapy, 36*, 1091-1099.
- Calhoun, P. S., Sampson, W. S., Bosworth, H. B., Feldman, M. E., Kirby, A. C., Hertzberg, M. A. (2000). Drug use and validity of substance use self-reports in veterans seeking help for posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology, 68*(5), 923-927
- Callahan, R., & Callahan, J. (1996). *Thought field therapy (TFT) and trauma: Treatment and theory*. Indian Wells, CA: Thought Field Therapy Training Center.

- CANFORGENS (1998). Witness the Evil (Author, Director). Ottawa, CA: DGPA-National Defense Headquarters-Ottawa.
- Cannon, W.B. (1914) The emergency function of the adrenal medulla in pain and the major emotions. *American Journal of Physiology* 33: 356-372.
- Card, J. J. (1987). Epidemiology of posttraumatic stress disorder in a national cohort of Vietnam veterans. *Journal of Clinical Psychology*, 43, 6-17.
- Carey, P. D., Stein, D. J., Nompumelelo, Z. D., & Seedat, S. (2003). Trauma and posttraumatic stress disorder in an urban Xhosa primary care population: Prevalence, comorbidity, and severe use patterns. *Journal of Nervous and Mental Disease*, 191(4), 230-236.
- Carlier, I. V. E., & Gersons, B. P. R. (1995). Partial posttraumatic stress disorder: The issue of psychological scars and the occurrence of PTSD symptoms. *Journal of Nervous and Mental Disease*, 183(2), 107-109.
- Carlier, I. V. E., Lamberts, R. D., Fouwels, A. J., & Gersons, B. P. R. (1996). PTSD in relation to dissociation in traumatized police officers. *American Journal of Psychiatry*, 153(10), 1325-1328.
- Cavenar, J. O., & Nash, J. L. (1976). The effects of combat on the normal personality: War neurosis in Vietnam returnees. *Comprehensive Psychiatry*, 17, 647-653.
- Castro, C. A., Bienvenu, R. V., Huffman, A. H., & Adler, A. B. (2000). Soldier dimensions and operational readiness in the U.S. Army forces deployed to Kosovo. *International Review of the Armed Forces Medical Services*.
- Cherpitel, C. J. (1995). Analysis of cutoff points for screening instruments for alcohol problems in the emergency room. *Journal of Studies on Alcohol*, 56, 695-700.

- Clark, D., Lesnick, L., & Hegedus, A. (1997). Traumas and other adverse life events in adolescents with alcohol abuse and dependence. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 1744-1751.
- Clements, R. (1998). A critical evaluation of several alcohol screening instruments using the CIDI-SAM as a criterion measure. *Alcoholism: Clinical and Experimental Research*, 22(5), 985-993.
- Clum, G. A., Calhoun, K. S., & Kimerling, R. (2000). Associations among symptoms of depression and posttraumatic stress disorder and self-reported health in sexually assaulted women. *Journal of Nervous and Mental Disease*, 188, 671-678.
- Cooper, C. L., Dewe, P. J., & O'Driscoll, M. P. (2001). *Organizational stress: A review and critique of theory, research, and applications*. Thousand Oaks, CA: Sage.
- Cooper, N. A., & Clum, G. A. (1989). Imaginal flooding as a supplementary treatment for PTSD in combat veterans. A controlled study. *Behavior Therapy*, 20, 381-391.
- Cryer, L., & Beutler, L. (1980). Group therapy: An alternative treatment approach for rape victims. *Journal of Sex and Marital Therapy*, 6, 40-46.
- Daly, R. J. (1983). Samuel Pepys and posttraumatic stress disorder. *British Journal of Psychiatry*, 143, 64-68.
- Danieli, Y. (Ed.). (1998). *International handbook of multigenerational legacies of trauma*. New York: Plenum Press.
- Danieli, Y., Rodley, N., & Weisaeth, L. (Eds.). (1996). *International Responses to traumatic stress*. Amityville, NY: Baywood Publishing Company.

- Davidson, J. R. T. (1994). Issues in the diagnosis of posttraumatic stress disorder. In R. S. Pynoos (Ed.), *Posttraumatic stress disorder: A clinical review* (pp. 1-15). Lutherville, MD: Sidran Press.
- Davidson, J. R. T., & Foa, E. B. (1991). Diagnostic issues in posttraumatic stress disorder: Considerations for the DSM-IV. *Journal of Abnormal Psychology, 100*, 346-355.
- Davidson, J. R. T., Hughes, D., Blzer, D., & George, L.K. (1991). Posttraumatic stress disorder in the community: An epidemiological study. *Psychological Medicine, 21*, 1-19.
- Davis, H. (1999). The psychiatrization of post-traumatic distress: Issues for social workers. *British Journal of Social Work, 29*, 755-777.
- Deahl, M. P., Srinivasan, M., Jones, N., Thomas, J., Neblett, C., & Jolly, A. (2000). Preventing psychological trauma in soldiers: The role of operational stress training and psychological debriefing. *British Journal of Medical Psychology, 73*, 77-85.
- de Girolamo, G., & McFarlane, A. C. (1996). Epidemiology of posttraumatic stress disorders: A comprehensive review of the literature. In A. J. Marsella, M. J. Friedman, E. Gerrity, & R. Scurfield (Eds.), *Ethnocultural aspects of post-traumatic stress disorder: Issues, research, and directions*. Washington, DC: American Psychological Association.
- Devilley, G. J., & Spence, S. H. (1999). The relative efficacy and treatment distress of EMDR and a cognitive behavioral trauma treatment protocol in the amelioration of post traumatic stress disorder. *Journal of Anxiety Disorders, 13*, 131-157.
- Devins, G. M., & Orme, C. M. (1985). Center for Epidemiologic Studies Depression Scale. In D. J. Keyser & R. C. Sweetland (Eds.), *Test critiques: Vol. 2*. Kansas City, MO: Test Corporation of America.

- Deykin, E. Y., & Buka, S. L. (1997). Prevalence and risk factors for posttraumatic stress disorder among chemically dependent adolescents. *American Journal of Psychiatry*, *154*, 752-757.
- Doublet, S. (2000). *The stress myth*. Chesterfield, MO: Science and Humanities Press.
- Ehlich, P. J., Roemer, L., & Litz, B. T. (1997). PTSD after a peacekeeping mission. *American Journal of Psychiatry*, *154*(9), 1319-1320.
- Engel, C. C., Liu, X., McCarthy, B. D., Miller, R. F., & Ursano, R. (2000). Relationship of physical symptoms to posttraumatic stress disorder among veterans seeking care for gulf war-related health concerns. *Psychosomatic Medicine*, *62*, 739-745.
- Everly, G., & Lating, J. (Eds.). (1995). *Psychotraumatology*. New York: Plenum Press.
- Ewing, J. A. (1984). Detecting alcoholism: The CAGE questionnaire. *Journal of the American Medical Association*, *252*, 1905-1907.
- Fairbank, J. A., Schlenger, W.E. , Saigh, P.A. & Davidson, J. R. T. (1995). An epidemiologic profile of posttraumatic stress disorder: Prevalence, co-morbidity, and risk factors. In M.J. Friedman, D.S. Charney, & A. Deutch. (Eds.), *Neurobiological and clinical consequences of stress: From normal adaptation to PTSD* (pp. 415-427). New York: Raven Press.
- Falsetti, S. A., Resnick, H. S., Resnick, P. A., & Kilpatrick, D. G. (1993). The Modified PTSD Symptom Scale: A brief self-report measure of posttraumatic stress disorder. *The Behaviour Therapist*, *16*(6), 161-162.
- Ferrada-Noli, M., Asberg, M., Ormstad, K., Lundin, T., & Sundbom, E. (1998). Suicidal behavior after severe trauma, part 1: PTSD diagnoses, psychiatric comorbidity, and assessments of suicidal behavior. *Journal of Traumatic Stress*, *11*, 103-112.

- Figley, C. R. (Ed.). (1978). *Stress disorders among Vietnam veterans: Theory, treatment and research*. New York: Brunner/Mazel.
- Fink, A. (1995). *How to sample in surveys*. Thousand Oaks, CA: Sage.
- Flett, G. L., Vrendenburg, K., & Krames, L. (1997). The continuity of depression in clinical and non-clinical samples. *Psychological Bulletin*, *121*, 395-416.
- FM 8-51, . (1994). *Combat stress control in a theater of operations*. Washington, DC: Government Printing Office.
- Foa, E. B., Rothbaum, B. O., & Furr, J. M. (2003). Augmenting exposure therapy with other CBT procedures. *Psychiatric Annals*, *33*(1), 47-53.
- Foa, E. B., Steketee, G., & Rothbaum, B. O. (1989). Behavioral/cognitive conceptualizations of post-traumatic stress disorder. *Behavior Therapy*, *20*, 155-176.
- Fontana, A., Rosenheck, R., Spencer, H., & Gray, S. C. (1995). *The log journey home IV: The fourth progress report on the Department of Veterans Affairs specialized PTSD programs*. West Haven, CT: Department of Veterans Affairs, Northeast Program Evaluation Center.
- Forbes, D., Creamer, M., & Biddle, D. (2001). The validity of the PTSD checklist as a measure of symptomatic change in combat-related PTSD. *Behaviour Research and Therapy*, *39*, 977-986.
- Forbes, D., Creamer, M., Hawthorne, G., Allen, N., & McHugh, T. (2003). Comorbidity as a predictor of symptoms change after treatment in combat-related posttraumatic stress disorder. *Journal of Nervous and Mental Disease*, *191*(2), 93-99.

- Freud, S. (1955a). Beyond the pleasure principle. In J. Strachey (Ed.), *Beyond the pleasure principle, group psychology, and other works (1920-1922)* (Vol. 18, pp. 3-64). London, England: Hogarth Press.
- Freud, S. (1955b). The war neurosis. In J. Strachey (Ed.), *An infantile neurosis and other works (1917-1919)*. (Vol. 17, pp. 3-64). London, England: Hogarth Press.
- Friedman, M., & Yehuda, R. (1996). PTSD and comorbidity: psychological approaches to differential diagnosis. In M. Friedman, D. S. Charney, & A. Deutch (Eds.), *Neurobiological and clinical consequences of stress: From normal adaptation to PTSD*. New York: Raven Press.
- Gangestad, S., & Snyder, M. (1985). "To carve nature at its joints": On the existence of discrete classes of personality. *Psychological Review*, *92*, 317-349.
- Giaconia, R. M., Reinherz, H.Z., Hauf, A. C., Paradis, A. D., Wasserman, M. S., & Langhammer, D. M. (2000). Comorbidity of substance use and post-traumatic stress disorders in a community sample of adolescents. *American Journal of Orthopsychiatry*, *70*(2), 253-262.
- Gold, P. B., Engdahl, B. E., Eberly, R. E., Blake, R., J., Page, W. F., & Frueh, B. C. (2000). Trauma exposure, resilience, social support and PTSD construct validity among former prisoners of war. *Social Psychiatry and Psychiatric Epidemiology*, *35*, 36-42.
- Goodwin, J. (1987). The etiology of combat-related traumatic stress disorders. In T. Williams (Ed.), *Post-traumatic stress disorders: A handbook for clinicians*. (pp. 1-18). Cincinnati, OH: Disabled American Veterans.

- Green, B. L., Lindy, J. D., Grace, M. C., & Leonard, A. C. (1992). Chronic posttraumatic stress disorder and diagnostic comorbidity in a disaster sample. *Journal of Nervous and Mental Disease, 180*, 760-766.
- Green, L. B. (1994). Psychosocial research in traumatic stress: An update. *Journal of Traumatic Stress, 7*, 341-362.
- Grice, D. E., Brady, K. T., & Dustan, L. R. (1995). Sexual assault history and posttraumatic stress disorder in substance-dependent individuals. *The American Journal of Addictions, 4*, 297-305.
- Grigsby, J. P. (1987). The use of imagery in the treatment of posttraumatic stress disorder. *The Journal of Nervous and Mental Disease, 175*, 55-59.
- Grinker, R. R., & Spiegel, J. P. (1945). *Men under stress*. Philadelphia: Blakiston.
- Hall, D. P., Bicknell, G., & Cipriano, E. D. (1997). Preventive mental health interventions in peacekeeping missions to Somalia and Haiti. *Military Medicine, 162*, 41-43.
- Harris, J. (1999). History of army social work. In J. G. Daley (Ed.), *Social work practice in the military* (pp. 3-22). New York: Haworth Press.
- Haslam, N. (1997). Evidence that male sexual orientation is a matter of degree. *Journal of Personality and Social Psychology, 73*, 862-870.
- Hays, R. D., Merz, J. F., & Nicholas, R. (1995). Response burden, reliability, and validity of the CAGE, Short MAST, and AUDIT alcohol screening measures. *Behavioral Research Methods, Instruments and Computers, 27*(277-280).
- Helmchen, H., & Linden, M. (2000). Subthreshold disorders in psychiatry: clinical reality, methodological artifact, and double-threshold problem. *Comprehensive Psychiatry, 41*, 1-7.

- Helzer, J. E., Robins, L. N., & McEvoy, L. (1987). Posttraumatic stress disorder in the general population: Findings of the Epidemiologic Catchment Area survey. *New England Journal of Medicine*, *317*, 1630-1634.
- Hoge, C. W., Lesikar, S. E., Guevara, R., Lange, J., Brundage, J. F., Engel, C. C., et al. (2002). Mental disorders among U.S. military personnel in the 1990s: Association with high levels of health care utilization and early military attrition. *American Journal of Psychiatry*, *159*, 1576-1583.
- Horowitz, M. D., & Solomon, G. F. (1975). A prediction of delayed stress syndrome in Vietnam veterans. *Journal of Social Issues*, *4*, 67-79.
- Horowitz, M. J., Weiss, D. S., & Marmar, C. R. (1987). Diagnosis of posttraumatic stress disorder. *Journal of Nervous and Mental Disease*, *175*, 267-268.
- Horowitz, M., Wilner, N., & Alvarez, W. (1979). Impact of Event Scale: a measure of subjective stress. *Psychosomatic Medicine*, *41*, 209-218.
- Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). New York: John Wiley and Sons, Inc.
- Hotopf, M., David, A. S., Hull, L., Ismail, K., Palmer, I., Unwin, C., et al. (2003). The health effects of peace-keeping in UK Armed Forces: Bosnia 1992-1996. Predictors of Psychological Symptoms. *Psychological Medicine*, *33*, 155-162.
- Ivis, F. J., Adlaf, E. M., & Rehm, J. (2000). Incorporating the AUDIT into a general population phone survey: A methodological experiment. *Drug and Alcohol Dependence*, *60*, 97-104.
- Johnson, P., & Lubin, H. (1997). Treatment preferences of Vietnam veterans with posttraumatic stress disorder. *Journal of Traumatic Stress*, *10*(3), 391-403.

- Jones, F. D. (1995). Chronic post-traumatic stress disorder. In F. D. Jones, L. R. Sparacino, V. L. Wilcox, J. M. Rothberg, and J. W. Stokes (Eds.), *War psychiatry* (Vol. Part I, pp. 411-430). Bethesda, MD: Office of the Surgeon General of the United States Army.
- Kang, H. K., Natelson, B. H., Mahan, C. M., Lee, K. Y., & Frances, M. (2003). Post-traumatic stress disorder and chronic fatigue syndrome-like illness among Gulf War veterans: A population-based survey of 30,000 veterans. *American Journal of Epidemiology*, *157*(2), 141-148.
- Kaplan, H. I., & Sadock, B. J. (Eds.). (1998). *Synopsis of psychiatry* (8th ed.). Baltimore, MD: Williams & Wilkins.
- Kardiner, A. (1941). The traumatic neuroses of war. *Psychosomatic Medicine Monographs*, *1*(2 & 3).
- Keane, T. M., Caddell, J. M., & Taylor, K. L. (1988). Mississippi scales for combat-related posttraumatic stress disorder; three studies in reliability and validity. *Journal of Consulting and Clinical Psychology*, *56*, 85-90.
- Keane, T. M., Fairbank, J. A., Caddell, J. M., & Zimering, R. T. (1989). Implosive (flooding) therapy reduces symptoms of post-traumatic stress disorder in Vietnam veterans. *Behavior Therapy*, *20*, 245-260.
- Keane, T. M., Gerardi, R. J., Lyons, J. A., & Wolfe, J. (1988). The interrelationship of substance abuse and posttraumatic stress disorder: Epidemiological and clinical considerations. In M. Galanter (Ed.), *Recent developments in alcoholism* (Vol. 6, pp. 27-48). New York: Plenum Press.
- Keane, T. M., & Kaloupek, D. G. (1982). Imaginal flooding in the treatment of post-traumatic stress disorder. *Journal of Consulting and Clinical Psychology*, *53*, 95-102.

- Keane, T. M., Zimering, R. T., & Caddell, J. M. (1985). A behavioral formulation of posttraumatic stress disorder in Vietnam combat veterans. *Behavior Therapy, 20*, 245-260.
- Kessler, R. C., Sonnega, A., Bromet, E., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Study. *Archives in General Psychiatry, 52*, 1048-1060.
- Kimerling, R., Clum, G. A., & Wolfe, J. (2000). Relationships among trauma exposure, chronic posttraumatic stress disorder symptoms, and self-reported health in women: Replication and extension. *Journal of Traumatic Stress, 13*, 115-128.
- King, D. W., Leskin, G. A., King, L. A., & Weathers, F. W. (1998). Confirmatory factor analysis of the Clinician-Administered PTSD Scale: Evidence for the dimensionality of posttraumatic stress disorder. *Psychological Assessment, 10*(2), 90-96.
- King, M. E., & Bordnick, P. S. (2002). Alcohol use disorders: A social worker's guide to clinical assessment. *Journal of Social Work Practice in the Addictions, 2*(1), 3-31.
- Kodama, Y., Nomura, S., & Ogasawara, T. (2000). Psychological changes of Japan self-defense forces personnel during selection and training for the peacekeeping mission in the Golan Heights. *Military Medicine, 165*(9), 653-655.
- Kolb, L. C. (1988). A critical survey of hypotheses regarding post-traumatic stress disorders in light of recent findings. *Journal of Traumatic Stress, 1*(3), 291-304.
- Komar, Z., & Vukusic, H. (1999). Posttraumatic stress disorder in Croatia war veterans: Prevalence and psycho-social characteristics. In D. Dekaris & A. Sabioncello (Eds.), *New insight in posttraumatic stress disorder (PTSD)* (pp. 42-44). Zagreb, Croatia: Croatian Academy of Science and Arts.

- Kormos, H. R. (1978). The nature of combat stress. In C. R. Figley (Ed.), *Stress disorders among Vietnam veterans*. (pp. 3-22). New York: Bruner/Mazel.
- Kosten, T. R., Mason, J. W., Giller, E. L., Ostroff, R. B., & Harkness, L. (1987). Sustained urinary norepinephrine and epinephrine elevation in PTSD. *Psychoneuroendocrinology*, *12*, 13-20.
- Kozaric-Kovacic, D. (1999). PTSD and comorbidity. In D. Dekaris & A. Sabioncello (Eds.), *New insight in posttraumatic stress disorder (PTSD)*. Zagreb, Croatia: Croatian Academy of Science and Arts.
- Kozaric-Kovacic, D., & Kocijan-Hercigonja, D. (2001). Assessment of post-traumatic stress disorder and comorbidity. *Military Medicine*, *166*(8), 677-680.
- Krystal, H. (1988). *Integration and self-healing: Affect, trauma, alexithymia*. Hillsdale, NJ: Analytic Press.
- 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*. New York: Bruner/Mazel.
- Kulka, R. A., Schlenger, W. E., Fairbank, J. A., Hough, B. K., Marmar, C. R., and Weiss, D. S. (1991). Assessment of PTSD in the community: Prospects and pitfalls from recent studies of Vietnam veterans. *Journal of Consulting and Clinical Psychology*, *3*, 547-560.
- Kulka, R. A., Schlenger, W. E., Fairbank, J. A., Hough, R. L., Jordan, B. K., Marmar, C. R., et al. (1989). Validating questions against clinical evaluations: A recent example using diagnostic interview schedule-based and other measures of post-traumatic stress Disorder. In F. J. Fowler (Ed.), *Health survey research methods (DHHS Publication No. PHS 89-3447)*. Washington, DC: U.S. Government Printing Office.

- Kulka, R. A., Schlenger, W. E., Fairbank, J. A., Marmar, C. R., & Weiss, D. S. (1991). Assessment of PTSD in the community: Prospects and pitfalls from recent studies of Vietnam veterans. *Journal of Consulting and Clinical Psychology, 3*, 547-560.
- Lamerson, C. D., & Kelloway, E. K. (1996). Towards a model of peacekeeping stress: Traumatic and contextual influences. *Canadian Psychology, 37*(4), 195-204.
- Langholtz, H. J. (Ed.). (1998). *The psychology of peacekeeping*. Westport, CT: Praeger Publishers.
- Laughlin, H. P. (1967). *The neuroses*. Baltimore, MD: Butterfield Press.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping*. New York: Springer.
- Lerer, B., Bleich, A., Kotler, M., Garb, R., Hertzberg, M. A., & Levin, B. (1987). Post-traumatic stress disorder in Israeli combat veterans. *Archives in General Psychiatry, 44*, 976-981.
- Lerner, R. M. (1976). *Concepts and theories of human development*. Reading, MA: Addison-Wesley.
- Lerner, R. M. (1991). Changing organism-context relations as the basic process of development: A developmental contextual perspective. *Developmental Psychology, 27*, 27-32.
- Lewis, S. J. (2003). *A multi-level, longitudinal study of strain reducing effects of group efficacy, group cohesion, and leader behaviors on military personnel performing peacekeeping operations*. Unpublished Doctoral dissertation, The Florida State University, Tallahassee, FL.
- Lewis, S. J. (In press). Do one shot interventions for PTSD work? *Aggression and Violent Behavior*.
- Lilienfeld, S. O., Lynn, S. J., & Lohr, J. M. (Eds.). (2003). *Science and pseudoscience in clinical psychology*. New York: The Guilford Press.

- Litz, B. (1996). The psychological demands of peacekeeping for military personnel. *Clinical Quarterly*, 6(1), 1-15.
- Litz, B., Orsillo, S., Friedman, M., Ehlich, P., & Batres, A. (1997 a). Posttraumatic stress disorder associated with peacekeeping duty in Somalia for U.S. military personnel. *American Journal of Psychiatry*, 154(2), 178-184.
- Litz, B., Schlenger, W. E., Weathers, F. W., Caddell, J. M., Fairbank, J. A., & LaVange, L. (1997 b). Predictors of emotional numbing in posttraumatic stress disorder. *Journal of Traumatic Stress*, 10, 607-618.
- 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.
- MacDonald, C., Chamberlain, K., Long, N., & Mirfin, K. (1999). Stress and mental health status associated with peacekeeping duty for New Zealand Defense Force personnel. *Stress Medicine*, 15(4), 235-241.
- MacDonald, C., Pereira-Laird, J., Chamberlain, K., Mirfin, K., & Long, N. (1998). Mental health, physical health and stressors reported by New Zealand Defense Force peacekeepers: A longitudinal study. *Military Medicine*, 163(7), 477-481.
- Manzer, J. (2003). APA: Post-traumatic stress plaguing Canadians. Study reveals prevalence higher than in U.S. *The Medical Post*, 39(22).
- Marmar, C. R., Weiss, D. S., Schlenger, W. E., Fairbank, J. A., Jordan, B. K., Kulka, R. A., et al. (1994). Peritraumatic dissociation and post-traumatic stress in male Vietnam theater veterans. *American Journal of Psychiatry*, 151, 902-907.

- Marshall, R. D., Olfson, M., Hellman, F., Blanco, C., Guardino, M., & Struening, E. L. (2001). Comorbidity, impairment and suicidality in subthreshold PTSD. *American Journal of Psychiatry, 158*, 1467-1473.
- Marshall, R. D., & Pierce, D. (2000). Implications of recent findings in posttraumatic stress disorder and the role of pharmacotherapy. *Harvard Review of Psychiatry, 7*, 247-256.
- Marshall, R. P., Jorm, A. F., & Grayson, D. A. (1998). Posttraumatic stress disorder and other predictors of health care consumption by Vietnam veterans. *Psychiatric Services, 49*, 1609-1611.
- Marshall, V. W., Matteo, R. A., & Mueller, M. M. (2000). *Canadian forces clients of veterans affairs Canada: Employment status, career and retirement planning issues*. Chapel Hill, NC: University of North Carolina Institute on Aging.
- Martinez, J. A., Huffman, A. H., Castro, C. A., & Adler, A. B. (2002). Assessing psychological readiness in U.S. soldiers following NATO operations. *International Review of the Armed Forces Medical Services., 73*, 139-142.
- McCreary, D., & Sadava, S. (1998). Stress, drinking, and the adverse consequences of drinking in two samples of young adults. *Psychology of Addictive Behaviors, 12*(4), 247-261.
- McFall, M., Makcay, P., & Donovan, D. (1992). Combat-related post-traumatic stress disorder and severity of substance abuse in Vietnam veterans. *Journal of Studies of Alcohol, 53*, 357-363.
- McQuaid, J. R., Pedrelli, P., McCahill, M. E., & Stein, M. B. (2001). Reported trauma, post-traumatic stress disorder and major depression among primary care patients. *Psychological Medicine, 31*, 1249-1257.

- Meakins, J. C., & Wilson, R. M. (1918). The effect of certain sensory stimulation on the respiratory rate in case of so-called "irritable heart." *Heart*, 7, 17-22.
- Mehlum, L. (1998). *Alcohol and stress in Norwegian UN peace-keepers*. Paper presented at the International conference on the psycho-social consequences of war, Dubrovnik, Croatia.
- Mehlum, L., & Weisaeth, L. (2002). Predictors of posttraumatic stress reactions in Norwegian U.N. Peacekeepers 7 years after service. *Journal of Traumatic Stress*, 15(1), 17-26.
- Meisler, A. W. (1996). Trauma, PTSD, and substance abuse. *PTSD Research Quarterly*, 7(4), 1-8.
- Mitchell, J. T., & Everly, G. S., Jr. (1997). The scientific evidence for critical incident stress management. *Journal of Emergency Services*, 22, 86-93.
- Mollica, R. F., McIness, K., & Sarajliac, N. (1999). Disability associated with psychiatric comorbidity and health status in Bosnian refugees living in Croatia. *Journal of the American Medical Association*, 282, 433-439.
- Mott, F. W. (1919). *War neurosis and shell shock*. London: Oxford University Press.
- Mowrer, O. H. (1947). On the dual nature of learning: A reinterpretation of "conditioning" and "problem solving." *Harvard Educational Review*, 17, 102-148.
- Neal, L. A., Hill, N., Hughes, J., Middleton, A., & Busuttil, W. (1995). Convergent validity of measures of PTSD in an elderly population of former prisoners of war. *International Journal of Geriatric Psychiatry*, 10, 617-622. \
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory*. New York: McGraw-Hill.
- O'Donohue, W., & Elliott, A. (1992). The current status of post-traumatic stress disorder as a diagnostic category: Problems and proposals. *Journal of Traumatic Stress*, 5, 421-439.

- Op Den Weld, W., Aarts, P., Falger, P., Hovens, J., Van Duijn, H., De Goen, J., et al. (2002). Alcohol use, cigarette consumption and chronic post-traumatic stress disorder. *Alcohol & Alcoholism, 37*(4), 355-361.
- Passey, G. (1995). *Psychological consequences of Canadian U.N. peacekeeping duties in Croatia and Bosnia 1992-93*. Paris, France: 4th European Conference on Traumatic Stress.
- Pedlar, D. (2003). *The regular forces data set*. Proceedings from the Health and Transition Among Regular Force Clients: Lessons Learned from the Regular Force Data Set., Charlottetown, PEI.
- Perl, M., Westin, A. B., & Peterson, L. G. (1985). The female rape survivor: time-limited group therapy with female/male co-therapists. *Journal of Psychosomatic Obstetrics and Gynecology, 4*, 197-205.
- Perry, B. D. (1994). Neurobiological sequelae of childhood trauma: Posttraumatic stress disorders in children. In M. Murburg (Ed.), *Catecholamines in posttraumatic stress disorder: Emerging concepts* (pp. 233-276). Washington, DC: American Psychiatric Press.
- Pilgrim, D., & Bentall, R. P. (1999). The medicalisation of misery: A critical realist analysis of the concept of depression. *Journal of Mental Health, 8*, 261-274.
- Pincus, H. A., Davis, W. W., & McQueen, L. E. (1999). 'Subthreshold' mental disorders. *British Journal of Psychiatry, 174*, 288-296.
- Pittman, R., Orr, S., Fogue, D., Altman, B., & deJong, J. (1990). Psychophysiologic responses to combat imagery of Vietnam veterans with posttraumatic stress disorder versus other anxiety disorders. *Journal of Abnormal Psychology, 99*, 49-54.

- Powell, J. E., & McInness, K. (1994). Alcohol use among older hospital patients: Findings from an Australian study. *Drug and Alcohol Review, 13*, 5-12.
- Prins, A., Kaloupek, D. G., & Keane, T. M. (1995). Psychophysiological evidence for autonomic arousal and startle in traumatized adult populations. In M. J. Friedman, D. S. Charney, & A. Y. Deutch (Eds.), *Neurobiological and clinical consequences of stress: From normal adaptation to post-traumatic stress disorder*. Philadelphia: Lippincott-Raven.
- Radloff, L. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measures, 1*, 385-401.
- Ramsay, R., Gorst-Unsworth, C., & Turner, S. (1993). Psychiatric morbidity in survivors of organized state violence including torture. *British Journal of Psychiatry, 162*, 55-59.
- Resick, P. A. (2001). *Stress and trauma*. East Essex, UK: Psychology Press, Ltd.
- Resnick, H. S., Acierno, R., & Kilpatrick, D. G. (1997). Health impact of internal personal violence 2: Medical and mental health outcomes. *Behavioral Medicine, 23*, 65-78.
- Resnick, H. S., Yehuda, R., Pitman, R. K., & Foy, D. W. (1995). Effect of previous trauma on acute plasma cortisol level following rape. *American Journal of Psychiatry, 152*, 1675-1677.
- Riggs, D. S., Byrne, C. A., Weathers, F. W., & Litz, B. (1998). The quality of intimate relationships of male Vietnam veterans: problems associated with posttraumatic stress disorder. *Journal of Traumatic Stress, 11*, 87-102.
- Robins, L. N. (1990). Steps toward evaluating post-traumatic stress reactions as a psychiatric disorder. *Journal of Applied Social Psychology, 20*, 1674-1677.
- Robinson, M., & Lee, H. (2000). Developmental contextualism. *International Journal of Welfare for the Aged, 3*, 44-60.

- Robitscher, J. (1971). Mental suffering and traumatic neurosis. In J. J. Leedy (Ed.), *Compensation in Psychiatric Disability and Rehabilitation*. (p. 233). Springfield, IL: Charles C. Thomas.
- Rothbaum, B. O., & Foa, E. B. (1999). Exposure therapy for PTSD. *PTSD Research Quarterly*, *10*(2), 1-6.
- Rothbaum, B. O., & Foa, E. B. (1996). Cognitive-behavioral therapy for posttraumatic stress disorder. In B. A. van der Kolk, A. C. McFarlane, & L. Weisaeth (Eds.), *Traumatic Stress: The effects of overwhelming experience on mind, body, and society*. (pp. 491-509). New York: Guildford Press.
- Rothbaum, B. O., & Foa, E. B. (1993). Subtypes of posttraumatic stress disorder and duration of symptoms. In J. R. T. Davidson & E. B. Foa (Eds.), *Posttraumatic stress disorder: DSM-IV and beyond*. (pp. 23-35). Washington, D.C.: American Psychiatric Press.
- Rothbaum, B. O., Foa, E. B., Riggs, D. S., Murdock, T., & Walsh, W. (1992). A prospective examination of post-traumatic stress disorder in rape victims. *Journal of Traumatic Stress*, *5*, 455-475.
- Rothbaum, B. O., Hodges, L. F., Ready, D. J., Graap, K., & Alaracon, R. D. (2001). Virtual reality exposure therapy for Vietnam veterans with posttraumatic stress disorder. *Journal of Clinical Psychiatry*, *62*(8), 617-622.
- Ruscio, A. M., Ruscio, J., & Keane, T. M. (2002). The latent structure of post traumatic stress disorder: A taxometric investigation of reactions to extreme stress. *Journal of Abnormal Psychiatry*, *111*(2), 290-301.
- Ruscio, J., & Ruscio, A. M. (2002). A structure-based approach to psychological assessment: Matching measurement models to latent structure. *Assessment*, *9*, 4-16.

- Sabin, M., Cardozo, B. L., Nackerud, L., Kaiser, R., & Varese, L. (2003). *Guatemalan refugees twenty years later: Factors associated with poor mental health outcomes*. Unpublished manuscript accepted by JAMA, Athens, GA.
- Saigh, P. A. (Ed.). (1992). *Posttraumatic stress disorder: A behavioral approach to assessment and treatment*. Boston, MA: Allyn and Bacon.
- Saigh, P. A., & Bremner, D. J. (Eds.). (1999). *Posttraumatic stress disorder: A comprehensive reference*. Boston: Allyn and Bacon.
- Salmon, T. W. (1929). The care and treatment of mental diseases and war neurosis ("shell shock") in the British Army. In P. Bailey, F. E. Williams, P. A. Komora, T. W. Salmon, & N. Fenton (Eds.), *Neuropsychiatry* (Vol. 10, pp. Appendix, 497-523). Washington, D.C.: The Office of the Surgeon General of the United States Army.
- Saunders, J. B., Aasland, O. G., Amundsen, A., & Grant, A. (1993). Alcohol consumption and related problems among primary health care patients: WHO collaborative project on early detection of persons with harmful alcohol consumption I. *Addiction*, 88, 349-362.
- Schlenger, W. E., Fairbank, J. A., Jordan, B. K., et al. (1999). Combat-related posttraumatic stress disorder: Prevalence, risk factors and comorbidity. In P. A. Saigh & J. D. Bremner (Eds.), *Posttraumatic stress disorder: A comprehensive text*. Boston: Allyn and Bacon.
- Schlenger, W. E., Kulka, R. A., Fairbank, J. A., Jordan, B. K., Hough, R. L., Marmar, C. R., et al. (1992). The prevalence of post-traumatic stress disorder in the Vietnam generation: A multimethod, multisource assessment of psychiatric disorder. *Journal of Traumatic Stress*, 5, 333-363.

- Schnurr, P. P., Friedman, M. J., & Rosenberg, S. D. (1993). Premilitary MMPI scores as predictors of combat-related PTSD symptoms. *American Journal of Psychiatry, 150*(3), 479-483.
- Schnurr, P. P., & Jankowski, M. K. (1999). Physical health and post-traumatic stress disorder: Review and synthesis. *Seminars in Clinical Neuropsychiatry, 4*, 295-304.
- Schnurr, P. P., & Spiro III, A. (1999). Combat exposure, PTSD symptoms, and health behaviors as predictors of self-reported physical health status in older veterans. *Journal of Nervous and Mental Disease, 187*, 353-359.
- Schutzwohl, M., & Maercker, A. (1999). Effects of varying diagnostic criteria for posttraumatic stress disorder are endorsing the concept of partial PTSD. *Journal of Traumatic Stress, 12*(1).
- Scott, W. J. (1990). PTSD in DSM-III: A case in the politics of diagnosis and disease. *Social Problems, 37*, 294-310.
- Schwartz, A., Eilenberg, J., & Thompson-Fullilove, M. (1995). Gloria's despair: Struggling against the odds. *American Journal of Psychiatry, 153*, 1334-1338.
- Selzer, M. L. (1971). The Michigan Alcoholism Screening Test: The quest for a new diagnostic instrument. *American Journal of Psychiatry, 127*, 1653-1656.
- Seyle, H. (1956). *The stress of life*. (Vol. 2nd edition). New York: McGraw-Hill.
- Shalev, A. Y., Bonne, O., & Eth, S. (1996). Treatment of posttraumatic stress disorder: A review. *Psychosomatic Medicine, 58*, 165-182.
- Shalev, A. Y., Freedman, S., & Peri, T. (1998). Prospective study of posttraumatic stress disorder and depression following trauma. *American Journal of Psychiatry, 155*, 630-637.

- Shapiro, F. (1995). *Eye movement desensitization and reprocessing: Basic principles, protocols, and procedures*. New York: Guilford Press.
- Sharp, T. J., & Harvey, A. G. (2001). Chronic pain and posttraumatic stress disorder: Mutual maintenance? *Clinical Psychology Review, 21*(6), 857-877.
- Sherman, J. J., Turk, D. C., & Okifuji, A. (2000). Prevalence and impact of posttraumatic stress disorder-like symptoms on patients with fibroyalgia syndrome. *Clinical Journal of Pain, 16*, 127-134.
- Shigemura, J., & Nomura, S. (2002). Mental health issues of peacekeeping workers. *Psychiatry and Clinical Neurosciences, 56*, 483-491.
- Skinner, H., & Allen, B. (1982). Alcohol dependence syndrome: measurement and validation. *Journal of Abnormal Psychology, 91*(3), 199-209.
- Slusarcick, A. L., Ursano, R. J., Dineen, M. P., & Fullerton, C. S. (1999). Measurement of depression in a military sample. *Psychological Reports, 85*, 82-88.
- Smith, M. L., Glass, G. V., & Miller, T. L. (1980). *The benefits of psychotherapy*. Baltimore, MD: Johns Hopkins University Press.
- Solomon, Z. (1993). *Combat stress reaction: The enduring toll of war*. New York: Plenum Press.
- Solomon, Z., Kotler, M., & Milkulincer, M. (1988). Combat-related posttraumatic stress disorders among second generation Holocaust survivors: Preliminary findings. *American Journal of Psychiatry, 145*, 865-868.
- Southard, E. E. (1919). *Shell shock and neuropsychiatric problems*. Boston: Leonard.
- Southwick, S. M., Morgan, C. A., Darnell, A., Bremner, D. J., Nicolau, A. L., Nagy, L. M., et al. (1995). Trauma-related symptoms in veterans of Operation Desert Storm: A 2-year follow-up. *American Journal of Psychiatry, 152*(8), 1150-1158.

- Spitzer, R. L., Williams, J. B., Gibbon, M., & First, M. B. (1992). The Structured Clinical Interview for DSM-III-R (SCID). I: History, rationale, and description. *Archives of General Psychiatry*, *49*(8), 624-629.
- Spivak, B., Segal, M., Laufer, N., Mester, R., & Weitzman, A. (2000). Lifetime psychiatric morbidity rate in Israel non-help-seeking patients with combat-related post-traumatic stress disorder. *Journal of Affective Disorders*, *57*, 185-188.
- Stein, M. B., & Kennedy, C. (2001). Major depressive and post-traumatic stress disorder comorbidity in female victims of intimate partner violence. *Journal of Affective Disorders*, *66*, 133-138.
- Stein, M. B., Walker, J. R., Hazen, A. L., & Forder, D. R. (1997). Full and partial posttraumatic stress disorder: Findings from a community survey. *American Journal of Psychiatry*, *154*(8), 1114-1119.
- Steinglass, P., & Gerrity, E. (1990). Natural disasters and post-traumatic stress disorder: Findings from a community survey. *Journal of Applied Social Psychology*, *20*, 1746-1765.
- Strachey, J., & Freud, A. (Eds.). (1957). *Studies on Hysteria*. New York: Basic Books.
- Sutker, P. B., Bugg, F., & Allain, A. N. (1990). Person and situation correlates of posttraumatic stress disorder among POW survivors. *Psychological Reports*, *66*, 912-914.
- Taylor, S., & Koch, W. J. (1992). How does anxiety sensitivity vary across anxiety disorders? *Journal of Anxiety Disorders*, *6*, 249-259.
- Taylor, S., Kuch, K., Koch, W. J., Crockett, D. J., & Passey, G. (1998). The structure of posttraumatic stress symptoms. *Journal of Abnormal Psychiatry*, *107*, 154-160.

- Thoresen, S., & Mehlum, L. (1999). *Suicide and other violent death in former Norwegian peace-keeping personnel. The UNIFIL follow-up study*. Oslo, Norway: The Norwegian Armed Forces Joint Medical Service, Oslo.
- Thyer, B., & Wodarski, J. (1998). First principles of empirical social work practice. In B. Thyer & J. Wodarski (Eds.), *Handbook of empirical social work practice* (Vol. 1, mental disorders, pp. 1-21). New York: John Wiley and sons.
- Turner, S. M., & Frank, E. (1981). Behavior therapy in the treatment of rape victims. In L. Michelson & M. Hersen & S. M. Turner (Eds.), *Future perspectives in behavior therapy*. New York: Plenum Publishing.
- Van Ameringen, M. (2003). *Posttraumatic stress disorder in Canada: An epidemiological study*. Paper to be presented in March, 2004 at the 24th Annual Conference of the Anxiety Disorders Association of America, Miami, Florida. Obtained from the internet on 8/5/03.
- van der Kolk, B. A. (1996). The body keeps score: Approaches to the psychobiology of posttraumatic stress disorder. In B. A. van der Kolk, A. C. McFarlane, & L. Weisaeth (Eds.), *Traumatic Stress: The effects of overwhelming experience on mind, body, and society*. (pp. 214-241). New York: Guilford Press.
- van der Kolk, B. A., McFarlane, A. C., & Weisaeth, L. (Eds.). (1996). *Traumatic stress: The effects of overwhelming experience on mind, body, and society*. New York: Guilford Press.
- Veronen, L. J., & Kilpatrick, D. G. (1983). Stress management for rape victims. In D. Meichenbaum & M. E. Jaremko (Eds.), *Stress reduction and prevention* (pp. 341-374). New York: Plenum Press.

- Vonk, M. E. (1996). *Evaluating the effectiveness of short-term treatment at a university counseling center*. Unpublished doctoral dissertation, The University of Georgia, Athens, GA.
- Vonk, M. E. (2002). The assessment and treatment of posttraumatic stress disorder. In A. R. Roberts & G. J. Greene (Eds.), *Social Workers' Desk Reference part 64*. New York: Oxford.
- Wagner, A. W., & Linehan, M. M. (1998). Dissociative behavior. In V. M. Follette & J. I. Ruzek & F. R. Abueg (Eds.), *Cognitive-behavioral therapies for trauma*. (pp. 191-225). New York: Guilford Press.
- Wagner, A. W., Wolfe, J., Rotnitsky, A., et al. (2000). An investigation of the impact of posttraumatic stress disorder on physical health. *Journal of Traumatic Stress, 13*, 41-55.
- Wampold, B. E. (2001). *The great psychotherapy debate: Models, methods, and findings*. Mahwah, NJ: Lawrence Erlbaum.
- Ward, J. (2002). Stress hits 1 in 5 Afgan war vets, ombudsman says: Stigma 'is sitll very much alive', Marin warns of possble law suits. *Toronto Star*, pp. A06.
- Weathers, F. W., Litz, B., Herman, D. S., Huska, J. A., & Keane, T. M. (1993). *The PTSD Checklist: Reliability, validity, and diagnostic utility*. San Antonio, TX: Paper presented at the Annual Meeting of the International Society for Traumatic Stress Studies.
- Wedding, D. (1987). Substance abuse in the Vietnam veteran. *AAOHN Journal, 35*, 74-76.
- Weisaeth, L. (1994). *Preventive intervention*. Paper presented at the North American Treaty Organization Conference.

- Weiss, D. S., Marmar, C. R., Schlenger, W. E., Fairbank, J. A., Jordan, B. K., Hough, R. L., et al. (1992). The prevalence of lifetime and partial post-traumatic stress disorder in Vietnam theater veterans. *Journal of Traumatic Stress, 5*(3), 365-376.
- Westerink, J., & Giarratano, L. (1999). The impact of posttraumatic stress disorder on partners and children of Australian Vietnam veterans. *Australian and New Zealand Journal of Psychiatry, 33*(6), 841-847.
- Whaley, A. (2004). Ethnicity/race, paranoia, and hospitalization for mental health problems among men. *American Journal of Public Health.*
- WHO (1948). *Manual of international statistical classification* (9 ed. Vol. 1). Washington, D.C.: National Office of Vital Statistics.
- WHO (1992). *ICD-10: International statistical classification of diseases and related health problems (10th revision)*. Geneva, Switzerland: World Health Organization.
- Widiger, T. A., & Clark, L. A. (2000). Toward DSM-V and the classification of psychopathology. *Psychological Bulletin, 5*, 946-963.
- Wilson, J. P., Friedman, M. J., & Lindy, J. D. (Eds.). (2001). *Treating psychological trauma and PTSD*. New York: The Guilford Press.
- Yarvis, J. (2000). Clinical and cultural concerns in OOTW: A case study of HIV and Haiti. *The U.S. Army Medical Department Journal* (Oct-Dec), 45-51.
- Yarvis, J. S., & Spivey, C. A. (2003). Eye movement desensitization and reprocessing: Ethical considerations of EMDR marketing, training, and research procedures. *The Scientific Review of Mental Health Practice, 2*(2), 4.

- Yarvis, J. S., Vonk, M. E., & Bordnick, P. S. (under review). PREPS, Pre-disaster Required Equipment Package for Social Workers: A comprehensive guide to disaster social work. *Journal of Social Work*.
- Yehuda, R. (Ed.). (1999). *Risk factors for posttraumatic stress disorder*. Washington, DC: American Psychiatric Press, Inc.
- Yehuda, R., Boisoineau, D., Lowry, M. T., & Giller, E. L. (1995). Dose-response changes in plasma cortisol and lymphocyte glucocorticoid receptors following dexamethasone administration in combat veterans with and without post-traumatic stress disorder. *Archives in General Psychiatry*, *52*, 583-593.
- Yehuda, R., & McFarlane, A. C. (1995). Conflict between current knowledge about posttraumatic stress disorder and its conceptual basis. *American Journal of Psychiatry*, *152*, 1705-1713.
- Yehuda, R., Perry, B. D., Southwick, S., & Giller, E. L. (1990). Platelet alpha2 adrenergic binding in PTSD, generalized anxiety disorder and major depressive disorder. *New Research Abstracts*, *143*.
- Yehuda, R., Southwick, S., Giller, E. L., Ma, X., & Mason, J. W. (1992). Urinary catecholamine excretion and severity of PTSD symptoms in Vietnam combat veterans. *Journal of Nervous and Mental Disease*, *180*, 321-325.
- Yonkers, K. A., Dyck, I. R., Warshaw, M., & Keller, M. B. (2000). Factors predicting the clinical course of generalized anxiety disorder. *British Journal of Psychiatry*, *176*, 544-549.

- Zatzick, D., Marmar, C. R., & Weiss, D. S. (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*, 1690-1694.
- Zimering, R. T., Caddell, J. M., Fairbank, J. A., & Keane, T. M. (1993). Post-traumatic stress disorder in Vietnam veterans: An experimental validation of the DSM-III diagnostic criteria. *Journal of Traumatic Stress*, *6*, 327-342.
- Zlotnick, C., Franklin, C. L., & Zimmerman, M. (2002). Does "subthreshold" posttraumatic stress disorder have any clinical relevance? *Comprehensive Psychiatry*, *43*(6), 413-419.
- Zlotnick, C., Warshaw, M., & Shea, M. T. (1999). Chronicity in posttraumatic stress disorder (PTSD) and predictors of course of comorbid PTSD in patients with anxiety disorders. *Journal of Traumatic Stress*, *12*, 89-100.
- Zoellner, L. A., Goodwin, M. L., & Foa, E. B. (2000). PTSD severity and health perceptions in female victims of sexual assault. *Journal of Traumatic Stress*, *13*, 635-649.

APPENDIX A

DSM-IV DIAGNOSTIC CRITERIA FOR PTSD 309.81

DSM-IV DIAGNOSTIC CRITERIA FOR PTSD 309.81

- A. The person has been exposed to a traumatic event in which both of the following were present:
- (1) the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others.
 - (2) the person's response involved intense fear, helplessness, or horror.
- Note: In children, this may be expressed instead by disorganized or agitated behavior .
- B. The traumatic event is persistently reexperienced in one (or more) of the following ways:
- (1) recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. Note: In young children, repetitive play may occur in which themes or aspects of the trauma are expressed.
 - (2) recurrent distressing dreams of the event. Note: In children, there may be frightening dreams without recognizable content.
 - (3) acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or while intoxicated). Note: In young children, trauma-specific reenactment may occur.
 - (4) intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
 - (5) physiological reactivity upon exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event .
- C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following:
- (1) efforts to avoid thoughts, feelings, or conversations associated with the trauma
 - (2) efforts to avoid activities, places, or people that arouse recollections of the trauma
 - (3) inability to recall an important aspect of the trauma
 - (4) markedly diminished interest or participation in significant activities
 - (5) feeling of detachment or estrangement from others
 - (6) restricted range of affect (e.g., unable to have loving feelings)
 - (7) sense of foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span).
- D. Persistent symptoms *of* increased arousal (not present before the trauma), as indicated by two .(or more) of the following:
- (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 disturbance (symptoms in criteria B, C, and D) is more than 1 month.
- F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Specify if: **Acute:** if duration of symptoms is less than 3 months
 Chronic: if duration of symptoms is 3 months or more

Specify if: **With Delayed Onset:** if onset of symptoms is at least 6 months after the stressor

APPENDIX B

PCL-M

PCL-M

(Appendices B-D are copied from the original 1999 VAC Survey).

39. This question will provide us with your views about some problems and complaints that military personnel sometimes have.
- A) Specifically, we would like to know how each problem may or may not have affected you.
- B) If you have experienced the problem, please indicate how much this has bothered you over the past 30 days.
- C) The year you first began experiencing this feeling.

(A) Over the past 30 days, starting from yesterday, have you experienced any of the following?	(B) If yes, how much has this bothered you over the past 30 days				(C) Year first started having this feeling	
	a little bit	moderately	quite a bit	extremely		
a) Had repeated, disturbing <u>memories</u> of your military experiences?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ____
b) Had repeated, disturbing <u>dreams</u> of your military experiences?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ____
c) Suddenly acted or felt as if your military experiences were happening again?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ____

(A) Over the past 30 days, starting from yesterday, have you experienced any of the following?	(B) If yes, how much has this bothered you over the past 30 days				(C) Year first started having this feeling	
	a little bit	moderately	quite a bit	extremely		
d) Felt very upset when something happened that reminded you of your military experiences?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___
e) Had trouble remembering important parts of your military experiences?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___
f) Lost interest in activities you used to enjoy?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___
g) Felt distant or cut off from other people?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___
h) Felt emotionally numb or unable to have loving feelings for those close to you?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___
i) Felt as if your future will somehow be cut short?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___
j) Had trouble falling or staying asleep?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___
k) Been feeling irritable or had angry outbursts?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___
l) Had difficulty concentrating?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___
m) Been overly alert, watchful, or on guard?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___
n) Been feeling jumpy or easily startled?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___
o) Had physical reactions when something reminded you of your military experiences?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___
p) Avoided thinking about your military experiences, or avoided having feelings about them?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___
q) Avoided activities or situations because they reminded you of your military experiences?	Yes () ¹ → No () ²	() ¹	() ²	() ³	() ⁴	19 ___

APPENDIX C

CES-D

Appendix C-CES-D

Depression Scale items:

40. Below is a list of some of the ways people feel at different times. Please identify which statement best describes how often you felt that way during the past week.

	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of the time (3-4 days)	Most or all of the time (5-7 days)
a) I was bothered by things that usually don't bother me.	() ¹	() ²	() ³	() ⁴
b) I did not feel like eating; my appetite was poor.	() ¹	() ²	() ³	() ⁴
c) I felt that I could not shake off the blues, even with help from family and friends.	() ¹	() ²	() ³	() ⁴
d) I felt that I was just as good as other people.	() ¹	() ²	() ³	() ⁴
e) I had trouble keeping my mind on what I was doing.	() ¹	() ²	() ³	() ⁴
f) I felt depressed.	() ¹	() ²	() ³	() ⁴
g) I felt that everything I did was an effort.	() ¹	() ²	() ³	() ⁴
h) I felt hopeful about the future.	() ¹	() ²	() ³	() ⁴
i) I thought my life had been a failure.	() ¹	() ²	() ³	() ⁴
j) I felt fearful.	() ¹	() ²	() ³	() ⁴
k) My sleep was restless.	() ¹	() ²	() ³	() ⁴
l) I was happy.	() ¹	() ²	() ³	() ⁴
m) I talked less than usual.	() ¹	() ²	() ³	() ⁴
n) I felt lonely.	() ¹	() ²	() ³	() ⁴
o) People were unfriendly.	() ¹	() ²	() ³	() ⁴
p) I enjoyed life.	() ¹	() ²	() ³	() ⁴
q) I had crying spells.	() ¹	() ²	() ³	() ⁴
r) I felt sad.	() ¹	() ²	() ³	() ⁴
s) I felt that people disliked me.	() ¹	() ²	() ³	() ⁴
t) I could not "get going"	() ¹	() ²	() ³	() ⁴

APPENDIX D

AUDIT

AUDIT

The following questions deal with your alcohol use. By alcohol, we mean beer, wine, wine coolers, and hard liquor, such as rye, rum, vodka, gin, etc.

52. How often do you have a drink containing alcohol? (Mark one only.)

- Never..... ¹ → GO TO QUESTION 56
- Monthly or less..... ²
- Two to four times a month..... ³
- Two to three times a week..... ⁴
- Four or more times a week..... ⁵

53. How many drinks do you have on a typical day when you are drinking? (Mark one only)

- 1 or 2..... ()¹
- 3 or 4..... ()²
- 5 or 6..... ()³
- 7 or 9..... ()⁴
- 10 or more..... ()⁵

54.

	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
a) How often do you have six or more drinks on one occasion?	() ¹	() ²	() ³	() ⁴	() ⁵
b) How long during the past year have you found that you were not able to stop drinking once you had started?	() ¹	() ²	() ³	() ⁴	() ⁵
c) How often during the past year have you failed to do what was normally expected from you because of drinking?	() ¹	() ²	() ³	() ⁴	() ⁵
d) How often during the past year have you needed a first drink in the morning to get yourself going?	() ¹	() ²	() ³	() ⁴	() ⁵
e) How often during the past month have you had a feeling of guilt or remorse after drinking?	() ¹	() ²	() ³	() ⁴	() ⁵
f) How often during the past year have you been unable to remember what happened the night before because you had been drinking?	() ¹	() ²	() ³	() ⁴	() ⁵
g) Have you or someone else been injured as a result of your drinking?	() ¹	() ²	() ³	() ⁴	() ⁵

55. Has a relative, friend, doctor, or other health worker been concerned about you drinking or suggested you cut down?

- No..... ()¹
- Yes, but not in the past year..... ()²
- Yes, during the past year..... ()³

APPENDIX E
DESCRIPTIVES

Table 1

Summary Descriptive Statistics on Veteran Demographic Interval-variables.

Variable	All Groups			PTSD			SUB-PTSD			NO-PTSD		
	M	SD	n	M	SD	n	M	SD	n	M	SD	n
*Age	49.8	(10.8)	1101	44.5	(10.4)	207	49.0	(10.7)	148	50.9	(10.5)	746
Years Married	23.8	(12.7)	1101	22.7	(12.5)	207	23.1	(12.7)	148	23.5	(12.6)	746
No. Deployments	1.2	(1.3)	1101	1.1	(1.2)	207	1.1	(1.2)	148	1.2	(1.3)	746
Years Served	16.9	(11.0)	1101	16.1	(11.2)	207	16.6	(11.8)	148	17.2	(10.8)	746

* $p < .001$.

Table 2

Descriptive Summary Statistics on Veteran Demographic Categorical-variables.

	Frequency	Percent
<u>*Marital Status</u>		
Married	950	86.3
Not Married	151	13.7
<u>Language</u>		
Anglo	906	82.3
Franco	195	17.7
<u>Personal Income</u>		
Less than \$10,000	59	5.9
\$10,000 to \$19,999	117	11.8
\$20,000 to \$29,999	224	22.6
\$30,000 to \$39,999	236	23.8
\$40,000 to \$49,999	176	17.7
\$50,000 to \$59,000	78	7.9
\$60,000 to \$69,000	35	3.6
\$70,000 to \$79,000	25	2.5
\$80,000 and over	42	4.2
<u>Highest Rank</u>		
General Officer	5	0.5
Senior Officers	119	11.1
Junior Officers	125	11.7
Subordinate Officers	29	2.7
NCO's	792	73.9
Appointments	2	0.2
<u>Service Status</u>		
Regular Force	264	24.0
SDA	697	63.3
Reserve	140	12.7

*p. <.001

APPENDIX F
ALCOHOL USE DISORDERS

Alcohol Use Disorders

Table 3

Means and Standard Deviations of PTSD Status on the AUDIT.

Level	n	M	SD
PTSD	207	7.33	5.40
Sub-PTSD	148	5.69	3.90
No PTSD	746	5.34	3.42
Total	1101	6.12	4.24

* $p < .001$

Table 4

ANOVA Summary Table for PTSD Status on Alcohol Use Disorders.

Variable	Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
AUDIT1	Between Groups	644.666	2	322.333	20.893
	Within Groups	16939.584	1098	15.428	
	Total	17584.251	1100		

* $p < .001$

Table 5

Multiple Comparisons for PTSD Status on Alcohol Use Disorders.

Dependent Variable	Method	PTSD Status	Comparison	Significance
AUDIT	Bonferonni	PTSD	Sub PTSD	.000
			No PTSD	.000
		Sub PTSD	PTSD	.000
			No PTSD	.950
		No PTSD	PTSD	.000
			Sub PTSD	.950

Table 6

ANCOVA Summary Table for PTSD Status and Age on Alcohol Use Disorders.

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Sig.</u>
AGE	.027	1	.027	.002	.967
PTSDA	607.569	2	303.784	19.673	.000
Error	16939.558	1097	15.442		
Total	54081.000	1101			
Corrected Total	17584.251	1100			

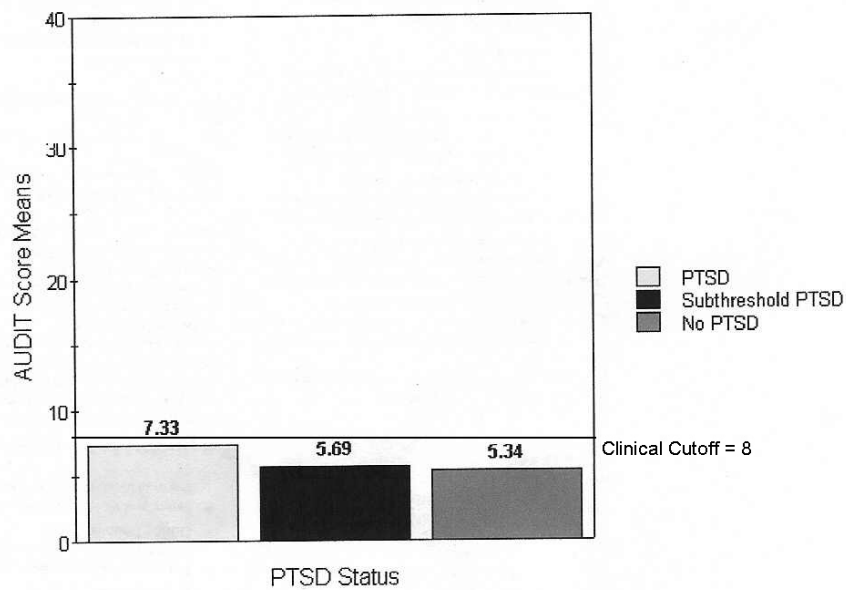


Figure 1 Mean of Veterans' Alcohol Use Disorder Scores by PTSD Status.

APPENDIX G
DEPRESSIVE SYMPTOMS

Depressive Symptoms

Table 7

Means and Standard Deviations of PTSD Status on the CES-D.

Level	n	M	SD
PTSD	207	25.16	12.17
Sub-PTSD	148	14.77	9.73
No PTSD	746	8.53	6.14
Total	1101	12.49	10.37

* $p < .001$

Table 8

ANOVA Summary Table for PTSD Status on Depressive Symptoms.

Variable	Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
CESD	Between Groups	45713.307	2	22856.653	346.285
	Within Groups	72473.892	1098	66.005	
	Total	118187.20	1100		

* $p < .001$

Table 9

Multiple Comparisons for PTSD Status on Depressive Symptoms

Dependent Variable	Method	PTSD Status	Comparison	Significance
CESD	Bonferonni	PTSD	Sub PTSD	.000
			No PTSD	.000
		Sub PTSD	PTSD	.000
			No PTSD	.000
		No PTSD	PTSD	.000
			Sub PTSD	.000

Table 10

ANCOVA Summary Table for PTSD Status and Age on Depressive Symptoms.

Source	SS	df	MS	F	Sig.
AGE	450.767	1	450.767	6.866	.009
PTSDA	41004.744	2	20502.372	312.276	.000
Error	72023.125	1097	65.655		
Total	290031.000	1101			
Corrected Total	118187.199	1100			

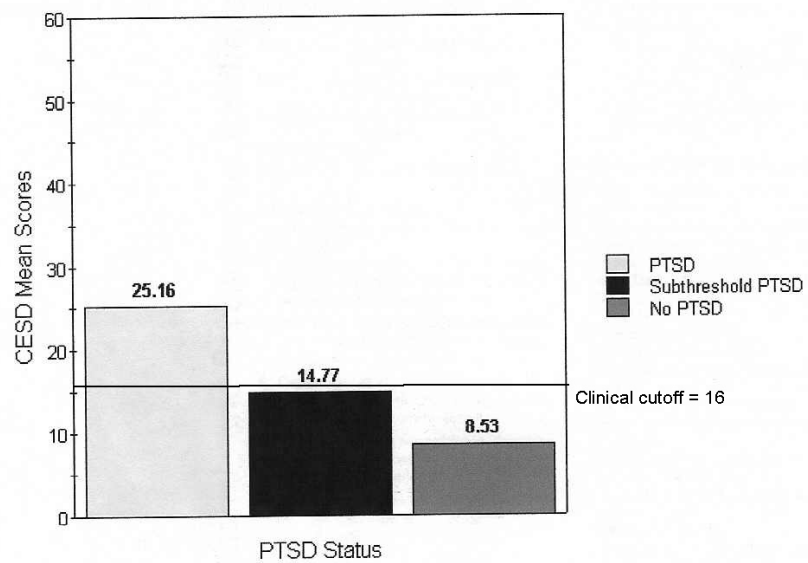


Figure 2 Mean of Veterans' Depressive Symptom Scores by PTSD Status.

APPENDIX H
PHYSICAL HEALTH PROBLEMS

Physical Health Problems

Table 11

Means and Standard Deviations of PTSD Status on Physical Health Problems.

Level	n	M	SD
PTSD	207	3.76	2.13
Sub-PTSD	148	3.05	1.83
No PTSD	746	2.66	1.83
Total	1101	2.92	1.94

* $p < .001$

Table 12

ANOVA Summary Table for PTSD Status on Number of Physical Health Problems.

Variable	Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Nbq36	Between Groups	198.279	2	99.140	27.736
	Within Groups	3924.687	1098	3.574	
	Total	4122.966	1100		

* $p < .001$

Table 13

Multiple Comparisons for PTSD Status on Physical Health Problems

Dependent Variable	Method	PTSD Status	Comparison	Significance
Health	Bonferonni	PTSD	Sub PTSD	.002
			No PTSD	.000
		Sub PTSD	PTSD	.002
			No PTSD	.063
		No PTSD	PTSD	.000
			Sub PTSD	.063