MANUAL FOR THE DEPLOYMENT RISK AND RESILIENCE INVENTORY (DRRI)

A Collection of Measures for Studying Deployment-Related Experiences of Military Veterans

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The development of the Deployment Risk and Resilience Inventory was supported by a grant from the U. S. Army Medical Research and Materiel Command, Ft. Detrick, MD (Grant DoD PG-087; Co-Principal Investigators: Daniel King and Lynda King).

The authors would like to express special appreciation to Rita Samper for her invaluable assistance in preparing this manual, as well as to the following colleagues who assisted in the project:

Jeffrey Knight
Dave Foy
Clifford Evans
Anica Pless
Elisa Chrysos
Kristin Vickers
Nathan Stein
Brett Litz
Jessica Wolfe
Marcia Fitzpatrick
Molly Keehn
Erika Stone
COL (Ret) James Martin
GEN (Ret) Glenn Otis

Finally, we would like to thank Scott Brigante for the design of the cover.

Citation: King, D. W., King, L. A., & Vogt, D. S. (2003). *Manual for the Deployment Risk and Resilience Inventory (DRRI): A Collection of Measures for Studying Deployment-Related Experiences of Military Veterans*. Boston, MA: National Center for PTSD.

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PART ONE

INTRODUCTION

Summary Description of the DRRI

This manual for the Deployment Risk and Resilience Inventory (DRRI) describes the development of the instrument and provides information on administration, scoring, and psychometric properties. The DRRI is the product of a four-year Department of Defense/Department of Veterans Affairs-sponsored program.[1] The aim was to develop a research inventory of risk and resilience measures associated with possible military deployment stress-related reactions that may have implications for veterans' long-term health. The DRRI assesses 14 risk and resilience factors:

- 2 Predeployment/Prewar Factors: *prior stressors* (15 items) and *childhood family environment* (15 items)

- 10 Deployment/War-zone Factors: *sense of preparedness* (14 items), *difficult living and working environment* (20 items), *concerns about life and family disruptions* (14 items), *deployment social support* (12 items), *sexual harassment* (7 items), *general harassment* (7 items), *perceived threat* (15 items), *combat experiences* (15 items), *exposure to the aftermath of battle* (15 items), and *self-reports of nuclear, biological, or chemical (NBC) exposures* (20 items).

- 2 Postdeployment/Postwar Factors: *postdeployment social support* (15 items), and *postdeployment stressors* (17 items).

Any one or more of these measures may be used individually, depending upon the needs of the researcher. All measures were derived from a four-phase psychometric endeavor that included: (a) an initial concern for content validity using focus groups of veterans who were deployed to the Persian Gulf region in 1990-91 (Gulf War I); (b) a telephone survey of a national sample of female and male Gulf War I veterans to select items and establish initial psychometric properties; (c) a national mail survey of Gulf War I veterans to confirm the psychometric properties and usefulness of the DRRI in paper-and-pencil format; and (d) a final validation telephone survey of another national sample of Gulf War I veterans to relate scores on the 14 measures to physical and mental health and health-related quality of life.

The wording of all items in all measures of the DRRI is appropriate to contemporary military deployments. This manual is intended primarily as a resource for users of the paper-and-pencil version of the DRRI; for consultation on use of the telephone interview version, please contact the test authors.

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[1] Specific funding source: U. S. Army Medical Research and Materiel Command, Ft. Detrick, MD (Grant DoD PG-087; Co-Principal Investigators: Daniel King and Lynda King).

Rationale for the DRRI

The impact of deployment and especially war-zone experiences on the health and well-being of military veterans is undeniable. Indeed, war-zone exposures have been associated with an array of negative mental health outcomes, including posttraumatic stress disorder, depression, anxiety, and substance abuse. In the wake of Gulf War I and more recent military deployments, there has been keen interest in how specific war-zone exposures might lead to physical health problems. Additionally, some researchers have recently turned their attention to the potential for positive consequences of war-zone experiences, including an enhanced appreciation for life, greater attainment of life goals, and closer interpersonal relationships. Hence, the development of the DRRI is responsive to the growing interest in deriving a better understanding of deployment-related factors that may have implications for veterans' long-term well-being.

While many measures of deployment stressors are available in the literature, the study of veteran health could benefit from new measures of contemporary military experiences that are ecologically valid and targeted at domains of functional importance to their respective missions. A review of the literature reveals a lack of measures of deployment-related stressors that are reliable and valid for assessing the experiences of present-day deployments. For example, while there are a number of well-accepted measures of combat exposure, they were developed for previously deployed cohorts, and most notably, for Vietnam veterans. This is problematic because the combat-related experiences that characterize more contemporary deployments are likely to differ quite markedly from those of earlier conflicts.

Furthermore, there is an emphasis in the literature on assessing combat events to the exclusion of other potentially important dimensions of the deployment experience. There is a growing body of research demonstrating the salience of other war-zone factors, as examples, perceived threat, exposure to the aftermath of battle, and the general milieu of distressing or uncomfortable living conditions. Relatedly, while the majority of veterans may see no direct combat, the possibility of nuclear, biological, and chemical exposures—and the fear associated with such exposures—may represent significant stressors. The deployment of a much larger proportion of women and National Guard and Reserve personnel in the context of an all-volunteer military force calls attention to additional stressors, such as sexual harassment and concerns about life and family disruptions, that were not considered of research importance for previous cohorts of veterans. Therefore, a broader assessment of the experiences of contemporary deployments is needed, and the DRRI responds to this need by indexing a variety of risk and resilience factors important to modern deployments.

DRRI Constructs

As noted above, the 14 DRRI measures fall into three general categories: predeployment/prewar factors, deployment/war-zone factors, and postdeployment/postwar factors. Definitions for these constructs within categories are provided below:

Predeployment/Prewar Factors:

Prior Stressors: Exposure to traumatic events before deployment, such as community or domestic violence, physical assault, sexual abuse, previous combat duty, or other highly stressful life events.

Childhood Family Environment: Quality of early life in the family of origin in terms of cohesion, accord, and closeness among family members.

Deployment/War-zone Factors:

Preparedness: Extent to which an individual perceives that he/she was prepared for deployment. This includes the extent to which military personnel believe they had the equipment and supplies they needed and were trained to perform necessary procedures and tasks using equipment and supplies. This also includes the extent to which military personnel feel they were prepared for what to expect in terms of their role in the deployment and what it would be like in the region.

Difficult Living and Working Environment: Exposure to events or circumstances representing repeated or day-to-day irritations and pressures related to life in the war zone. These personal discomforts or deprivations may include the lack of desirable food, lack of privacy, poor living arrangements, uncomfortable climate, cultural difficulties, boredom, inadequate equipment, and long workdays.

Concerns About Life and Family Disruptions: Worries that deployment might negatively affect other important life domains. These include both career-related concerns (e.g., losing a job or missing out on a promotion, perhaps especially important for members of the National Guard and Reserves) and family-related concerns (e.g., damaging relationships with spouse or children or missing significant events such as birthdays, weddings, and deaths).

Deployment Social Support: Amount of assistance and encouragement in the war zone from the military in general (i.e., military personnel felt they were valued versus expendable by the military), unit leaders (i.e., military personnel believed that superiors were trustworthy and dependable), and other unit members (i.e., military personnel felt a sense of camaraderie with their peers in the unit).

Sexual Harassment: Exposure to unwanted sexual touching or verbal conduct of a sexual nature from other unit members, commanding officers, or civilians in the war zone that creates a hostile working environment.

General Harassment: Exposure to harassment that is non-sexual but that may occur on the basis of one' s biological sex or minority or other social status and that is used to enforce traditional roles, or in response to the violation of these roles. Categories of harassment include indirect resistance to authority, deliberate sabotage, indirect threats, constant scrutiny, and gossip and rumors directed toward individuals.

Perceived Threat: Fear for one's safety and well-being in the war zone, especially as a response to potential exposure to circumstances of combat, including fear of NBCs (nuclear, biological, or chemical agents), missiles, and friendly fire incidents. This factor reflects emotional or cognitive appraisals of situations that may or may not accurately represent objective or factual reality.

Combat Experiences: Exposure to stereotypical warfare experiences such as firing a weapon, being fired on (by enemy or friendly troops), witnessing injury and death, and going on special missions and patrols that involve such experiences. This war-zone factor refers to objective events and circumstances and does not include personal interpretations or subjective judgments of the events or circumstances.

Aftermath of Battle: Exposure to the consequences of combat, including observing or handling the remains of civilians, enemy soldiers, U.S. and allied personnel, or animals, dealing with POWs, and observing other consequences such as devastated communities and homeless refugees. This factor is also conceptualized as cataloging more objective war-zone events and circumstances.

NBC Exposures: Endorsed exposures to an array of nuclear, biological, and chemical agents that the veteran believes he/she encountered while serving in the war zone.

Postdeployment/Postwar Factors:

Postdeployment Social Support: The extent to which family, friends, coworkers, employers, and community provide emotional sustenance and instrumental assistance. Emotional sustenance refers to the extent to which others provide the individual with understanding, companionship, a sense of belonging, and positive self-regard. Instrumental assistance refers to the extent to which the individual receives tangible aid such as help to accomplish tasks and material assistance or resources.

Postdeployment Stressors: Exposure to stressful life events after the deployment, including both generally stressful events that are unrelated to the deployment, such as vehicular accidents, physical assaults, and death or serious illness of a relative, and events that may be related to efforts at reintegration (especially for National Guard and Reserves), such as job interruption, difficulties in reestablishing family and community roles, legal or financial difficulties, and divorce.

Sample Items

Table 1 contains sample items and the response format for each DRRI measure. The section (A through M) and survey label for each measure (as they appear in the DRRI itself) are also provided.

Table 1
DRRI Measures, Sample Items, and Response Formats

MEASURE	SECTION	SURVEY LABEL	SAMPLE ITEMS	RESPONSE FORMAT
PREDEPLOYMENT/PREWAR FACTORS				
PRIOR STRESSORS	**A**	Pre-Deployment Life Events	Before I was deployed, I experienced... ... a natural disaster (for example, a flood or hurricane), a fire, or an accident in which I was hurt or my property was damaged. ...a parent who had a problem with drugs or alcohol. ... the death of someone close to me.	Dichotomous items (0 = *No*; 1 = *Yes*), with special variations. See Scoring Guide in Part Two.
CHILDHOOD FAMILY ENVIRONMENT	**B**	Childhood Experiences	Family members were affectionate with each other. Family members felt uncomfortable with each other. People in my family did things together.	5-point Likert scale (1 = *Almost none of the time*; 5 = *Almost all of the time*).
DEPLOYMENT/WAR-ZONE FACTORS				
PREPAREDNESS	**C**	Training and Deployment Preparation	I had all the supplies and equipment needed to get my job done. I received adequate training on how to use my equipment. I was informed about the role my unit was expected to play in the deployment.	5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*).
DIFFICULT LIVING AND WORKING ENVIRONMENT	**D**	Deployment Environment	The climate was extremely uncomfortable. I got as much sleep as I needed. My daily activities were restricted because of local religious or ethnic customs.	5-point Likert scale (1 = *Almost none of the time*; 5 = *Almost all of the time*).
CONCERNS ABOUT LIFE AND FAMILY DISRUPTIONS	**E**	Life and Family Concerns	While I was deployed, I was concerned about... ...damaging my career because I was overseas for a long time. ... harming my relationship with my spouse/significant other. ... the well-being of my family or friends while I was away.	4-point Likert scale (1 = *Not at all*; 4 = *A great deal*) with an additional option of 0 = *Not applicable*.

MEASURE	SECTION	SURVEY LABEL	SAMPLE ITEMS	RESPONSE FORMAT
DEPLOYMENT SOCIAL SUPPORT	**F**	Unit Support	My unit was like family to me. The commanding officer(s) in my unit were supportive of my efforts. The military appreciated my service.	5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*).
GENERAL HARASSMENT	**G (ITEMS 1-7)**	Relationships Within Unit	While I was deployed, unit leaders or other unit members... ...treated me in an overly critical way. ... treated me as if I had to work harder than others to prove myself. ... "put me down" or treated me in a condescending way.	4-point Likert scale (1 = *Never*; 4 = *Many times*).
SEXUAL HARASSMENT	**G (ITEMS 8-14)**	Relationships Within Unit	While I was deployed, unit leaders or other unit members... ...gossiped about my sex life or spread rumors about my sexual activities. ... made crude and offensive sexual remarks directed at me, either publicly or privately. ... forced me to have sex.	4-point Likert scale (1 = *Never*; 4 = *Many times*).
PERCEIVED THREAT	**H**	Deployment Concerns	I thought I would never survive. I felt that I was in great danger of being killed or wounded. I felt that I would become sick from the pesticides or other routinely used chemicals.	5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*).
COMBAT EXPERIENCES	**I**	Combat Experiences	While deployed: I went on combat patrols or missions. I or members of my unit were attacked by terrorists or civilians. My unit engaged in battle in which it suffered casualties.	Dichotomous items (0 = *No*; 1 = *Yes*).
AFTERMATH OF BATTLE	**J**	Post-Battle Experiences	I saw refugees who had lost their homes and belongings as a result of battle. I was exposed to the sight, sound, or smell of dying men and women. I saw Americans or allies after they had been severely wounded or disfigured in combat.	Dichotomous items (0 = *No*; 1 = *Yes*).

MEASURE	SECTION	SURVEY LABEL	SAMPLE ITEMS	RESPONSE FORMAT
NBC EXPOSURES	**K**	Exposure to Nuclear, Biological, Chemical Agents	While I was deployed, I was exposed to… ...smoke or other air pollution. ...depleted uranium in munitions. Either in preparation for or during my deployment… ...I took pyridostigmine or little white pills in foil packets, sometimes called NAPPs, which are used to protect against nerve gas.	Polytomous Items (0 = *No*; 1 = *Don't know*; 2 = *Yes*).
POSTDEPLOYMENT/POSTWAR FACTORS				
POSTDEPLOYMENT SOCIAL SUPPORT	**L**	Post-Deployment Support	The reception I received when I returned from my deployment made me feel appreciated for my efforts. Among my friends or relatives, there is someone who makes me feel better when I am feeling down. There are people to whom I can talk about my deployment experiences.	5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*).
POSTDEPLOYMENT STRESSORS	**M**	Post-Deployment Life Events	Since returning home, I have experienced... ...a serious operation. Since returning home, I have… …been robbed or had my home broken into. ...had problems getting access to adequate healthcare.	Dichotomous items (0 = *No*; 1 = *Yes*).

Potential Uses

Again, the measures contained in the DRRI may be considered as "stand-alone" instruments: One or more may be used, apart from the full DRRI, depending upon the purpose of the study. The measures are intended to identify deployment-related factors that either put veterans at risk for postdeployment symptomatology or that serve a protective function. Information generated from the administration of DRRI measures can facilitate a better understanding of the special training and preparedness needs of personnel facing the challenges presented by modern military operations. To the extent that we have a sound understanding of the risk and resilience factors that underlie health-related sequelae of military deployments, we are better able to formulate techniques aimed at stress inoculation. From a postdeployment and/or postmilitary perspective, the use of the DRRI can contribute to a better understanding of veterans' health and well-being. Postdeployment physical and mental health and quality of life (including social adjustment and occupational attainment) will surely benefit from scientific research that identifies and measures salient military experiences and their long-term consequences.

PART TWO

ADMINISTRATION AND SCORING

Instructions and Administration Guidelines

The instructions for the full Deployment Risk and Resilience Inventory (DRRI), located on the cover of the instrument, present the general purpose of the inventory by indicating that the "…survey contains questions regarding your experiences before, during, and after military deployment." Each section of the inventory, in turn, contains more specific instructions that orient the respondent to the timeframe (i.e., predeployment, during deployment, postdeployment) and the particular content domain (e.g., childhood experiences, combat experiences, postdeployment social support) being assessed. Throughout the inventory, the respondent is requested to circle the option (e.g., *yes* or *no*; *1*, *2*, 3, *4*, or *5* on a Likert scale) that best describes his/her experiences, perceptions, or beliefs. ***As noted several times previously, the measures represented in each section may be extracted and are available as separate entities.***

Respondents should be given adequate time to complete the DRRI at a comfortable pace. If the DRRI is administered in its entirety (all 14 measures), it should take approximately 30 to 40 minutes to complete. Time required to complete the individual measures ranges from approximately 1-2 minutes (e.g., the *sexual harassment* and *general harassment* measures) to 2-3 minutes (e.g., the *childhood family environment* and *concerns about life and family disruptions* measures).

Due to the sensitive nature of some of the items contained in the DRRI, respondents should be allowed to complete the instrument anonymously if circumstances permit. Otherwise, the test administrator should make every attempt to ensure respondent privacy and confidentiality.

The reading level of the instrument (instructions and items), as assessed by the Flesch-Kincaid index (Flesch, 1946, 1949), is grade level 8.0 across all measures. Therefore, the instrument should be suitable for the majority of military personnel and veterans.

Scoring

Suggested guidelines for scoring the various DRRI measures are provided in Table 2.

Table 2
DRRI Scoring Guide

Construct/Measure	Scoring Instructions
PRIOR STRESSORS [Section A: Pre-Deployment Life Events]	• Dichotomous items (0 = *No*; 1 = *Yes*), with special variation described below. • For Items 14 and 15: If the respondent answers *No*, each of these items is scored 0. If the respondent answers *Yes*, each of these items is scored by examining the responses to the 14a or 15a options. If the respondent circles ONE OF THE TWO options, "in childhood" OR "in adulthood," he/she should receive a 1. If the respondent endorses BOTH "in childhood" AND "in adulthood," he/she should receive a 2. • Sum item scores. • The possible range is 0 to 17; higher scores are indicative of more exposure to predeployment stressors.
CHILDHOOD FAMILY ENVIRONMENT [Section B: Childhood Experiences]	• 5-point Likert scale (1 = *Almost none of the time*; 5 = *Almost all of the time*). • Reverse score items 2, 3, 6, 8, 9, 10, 14, and 15. • Sum item scores. • Possible range is 15 to 75; higher scores are indicative of greater cohesion, accord, and closeness among family members.
PREPAREDNESS [Section C: Training and Deployment Preparation]	• 5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*). • Sum item scores. • Possible range is 14 to 70; higher scores are indicative of a stronger sense of deployment preparedness.
DIFFICULT LIVING AND WORKING ENVIRONMENT [Section D: Deployment Environment]	• 5-point Likert scale (1 = *Almost none of the time*; 5 = *Almost all of the time*). • Reverse score items 3, 4, 7, 8, 10, 12, 13, 17, and 19. • Sum item scores. • Possible range is 20 to 100; higher scores are indicative of a more difficult living and working environment.

CONCERNS ABOUT LIFE AND FAMILY DISRUPTIONS [Section E: Life and Family Concerns]	• 4-point Likert scale (1 = *Not at all*; 4 = *A great deal*) with an additional option of 0 = *Not applicable.* • Recode all responses of 0 = *Not applicable* to a score of 1. • Sum item scores. • Possible range is 14 to 56; higher scores are indicative of more concerns about life and family disruptions.
DEPLOYMENT SOCIAL SUPPORT [Section F: Unit Support]	• 5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*). • Sum item scores. • Possible range is 12 to 60; higher scores are indicative of greater perceived support and cohesion with regard to the military in general, leaders, and fellow unit members.
GENERAL HARASSMENT [Section G: Relationships Within Unit; Items 1-7]	• 4-point Likert scale (1 = *Never*; 4 = *Many times*). • Sum item scores. • Possible range is 7 to 28; higher scores are indicative of more general harassment.
SEXUAL HARASSMENT [Section G: Relationships Within Unit; Items 8-14]	• 4-point Likert scale (1 = *Never*; 4 = *Many times*). • Sum item scores. • Possible range is 7 to 28; higher scores are indicative of more sexual harassment.
PERCEIVED THREAT [Section H: Deployment Concerns]	• 5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*). • Reverse score items 2 and 8. • Sum item scores. • Possible range is 15 to 75; higher scores are indicative of more perceived threat to one's own safety and well-being.
COMBAT EXPERIENCES [Section I: Combat Experiences]	• Dichotomous items (0 = *No*; 1 = *Yes*). • Sum item scores. • Possible range is 0 to 15; higher scores are indicative of greater exposure to combat.

AFTERMATH OF BATTLE [Section J: Post-Battle Experiences]	• Dichotomous items (0 = *No*; 1 = *Yes*). • Sum item scores. • Possible range is 0 to 15; higher scores are indicative of greater exposure to the consequences of combat.
NBC EXPOSURES [Section K: Exposure to Nuclear, Biological, Chemical Agents]	• Polytomous Items (0 = *No*; 1 = *Don't know*; 2 = *Yes*). • Sum item scores. • Possible range is 0 to 40; higher score are indicative of greater perceived exposures.
POSTDEPLOYMENT SOCIAL SUPPORT [Section L: Post-Deployment Support]	• 5-point Likert scale (1 = *Strongly disagree*; 5 = *Strongly agree*). • Reverse score items 6 and 8. • Sum item scores. • Possible range is 15 to 75; higher scores are indicative of greater perceived social support upon return from the deployment.
POSTDEPLOYMENT STRESSORS [Section M: Post-Deployment Life Events]	• Dichotomous items (0 = *No*; 1 = *Yes*). • Sum item scores. • Possible range is 0 to 17; higher scores are indicative of more exposure to life stressors after returning from the deployment.

PART THREE

INSTRUMENT DEVELOPMENT AND PSYCHOMETRIC PROPERTIES

Initial Definitions of Constructs

Using a rational approach to test construction (Jackson, 1971; Nunnally, 1978), we first set forth preliminary definitions for the proposed DRRI risk and resilience factors. These initial definitions were based largely on a review of the literatures on war-related stressors in general and Gulf War I-related stressors in particular. Of utmost concern at this stage was the soundness of the content of the core constructs, both content relevance and content breadth. Importantly, we attempted to articulate not only what each construct was, but also what each was not (Clark & Watson, 1995). These definitions underwent several rounds of revision for the purpose of clarity and precision. That is, the preliminary definitions were repeatedly subjected to the review of members of the research team until all were in agreement that each construct was represented by an appropriate working definition that included relevant content domains.

Focus Groups

Once we arrived at preliminary definitions of the risk and resilience variables, we conducted focus groups with veterans of Gulf War I to further elaborate these definitions and to generate content that could be used for the specification of items to assess each construct. Thirty-three (33) Gulf War I veterans participated in a total of six focus groups: three groups of male veterans who were deployed to the Gulf region from active duty units, one group of male veterans who were activated for Gulf War duty from the National Guard or Reserves, one group of female Gulf War I veterans, and one group of veterans that was mixed by predeployment duty status and gender. All were from the enlisted ranks. Focus group participants were asked to discuss their most important war-zone experiences, speaking openly with the moderator and with each other. Participants were guided by a series of topics, general questions, and more specific questions that explored different aspects of their deployment experiences. Based on information generated from these focus groups, we were able to corroborate and elaborate upon our preliminary definitions of the risk and resilience constructs.

Item Generation and Refinement

Guided by our refined definitions, with ongoing reference to the scientific and professional literature on war-related stressors, and informed by critical information derived from the focus groups, we generated an initial pool of items to reflect the content of each of the 14 risk and resilience factors, on average, about 25 items per factor. Measures of similar or related constructs were identified from the existing literature and items from these measures were reviewed for possible use or adaptation.

Additional items were developed by a group of doctoral-level content experts and research assistants on the basis of their relevance to each construct as defined and with reference to content contained in quotes generated from the focus groups. Special attention was given to the inclusion of language that was used by Gulf War I veterans themselves. For example, several focus group participants referred to nuclear, biological, and chemical agents as "NBCs" and we integrated this acronym into our items (along with the full spelling of the term for those who might be unfamiliar with the acronym). Focus group participants also used the term "camaraderie" when asked about their interpersonal relationships with others in their military groups, and thus, we incorporated this term into items assessing social support in the war zone. We attempted to sample all possible content domains within each construct, erring on the side of overinclusiveness, with the intention of eliminating items that were identified as weak or tangentially related to the construct of interest at a later point in the instrument development process (Clark & Watson, 1995).

Verification of Item Content and Domains

Consistent with Haynes, Richard, and Kubany's (1995) suggestion for expert consultation in the initial generation of items, our items were reviewed by outside content validity judges, experts in stress and health research. Judges were asked to identify those items that were face-valid for the assessment of the proposed risk and resilience factors, as well as to provide suggestions for rewording items that did not adequately represent content domains within each construct. Research team members then compiled written suggestions for item revisions and discussed potential response options for each measure. Items were reworded for simplicity and clarity, selected response options were incorporated, and redundant items were eliminated. Additional items to tap specific facets of constructs that did not have adequate item coverage in the existing item set also were added.

After item sets were developed for each construct, they were subjected to one last review by research staff in which three staff members (the project coordinator and two research assistants) examined each item and evaluated the item on six specifications: readability (Was the item easy to read and interpret?), item-to-response match (Was the item phrased in a way that corresponded with the response options?), face validity (Did the item appear to assess the construct as defined?), neutrality (Was the item phrased in a neutral manner, so that it would not influence the response of the participant in one direction or another?), "double-barreledness" (Was the item asking more than one question, or implying causality; e.g., Were you miserable because of the flies?), and response variance (Was the item phrased in such a way that all response options could be used by respondents?).

As a final step in the review process, and consistent with Haynes et al.'s (1995) recommendation to consult members of the target population for which items are intended, items were presented to several Gulf War I veterans for their examination. Veterans supplied feedback about the relevance of the items, themes that may have been overlooked, and the appropriateness of the language and terminology. Since the survey's

next use was via telephone administration, mock interviews were also conducted to test the clarity and conversational quality of items as well as the administration time of the interview.

First Psychometric Study: Telephone Survey

The next step involved collecting data from a test development sample of Gulf War I veterans to examine the initial psychometric properties of the instrument and to refine the measures as appropriate. Using empirically derived item and scale characteristics, our intent was to trim the item pool to arrive at smaller, high-quality, and more parsimonious item sets.

Using information supplied by the Defense Manpower Data Center and the Department of Veterans Affairs, a test development sample was selected in accordance with a stratified random sampling plan. The sample design first stratified on duty status prior to deployment to the Gulf region: active duty personnel (50%) versus National Guard/Reserve personnel (50%). Within these groups, the sample then was stratified on whether or not the respondent had participated in a health registry program, either the Department of Veterans Affairs' Gulf Registry Health Examination Program or the comparable Comprehensive Clinical Evaluation Program initiated by Department of Defense: registry (50%) versus nonregistry (50%). All veterans who had health concerns after serving in the Gulf War theater of operations were invited to participate in one of these programs. Within each of these four cells, the sample further was stratified on gender: 75% men and 25% women. The goal was to achieve a sample that varied on war-zone experiences. In the end, we obtained a sample (N = 357) with stratification characteristics very similar to our desired sample. Of those veterans who were successfully located and contacted by telephone, the participation rate was 92%. Table 3 presents a profile of this sample.

Classical test theory-oriented item and scale characteristics were computed (Aiken, 1994; Anastasi, 1982; Nunnally, 1978). For the items that were accompanied by multipoint Likert-type response formats (e.g., *Strongly disagree* to *Strongly agree*), frequency distributions and descriptive statistics first were calculated. For dichotomous items, (e.g., Y*es*/*No* responses), the probabilities of endorsement, or the proportion of respondents providing an affirmative response, were calculated. Finally, corrected item-total correlations, the correlations of each item's score with the sum of scores on all other items measuring that construct, were computed as appropriate.

We used several guidelines in our selection of the best items to assess each risk and resilience factor. Items having a symmetric response distribution were preferred over items having a skewed distribution. In general, items with higher item-total correlations took precedence over those with lower item-total correlations. For certain constructs, however, especially those based on discrete stressor events that are not necessarily expected to covary (e.g., being in an automobile accident and being assaulted), content relevance and content breadth were considered more critical to item retention than the item-total correlation. At this stage, items with the poorest item characteristics were

Table 3
Demographics and Respondent Characteristics for the Test Development Telephone Survey (First Psychometric Study)

VARIABLE	FREQUENCY	
Gender	n=357	%
Female	80	22
Male	277	78
Age Group	n=356	%
20-30	28	8
31-40	141	40
41-50	103	29
51-60	68	19
>60	16	4
Ethnicity	n=356	%
Hispanic	17	5
Non-Hispanic	339	95
Race	n=345	%
Pacific Islander	2	1
American Indian/Alaskan Native	7	2
Asian	4	1
Black or African American	70	20
White	261	76
Bi-racial	1	0
Branch of Military	n=357	%
Marines	23	6
Army	266	75
Navy	35	10
Air Force	31	9
Coast Guard	2	1
Duty Status	n=339	%
Active duty	172	51
National Guard	75	22
Reserves	92	27
Registry Status	n=357	%
Registry	171	48
Non-Registry	186	52

Note: Percentages do not always total 100 due to rounding.

eliminated to meet our goal of trimming item sets to approximately 15 to 20 items per scale.

Second Psychometric Study: Mail Survey

The medium for the first psychometric study was a telephone interview. We next endeavored to develop a paper-and-pencil version of the DRRI measures, which would be amenable to distribution as a mailed questionnaire. Moreover, instructions and items in the first form of the inventory (the telephone survey) had wording that was specific to

the Gulf War I deployment. The new paper-and-pencil form of the inventory was intended to be generic and adaptable to any future deployment. Thus, we rephrased questions and instructions to remove references specific to the first Gulf War.

For this mail survey, we sought the participation of 495 veterans from across the country who had agreed to participate in the original telephone interviews but were not contacted because of a very high response rate to the invitation for telephone interviews. Of the 495 questionnaires mailed to potential participants, the U.S. Postal Service returned 17 without a forwarding address. In total, 320 (67%) returned completed questionnaires. Table 4 summarizes the characteristics of this sample.

Table 4
Demographics and Respondent Characteristics for the Mail Survey (Second Psychometric Study)

VARIABLE	**FREQUENCY**	
Gender	n=303	%
Female	76	25
Male	227	75
Age Group	n=303	%
20-30	6	2
31-40	116	38
41-50	93	31
51-60	78	26
>60	10	3
Hispanic Ethnicity	n=298	%
Hispanic	22	7
Non-Hispanic	276	93
Race	n=275	%
Pacific Islander	2	1
American Indian/Alaskan Native	3	1
Asian	2	1
Black or African American	46	17
White	222	81
Branch of Military	n=301	%
Marines	18	6
Army	233	77
Navy	17	6
Air Force	32	11
Coast Guard	1	0
Type of Duty	n=298	%
Active duty	77	26
National Guard	91	31
Reserves	130	44
Registry Status	n=268	%
Registry	189	71
Non-Registry	79	29

Note: Percentages do not always total 100 due to rounding.

Classical test theory-oriented item and scale characteristics again were computed (Aiken, 1994; Anastasi, 1982; Nunnally, 1978). More specifically, estimates of internal consistency reliability were derived for each of the risk and resilience measures. In addition, means, standard deviations, and ranges were calculated for all measures.

Scale characteristics and internal consistency reliability estimates for each measure are presented in Table 5. As shown there, estimates of internal consistency reliability were quite good, given the relative brevity of each measure. Internal consistency estimates for 11 of the 14 measures were .85 or higher; 7 of these 11 coefficients were .89 or higher. The three measures having the lower internal consistency estimates (alphas in the .72 - .82 range) reference constructs (*prior stressors*, *NBC exposures*, *postdeployment stressors*) that were based on discrete stressor events that are not necessarily expected to covary. In addition, measures demonstrated similar levels of internal consistency reliability as those derived from the analysis of the prior telephone survey results.

Third Psychometric Study: Evidence for Validity

Having created a collection of separate internally consistent measures of risk and resilience associated with possible military deployment stress-related reactions, we next turned attention to gathering evidence for their validity. In this regard, we sought to identify relationships between the risk and resilience factors and health outcomes reported by Gulf War I veterans. In addition, we examined the associations of the risk and resilience variables with select veteran demographic characteristics as well as their relationships to the social desirability response style. The mode of data collection for this psychometric endeavor was telephone interview.

Sample

Again, we relied on the Defense Manpower Data Center and the Department of Veterans Affairs to assist in sample selection. In this instance, the sample was stratified on predeployment duty status (active duty versus National Guard/Reserves) and registry status according to their representation in the population of Gulf War I veterans. Female veterans were oversampled to yield a 75% men-25% women gender distribution. We obtained a sample (N = 357) that closed mirrored these strata. Of those veterans who were successfully located and contacted by telephone, the participation rate was 92%. The demographic/background characteristics of participants for this validation sample are presented in Table 6.

Measures

Health outcomes were broadly categorized as physical health outcomes, neurocognitive deficits, and mental health outcomes, but also included indices of functional health status and life satisfaction. Below is a description of each measure administered in conjunction with the 14 DRRI measures:

Physical Symptoms and Conditions. Based on a review of the literature on health problems reported by Gulf War I veterans, a list of 27 symptoms (e.g., recurrent

headaches, skin disorders such as rashes, eczema, or psoriasis, and wheezing, shortness of breath, or coughing) and 25 conditions (e.g., chronic fatigue syndrome, gastritis/gastroenteritis, and fibromyalgia/fibrositis) was compiled. A total symptom count was computed as the sum of endorsed symptoms experienced over the past 3 months. A total condition count was the sum of all current physician-diagnosed conditions.

CDC Multisymptom Illness. Fukuda and colleagues (1998) at the Centers for Disease Control and Prevention (CDC) set forth what they characterized as a case definition and criteria for multisymptom illness in Gulf War I veterans. According to the case definition, an individual must have one or more chronic symptoms from at least two of three categories: fatigue, mood-cognition (feeling depressed, feeling moody, feeling anxious, trouble finding words, difficulty sleeping, or difficulty remembering or concentrating), and musculoskeletal (joint pain, joint stiffness, or muscle pain). We incorporated the CDC multisymptom illness case definition in our work, assigning a score of 1 to participants who met the criteria and a 0 to those who did not. All symptoms had to be reported as occurring after the war, but not before.

Table 5
Scale Characteristics Resulting from Mail Survey

RISK AND RESILIENCE VARIABLE	NO. OF ITEMS	MEAN	STD DEV	RANGE	ALPHA
Prior Stressors	15	3.11	2.80	0-12	.75
Childhood Family Environment	15	54.04	11.62	15-75	.92
Preparedness	14	47.17	10.78	18-70	.87
Difficult Living and Working Environment	20	58.46	14.09	22-98	.89
Concerns about Life and Family Disruptions	14	24.67	11.00	0-56	.89
Deployment Social Support	12	41.53	11.59	12-60	.94
General Harassment	7	11.92	5.24	7-28	.92
Sexual Harassment	7	7.89	2.68	7-25	.86
Perceived Threat	15	47.64	12.18	15-75	.89
Combat Experiences	15	3.12	3.31	0-15	.85
Aftermath of Battle	15	5.58	4.32	0-15	.89
NBC Exposures	20	24.72	7.05	0-40	.82
Postdeployment Social Support	15	56.69	10.52	18-75	.87
Postdeployment Stressors	17	4.10	2.89	0-14	.72

Note: Responses to items for variables such as *prior stressors*, *NBC exposures*, and *postdeployment stressors* may be considered causal indicators of their respective constructs. Hence, covariation among these items is not expected to be particularly high, and estimates of internal consistency reliability therefore may be less than expected for variables with effect indicators.

Table 6
Demographics and Respondent Characteristics for the Validation Sample (Third Psychometric Study)

VARIABLE	FREQUENCY	
Gender	n=357	%
Female	86	24
Male	271	76
Age Group	n=355	%
20-30	26	7
31-40	124	35
41-50	98	27
51-60	91	26
>60	16	5
Ethnicity	n= 356	%
Hispanic	19	5
Non-Hispanic	337	95
Race	n=	%
Pacific Islander	1	0
American Indian/Alaskan Native	5	1
Asian	2	1
Black or African American	55	15
White	289	82
Bi-racial	2	1
Branch of Military	n=357	%
Marines	19	5
Army	277	77
Navy	20	6
Air	39	11
Coast Guard	2	1
Duty Status	n=357	%
Active duty	238	67
National Guard/Reserves	119	33
Registry Status	n=357	%
Registry	52	15
Non-Registry	305	85

Note: Percentages do not always total 100 due to rounding.

Neurocognitive Deficits. A separate measure was created to assess three domains of neurocognitive deficits often identified as sources of problems in veterans' everyday lives: **attention/concentration, executive functioning, and memory**. The domain of attention/concentration (9 items) was regarded as the general capacity to focus upon a relevant stimulus, then sustain focused attention on that stimulus. Also, it encompassed the notion of attention span, both divided attention (the ability to shift attention between two concurrent demands) and simultaneous attention (the ability to distribute attention among multiple targets). Executive functioning (8 items) was broadly defined as a diverse cluster of skills related to information-processing speed, planning, problem-solving, self-monitoring, sequencing, organization, reasoning, and abstraction. Memory

(10 items) involves the encoding, storage, and retrieval of information about personal experiences, objects, properties, relationships, and time. A 5-point Likert response scale accompanied each neurocognitive item to provide information on frequency of occurrence. The scaled response options were: 1 = *Never*, 2 = *1-2 times/month*, 3 = *1-2 times/week*, 4 = *Several times/week*, and 5 = *Almost everyday*. Internal consistency reliability estimates were .97 for attention/concentration, .95 for executive functioning, and .95 for memory.

PTSD. We also included a measure of posttraumatic stress disorder (PTSD) symptom severity that is specific to reactions to stressful military experiences. This measure, the PTSD Checklist, contains 17 items directly adapted from the *DSM-IV* (*Diagnostic and Statistical Manual of Mental Disorders IV*, American Psychiatric Association, 1994) to evaluate PTSD's Criteria B (reexperiencing and intrusive thoughts and memories), C (active avoidance and emotional numbing), and D (hyperarousal) symptom categories. Respondents rated on a 5-point scale (with anchors ranging from 1 = *Not at all* to 5 = *Extremely*) how much "you have been bothered by that problem in the past month." This brief screening instrument for stress symptomatology has demonstrated coefficient alphas greater than .95, and is highly correlated with one of the most well-accepted measures of PTSD, the Clinician Administered PTSD Scale (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). The coefficient alpha for this sample was .96.

Depression. We included a measure of depression severity that was adapted from the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). These 7 items were rated on a 5-point scale with anchors ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*. Sample items include, "In the last three months, I have felt like a failure" and "In the last three months, I have had thoughts of killing myself." The full Beck Depression Inventory has been found to correlate well with clinician's ratings of severity of depression and to demonstrate coefficient alphas in the range of .81 to .86 (Beck, Steer, & Garbin, 1988). The coefficient alpha for this abbreviated version of the instrument was .91.

Anxiety. A measure of anxiety was also incorporated. It contained 7 items from the Beck Anxiety Inventory (Beck, Epstein, Brown, & Steer, 1988). Again, a 5-point response scale was used, with anchors ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*. Sample items include "In the last three months, I have been unable to relax" and "In the past three months, I have had a fear of losing control." The full scale has demonstrated high internal consistency (coefficient alpha = .92), and is highly correlated with other measures of anxiety (Beck et al., 1988). The coefficient alpha for this 7-item version of the instrument was .90.

Life Satisfaction. Our life satisfaction measure included the full Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) as well as items intended to assess satisfaction with specific life domains: satisfaction with family members, friends, romantic partners, work, leisure activities, and health (Smith, Niles, King, & King, 2001; see also Lehman, 1988). Respondents were asked to indicate their degree of satisfaction

on a Likert scale with anchors ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*. The coefficient alpha for this 14-item measure was .95.

Functional Health Status. The Short Form-12 Health Survey (SF-12) assessed physical functioning, role limitations due to physical problems, social functioning, bodily pain, general mental health, role limitations due to emotional problems, vitality, and general health perceptions. This measure is a shortened version of the full SF-36 (Ware et al., 1995, 1996a, 1996b). Item scores were combined to create two scale scores: one for physical functional health status and one for mental functional health status. This abbreviated instrument has been found to reproduce at least 90% of the variance in the physical and mental subscales of the SF-36, which has well-established reliability and validity (Ware & Sherbourne, 1992; Ware et al., 1993).

Social Desirability. The abbreviated 13-item version of the Marlowe-Crowne Scale (Crowne & Marlowe, 1960) was used to measure the extent to which one tends to respond in a socially desirable (or undesirable) manner. This scale is the most widely employed indicator of the social desirability response style, is considered reliable, and was previously used in telephone interviews with Gulf War I veterans (Iowa Group, 1997). In the mail survey component of this project, this measure demonstrated an internal consistency reliability of .78.

Analyses

Data were analyzed using the STATA software package (StataCorp, 1999), which incorporated sample design weights (the inverse probability of selection). Sample design weights corrected parameter estimates for the oversampling of women veterans, while the identification of strata enabled STATA to calculate the appropriate standard errors. In total, there were eight strata: 2 (predeployment duty status) x 2 (gender) x 2 (registry status). In addition to descriptive statistics for the major variables and bivariate correlations between the risk and resilience factors and health outcomes, we also compared scores on the risk and resilience factors for groups based on gender and predeployment duty status. Finally, we examined the bivariate association of each DRRI measure with the measure of social desirability.

Results

Descriptive statistics and bivariate associations between DRRI measures and health outcomes. Table 7 provides the means, standard deviations, and ranges for all variables, both the risk and resilience factors and the health outcomes. Table 8 contains correlations between scores on the DRRI measures and scores on the health outcomes.

To manage the large number of correlations between the risk and resilience factors and health outcomes, we first grouped the risk and resilience factors into conceptually meaningful categories. The 10 deployment/war-zone factors formed five categories: The first category included only the variable preparedness. The second category contained the more extreme war-zone stressors of combat experiences, aftermath of battle, and perceived threat. The third category included the lower level stressors of difficult living and working environment and concerns about life and family disruptions. The fourth

Table 7
Descriptive Statistics for Validation Sample (Third Psychometric Study)

VARIABLE	NO. OF ITEMS	MEAN	STD DEV	RANGE
Risk and Resilience Variables				
Prewar Factors				
Prior Stressors	15	4.57	2.71	0-13
Childhood Family Environment	15	57.38	9.54	19-75
War-zone Factors				
Preparedness	14	48.66	9.93	17-68
Difficult Living and Working Environment	20	58.15	13.75	28-92
Concerns about Life and Family Disruptions	14	28.33	8.76	14-52
Deployment Social Support	12	44.91	9.97	12-60
General Harassment	7	12.21	4.94	7-28
Sexual Harassment	7	7.90	1.39	7-25
Perceived Threat	15	47.37	11.13	20-74
Combat Experiences	15	3.99	3.24	0-14
Aftermath of Battle	15	5.99	4.11	0-15
NBC Exposures	20	21.63	6.72	4-37
Postwar Factors				
Postdeployment Social Support	15	60.53	9.25	24-75
Postdeployment Stressors	17	3.86	2.75	0-13
Health Outcomes				
Physical Health Outcomes				
Symptom Count	27	6.34	5.77	0-24
Condition Count	25	1.99	2.64	0-13
CDC Multisymptom Illness	-	0.54	0.53	0-1
Physical Health Functional Status (SF-12)	12	45.88	11.58	15-65
Neurocognitive Deficits	27	58.03	26.10	27-130
Attention and Concentration	9	21.68	10.63	9-45
Executive Functioning	8	16.14	7.84	8-40
Memory	10	20.21	9.12	10-49
Mental Health Outcomes				
PTSD	17	33.26	16.21	17-80
Depression	7	18.12	7.20	7-35
Anxiety	7	16.82	7.70	7-35
Life Satisfaction	14	51.89	12.34	15-70
Mental Health Functional Status (SF-12)	12	47.67	11.48	13-66

Table 8

Bivariate Correlations Between Risk and Resilience Factors and Health Outcomes

	Physical Health Outcomes				Neurocognitive Deficits			Mental Health Outcomes				
	Count of Symptoms	Count of Conditions	CDC Multisymptom Illness	Physical Health Functional Status	Attention and Concentration	Executive Functioning	Memory	PTSD	Depression	Anxiety	Satisfaction with Life	Mental Health Functional Status
Predeployment/Prewar Factors												
Prior Stressors	.13	.17	.10	-.10	.05	.01	-.09	.06	.19	.08	-.13	-.02
Childhood Family Environment	-.09	-.04	.01	.03	-.10	-.02	-.05	-.14	-.19	-.20	.24	.08
Deployment/War-zone Factors												
Preparedness	-.19	-.13	-.18	.28	-.21	-.22	-.15	-.12	-.30	-.30	.30	.27
Difficult Living and Working Environment	.33	.18	.21	-.27	.35	.30	.28	.38	.30	.37	-.30	-.29
Concerns about Life and Family Disruptions	.20	.23	.17	-.23	.29	.37	.33	.36	.24	.34	-.27	-.20
Deployment Social Support	-.18	-.12	-.09	.15	-.22	-.17	-.12	-.22	-.30	-.25	.33	.29
General Harassment	.24	.21	.17	-.21	.25	.26	.21	.36	.35	.40	-.31	-.30
Sexual Harassment	.23	.28	.17	-.14	.26	.17	.18	.26	.23	.17	-.21	-.27
Perceived Threat	.40	.28	.28	-.28	.33	.35	.34	.52	.31	.42	-.24	-.38
Combat Experiences	.18	.10	.11	-.21	.25	.23	.25	.32	.16	.18	-.18	-.18
Aftermath of Battle	.14	.05	.17	-.13	.22	.21	.23	.28	.19	.16	-.20	-.09
NBC Exposures	.35	.27	.30	-.28	.36	.29	.29	.39	.29	.33	-.30	-.27
Postdeployment/Postwar Factors												
Postdeployment Social Support	-.24	-.22	-.13	.20	-.33	-.36	-.30	-.45	-.47	-.39	.56	.44
Postdeployment Stressors	.25	.17	.17	-.29	.36	.37	.33	.41	.38	.37	-.42	-.30

category included the interpersonal variables of sexual harassment, general harassment, and deployment social support. We also used perceived NBC exposures as a fifth category related to war-zone stress. The two predeployment/prewar factors, prior stressors and childhood family functioning, formed a sixth category, and the two postdeployment/postwar factors, postdeployment social support and postdeployment stressors, comprised the seventh category. We relied on 12 primary health outcomes: Classified as physical health outcomes are count of symptoms, count of conditions, CDC multisymptom illness caseness, and physical health functional status. Scores on the neurocognitive measures of attention/concentration, executive functioning, and memory make up a second class of outcomes. And, PTSD, depression, anxiety, satisfaction with life, and mental health functional status constitute another outcome class.

The large majority of the correlation coefficients between risk and resilience factors and health outcomes displayed in Table 8 attained statistical significance ($p < .01$). For ease of presentation, we highlight those correlations that equal or exceed what might be considered a modest effect size of $r = .20$; those highlighted in yellow equal or exceed $r = .35$, a moderate effect size.

Taking the first war-zone stressor category, the preparedness variable, the 7 highlighted values are all modest in size. All correlations were in the expected direction and ranged in absolute value from $r = .12$ to $r = .30$. Four of these associations are with mental health outcomes and two are with neurocognitive deficits. Within the physical health class, the only relationship equal to or exceeding $r = .20$ was that between preparedness and physical health functional status.

Within the category of more extreme war-zone stressors (combat experiences, aftermath of battle, and perceived threat), the most powerful associations were those between perceived threat and health outcomes. In fact, perceived threat was associated at or above $r = .20$ with all 12 outcomes, and at or above $r = .35$ with 5 of the 12 outcomes, cutting across all three health outcome classifications. Perhaps most noteworthy is the fairly strong correlation of $r = .52$ between perceived threat and PTSD. The combat experiences and aftermath of battle variables—more objective event-related war-zone stressors—had markedly weaker associations with the collection of health outcomes.

Twenty-two (22) of the 24 associations involving the third category of lower-level stressors (the variables of difficult living and working environment and concerns about life and family disruptions) were modest or moderate in size. The strongest relationships were between difficult living and working environment and attention/concentration, PTSD, and anxiety, and between concerns about life and family disruption and executive functioning and PTSD.

The category of interpersonal variables (sexual harassment, general harassment, and deployment social support) appeared to be most strongly and consistently associated with the mental health outcomes. Furthermore, it is interesting that general harassment had coefficients above $r = .35$ with 3 of the 5 mental health outcomes: PTSD, depression, and

anxiety. Only about half of the associations between this category of deployment/war-zone factors and the other two classes of health outcomes were above $r = .20$.

The self-reported NBC exposures variable was associated with every health outcome, across the physical, neurocognitive, and mental health classes. In absolute value, correlations ranged from $r = .27$ to $r = .39$, with an average $r = .31$. Three (3) of the 12 could be considered moderate in size, $r = .35$ or higher: NBC exposures with count of symptoms, attention/concentration, and PTSD.

The first two lines of Table 8 present the bivariate associations between the two predeployment/prewar factors (prior stressors and childhood family functioning) and the collection of health outcomes. Associations between these two variables and both physical health outcomes and neurocognitive deficits were negligible. Childhood family functioning had modest associations with two mental health outcomes: anxiety and satisfaction with life, both in the expected direction.

Finally, the last two lines of Table 8 index bivariate relationships between the postdeployment social support and postdeployment stressors variables and the array of 12 health outcomes. Many of these correlation coefficients are relatively strong, especially those relating the postdeployment/postwar factors to mental health outcomes. Nine (9) of these 10 correlations exceeded $r = .35$; 6 of the 9 exceeded $r = .40$. The average of the absolute values of correlations between postdeployment social support and mental health outcomes was $r = .46$; the average of the absolute values of correlations between postdeployment stressors and mental health outcomes was $r = .38$. The postdeployment/postwar factors were modestly to moderately related to the neurocognitive variables as well (average absolute $r = .34$), and had modest associations with 5 of the 6 physical health outcomes.

Group Differences. Table 9 presents the results of comparisons on all risk and resilience variables between personnel deployed from regular active duty units and those deployed from National Guard/Reserve units. Differences between these groups that achieved significance ($p < .01$) were in the direction of personnel deployed from active duty units reporting more stressors and poorer health than personnel deployed from the National Guard or Reserves.

Table 10 provides results of tests of significance between men and women for all DRRI measures. The means for men were significantly ($p < .01$) greater than those for women on six risk and resilience measures: childhood family environment, preparedness, combat experiences, deployment social support, NBC exposures, and postdeployment social support. The means for women exceeded the means for men on difficult living and working environment and sexual harassment. In general, men and women tended to endorse different categories of stressors, highlighting the importance of examining gender in future explorations of the impact of war-zone stressors on health and well-being.

Table 9

Comparisons Between Veterans Deployed From Active Duty and Veterans Deployed From National Guard/Reserve Units

	Active Duty		National Guard/Reserves					
VARIABLE	**MEAN**	**STD DEV**	**MEAN**	**STD DEV**	**t**	c^2	**df**	**p**
Risk and Resilience Variables								
Predeployment/Prewar Factors								
Prior Stressors	4.79	3.30	4.11	4.60	2.21		337	.028
Childhood Family Environment	57.73	12.00	56.68	15.70	1.00		336	.320
Deployment/War-zone Factors								
Preparedness	48.02	13.00	49.94	14.70	-1.85		349	.065
Difficult Living and Working Environment	59.98	17.70	54.48	21.10	3.76		351	.000*
Concerns about Life and Family Disruptions	28.45	11.20	28.09	13.70	0.39		351	.698
Deployment Social Support	44.05	12.70	46.66	15.70	-2.43		348	.015
General Harassment	12.58	6.30	11.46	7.60	2.13		348	.034
Sexual Harassment	8.00	1.90	7.71	1.90	2.02		298	.044
Perceived Threat	48.29	13.80	45.50	18.70	2.25		347	.025
Combat Experiences	4.29	4.10	3.40	5.20	2.50		337	.013
Aftermath of Battle	6.42	5.20	5.12	6.70	2.89		350	.004*
NBC Exposures	22.88	7.70	19.14	13.10	4.63		348	.000*
Postdeployment/Postwar Factors								
Postdeployment Social Support	60.31	12.10	60.99	13.60	-0.70		337	.485
Postdeployment Stressors	4.03	3.30	3.52	4.80	1.62		327	.106
Health Outcomes								
Physical Health Outcomes								
Symptom Count	7.11	7.40	4.78	9.00	3.77		350	.000*
Condition Count	2.22	3.50	1.53	3.70	2.56		350	.011
CDC Multisymptom Illness	0.61	0.60	0.41	0.90		10.43	1	.001*
Physical Health Functional Status (SF-12)	43.37	15.20	50.92	16.90	-6.18		330	.000*
Neurocognitive Deficits								
Attention and Concentration	23.18	13.90	18.65	15.50	4.10		352	.000*
Executive Functioning	17.22	10.50	13.97	10.50	4.11		349	.000*
Memory	21.65	12.40	17.31	11.30	4.85		349	.000*
Mental Health Outcomes								
PTSD	35.30	21.70	29.18	22.00	3.74		352	.000*
Depression	18.49	9.00	17.36	11.80	1.42		349	.155
Anxiety	17.59	9.70	15.29	12.60	2.73		350	.001*

Table 9

Comparisons Between Veterans Deployed From Active Duty and Veterans Deployed From National Guard/Reserve Units

	Active Duty		National Guard/Reserves					
VARIABLE	**MEAN**	**STD DEV**	**MEAN**	**STD DEV**	**t**	c2	**df**	**p**
Life Satisfaction	51.04	16.40	53.59	17.20	- 2.02		350	.044
Mental Health Functional Status (SF-12)	47.37	14.20	48.26	19.60	- 0.68		331	.495

*Difference is significant, .01, 2-tailed

Table 10

Comparisons Between Men and Women

	Men		Women					
VARIABLE	**MEAN**	**STD DEV**	**MEAN**	**STD DEV**	**t**	c2	**df**	**p**
Risk and Resilience Variables								
Predeployment/Prewar Factors								
Prior Stressors	4.56	2.90	4.67	5.80	- 0.30		276	.765
Childhood Family Environment	57.80	10.10	51.83	25.60	4.08		346	.000*
Deployment/War-zone Factors								
Preparedness	49.29	10.50	40.22	22.60	6.82		344	.000*
Difficult Living and Working Environment	57.80	14.60	62.72	29.10	- 2.85		353	.005*
Concerns about Life and Family Disruptions	28.42	9.30	27.17	18.00	1.15		346	.250
Deployment Social Support	45.46	10.60	37.70	25.00	5.39		351	.000*
General Harassment	12.10	5.20	13.72	11.30	- 2.46		350	.015
Sexual Harassment	7.79	1.40	9.41	6.90	- 4.29		336	.000*
Perceived Threat	47.19	11.80	49.69	22.30	- 1.86		351	.063
Combat Experiences	4.13	3.50	2.18	4.00	6.81		323	.000*
Aftermath of Battle	6.05	4.40	5.12	7.20	2.10		347	.036
NBC Exposures	21.80	7.20	19.49	12.30	3.03		344	.003*
Postdeployment/Postwar Factors								
Postdeployment Social Support	60.76	9.80	57.46	21.80	2.60		349	.010*
Postdeployment Stressors	3.84	2.90	4.13	4.90	- 0.95		321	.345
Health Outcomes								
Physical Health Outcomes								
Symptom Count	6.24	6.10	7.57	11.20	- 1.95		348	.052
Condition Count	1.94	2.80	2.62	6.10	- 1.89		338	.060

Table 10
Comparisons Between Men and Women

	Men		Women					
VARIABLE	**MEAN**	**STD DEV**	**MEAN**	**STD DEV**	**t**	c^2	**df**	**p**
CDC Multisymptom Illness	0.54	0.60	0.62	1.00		2.13	1	.145
Physical Health Functional Status (SF-12)	46.06	12.30	43.52	24.10	1.77		350	.078
Neurocognitive Deficits								
Attention and Concentration	21.7	11.3	21.45	20.00	0.20		351	.844
Executive Functioning	16.16	8.40	15.89	14.30	0.31		351	.760
Memory	20.19	9.70	20.43	18.00	- 0.21		346	.831
Mental Health Outcomes								
PTSD	33.16	17.30	34.61	28.40	- 0.82		352	.412
Depression	18.02	7.60	19.35	15.60	- 1.44		350	.151
Anxiety	16.79	8.20	17.28	15.90	- 0.52		352	.604
Life Satisfaction	52.13	13.10	48.64	24.00	2.41		350	.017
Mental Health Functional Status (SF-12)	47.75	12.30	46.54	20.30	0.96		344	.338

*Difference is significant, .01, 2-tailed

Relationships with Social Desirability. Pearson product-moment correlations were computed between scores on the 14 risk and resilience measures and the measure of social desirability. Results can be found in Table 11. The associations between scores on the risk and resilience measures and scores on the Marlowe-Crowne Scale ranged from negligible to modest, with an average bivariate correlation of $r = .18$, thus suggesting that scores on the DRRI measures are not overly influenced by one's tendency to present oneself in a socially desirable (or undesirable) manner.

Summary

The Deployment Risk and Resilience Inventory (DRRI) is a collection of 14 relatively brief measures of factors that may be associated with the postdeployment health and well-being of military veterans. Any one or more of these measures may be used separately, or the entire DRRI can be administered as a package to survey key predeployment, deployment, and postdeployment variables. In the development of these measures, careful attention was given to content validity, with efforts including focus groups with members of the target population, consultation with content experts, and iterative procedures to insure relevance and appropriate wording and presentation of item content. Three psychometric studies followed, providing evidence for high internal consistency reliability, as appropriate, and preliminary support for the validity of the measures in terms of their demonstrated associations with important health outcomes, ability to discriminate between veteran subgroups, and fairly weak associations with a measure of social desirability.

Table 11
Bivariate Correlations Between Risk and Resilience Factors and Social Desirability

RISK AND RESILIENCE FACTOR	SOCIAL DESIRABILITY
Prior Stressors	-.19
Childhood Family Functioning	.13
Preparedness	.13
Difficult Living and Working Environment	-.21
Concerns about Life and Family Disruptions	-.19
Deployment Social Support	.19
General Harassment	-.29
Sexual Harassment	-.08
Perceived Threat	-.20
Combat Experiences	-.24
Aftermath of Battle	-.14
NBC Exposures	-.20
Postdeployment Social Support	.11
Postdeployment Stressors	-.28

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