

Evaluation of Psychological Hardiness and Coping Style as Risk/Resilience Factors for Health Risk Behaviour

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ABSTRACT

Use of alcohol and drugs, is a growing problem among military personnel, which brings substantial health risks and potential costs for the organization (Gackstetter et al., 2008; Jacobson et al, 2008; Seal et al., 2007). Unfortunately, current screening approaches are not very sensitive, since military workers tend to under-report health risk behavior and substance abuse problems on direct measures (Hoge et al., 2006). More effective screening approaches are needed, as well as better treatment programs (Bray et al., 2005).

This study will evaluate the Dispositional Resilience Scale-15 (DRS-15Bartone, 1995; Hystad et al, 2009), a short measure of psychological hardiness-resilience, as a screening tool to identify defense workers who may be at risk for alcohol and drug problems. It is known that people who are chronically low in hardiness-resilience also tend to rely on negative, avoidance coping strategies in responding to stress (Bartone 2005; 2006, Funk 1992). Thus, low hardiness levels in people could serve as a risk marker for stress-related alcohol and substance abuse. This study assesses the association of psychological hardiness and avoidance coping style with alcohol use patterns in a large national sample of Norwegian military defense personnel.

Results show that after controlling for age and sex, low psychological hardiness and high avoidance coping are significant predictors of alcohol use and abuse. Also, the challenge facet of hardiness predicts risk of alcohol abuse among respondents with recent deployment experience, and this effect is greater for those with more difficult deployment experiences. Older defense workers are also at higher risk, which suggests cumulative occupational stress may take a toll on defense workers. This research points the way to new approaches for early identification of military workers at risk for stress-related substance abuse, and more effective prevention efforts.

Report Documentation Page		Form Approved OMB No. 0704-0188
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.		
1. REPORT DATE APR 2011	2. REPORT TYPE N/A	3. DATES COVERED -
4. TITLE AND SUBTITLE Evaluation of Psychological Hardiness and Coping Style as Risk/Resilience Factors for Health Risk Behaviour		5a. CONTRACT NUMBER
		5b. GRANT NUMBER
		5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER	
	5e. TASK NUMBER	
	5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Joint Medical Command, Oslo c/o Christiesgate 12, 5015 Bergen, Norway		8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited		
13. SUPPLEMENTARY NOTES See also ADA578905. Mental Health and Well-Being across the Military Spectrum (Bien-être et santé mentale dans le milieu militaire). RTO-MP-HFM-205		
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15. SUBJECT TERMS		

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT SAR	18. NUMBER OF PAGES 12	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

INTRODUCTION

Alcohol and drug abuse among military personnel returning from overseas deployments is a growing problem, one which greatly complicates and in some cases prevents full health recovery. While substance abuse can be a problem for any military service member, the risk increases with stress exposure. Research shows that military members who have experienced more extreme combat exposure, more frequent deployments, and combat-related wounds are at elevated risk for a range of mental health problems (eg., Hoge, Castro, Messer, McGurk, Cotting, & Koffman, 2004). In addition to PTSD, a Veterans Administration study found that substance abuse was the most common health problem among American veterans of Iraq and Afghanistan seeking care in Veterans Administration facilities (Seal, Bertenthal, Miner, Sen, & Marmar, 2007). A recent study also found that combat deployed soldiers are at higher risk for new-onset heavy and binge drinking, and alcohol related problems after they return, and that the risk is even higher for younger and Reserve and National Guard troops (Jacobson, Ryan, Hooper, Smith, Amoroso, Boyko, Gackstetter, Wells, & Bell, 2008).

While many combat exposed troops develop stress-related problems, to include alcohol / substance abuse, not all do. In fact, the majority adjust quite well. More effective screening techniques are needed to identify early those troops most likely to fall into alcohol and drug abuse patterns after returning home. If more effective screening tools were available, the highest-risk sub-groups could be targeted for focused support and prevention efforts, including brief interventions that could be structured so as to avoid the stigma associated under current policy with referral to formal military substance abuse programs.

For example, Monti, Tevyaw & Borsari (2005) describe a number of very brief interventions used successfully with young adult problem drinkers in a variety of settings. But these authors also point out that young problem drinkers tend not to see themselves as such, and often are identified only when they get into some kind of trouble with the law (eg, drunk driving) or are seen in an emergency room. In the military, it is the youngest age group (18-25 year olds) that is at highest risk for heavy drinking (Bray et al, 2003; 2005). This suggests the need for indirect screening methods to identify redeploying soldiers who are at higher risk for alcohol or substance abuse, but who may not recognize this in themselves or be willing to admit it openly.

Studies examining individual differences in responses to stress have identified psychological hardiness as a factor that distinguishes healthy from non-healthy responders (Kobasa, 1979; Maddi & Kobasa, 1984). Bartone (1999) found that combat exposed Gulf War soldiers who were low in hardiness were at significantly higher risk for PTSD symptoms. Other studies have found similar effects (eg, Waysman, Schwarzwald & Solomon, 2001). The hardy-resilient style is a generalized mode of functioning that includes a strong sense of commitment, a belief that one can control or at least influence outcomes, an adventurous, exploring approach to living (challenge), and a future orientation.

Many studies have found that people high in these tendencies are more resistant to the ill-effects of extreme stress (Bartone, 2006). The health effects of hardiness appear to be at least partly due to the different kinds of coping strategies and behaviors favored by high versus low hardy persons. In responding to stress, people who are high in hardiness tend to prefer problem-focused, active coping approaches. In contrast, those low in hardiness more often revert to regressive or avoidance coping strategies which could include excessive alcohol consumption or drug abuse (Maddi & Kobasa, 1984).

The resiliency construct of hardiness has a strong theoretical background, and has been shown empirically to be a significant stress resistance resource in multiple groups, including those involved in military and security operations. Conceptually, psychological hardiness is an individual disposition or style that develops early in life and is reasonably stable over time, though amenable to change and trainable under certain conditions (Kobasa, 1979; Maddi & Kobasa, 1984).

Hardiness was first described by Kobasa (1979) as a collection of related personality qualities or traits that distinguished healthy executives under stress from unhealthy ones. More recently, Maddi and Khoshaba (2005) characterize hardiness as three related attitudes of commitment, control and challenge, or the “3 Cs.” Since 1979, an extensive body of research has accumulated showing that psychological hardiness protects against the ill effects of stress on health and performance.

Research studies with a variety of occupational groups have found that hardiness operates as a significant moderator or buffer of stress (e.g. Bartone, 1989; Contrada, 1989; Kobasa, Maddi, & Kahn, 1982; Roth, Wiebe, Fillingim, & Shay, 1989; Wiebe, 1991). In military groups, hardiness has also been identified as a significant moderator of combat exposure stress in US Gulf War soldiers (Bartone, 1993, 1999, 2000). Hardiness has appeared as a stress buffer in other military groups as well, including: U.S. Army casualty assistance workers (Bartone, Ursano, Wright, & Ingraham, 1989); peacekeeping soldiers (Bartone, 1996); Israeli soldiers in combat training (Florian, Mikulincer, & Taubman, 1995); Israeli officer candidates (Westman, 1990); and Norwegian Navy cadets (Bartone, Johnsen, Eid, Brun, & Laberg, 2002).

While recognizing the core importance of commitment, control and challenge attitudes, Bartone (2006) argues hardiness is more global and encompassing than mere attitudes. Rather, it is a broad personal style or approach to life, a generalized mode of functioning that incorporates commitment (conviction that life is interesting and worth living), control (belief one can control or influence outcomes), and challenge (adventurous, exploring approach to living). In addition, the “hardy-resilient style” person has a strong future orientation, or tendency to look to the future while at the same time learning from the past.

The hardy-resilient style is also courageous in the face of new experiences as well as disappointments, is action-oriented, competent, and has a sense of humor (Priest & Bartone, 2001). Many studies have found that people high in hardiness are more resistant to the ill-effects of extreme stress (e.g., Bartone, 1999). High hardy persons are not impervious to the ill-effects of stress, but do not show the same level of symptoms and performance decrements as low-hardy persons under stressful conditions.

Additionally, there is evidence pointing to the cross-cultural validity of the hardy-resilient style. For instance, the theoretical structure of three facets (commitment, control, and challenge) nested beneath a superordinate hardiness construct has been supported by confirmatory factor analyses in different cultures (Hystad, Eid, Johnsen, Laberg, & Bartone, 2010; Sinclair & Tetrick, 2000). Moreover, in a review of the relevant studies addressing the issue of hardiness across cultures, Maddi and Harvey (2006) conclude that available evidence shows little or no cultural differences in the role of hardiness, and suggest that hardiness appears to be a factor in resilience under stress across cultures.

Applying the terms of Ursin and Eriksen’s (2004) Cognitive Activation Theory of Stress (CATS), people high in hardiness and the sense of control are more likely to form positive outcome expectancies in response to stress (positive coping), while low hardiness people tend toward negative outcome expectancies (hopelessness or helplessness). In a study examining the relationship of hardiness to alcohol and illicit drug use in college students, Maddi et al (1996) found that students low in hardiness consumed more alcohol, and also that low hardiness was associated with marijuana and cocaine use as indicated both by self report and urinalysis results. This provides some supporting evidence for the view that persons low in hardiness are more likely to use avoidance or regressive coping approaches in response to stress, including substance and alcohol abuse. Considering this, it seems likely that military personnel who are low in hardiness-resilience are at elevated risk for substance abuse problems. Additional findings summarized above suggest that this risk will be further increased for military personnel who (1) are young; (2) are National Guard or Reserve; and (3) experienced greater exposure to stressful conditions.

RESEARCH DESIGN & METHODS

Objective/Hypothesis:

The objective of the study is to evaluate the utility of a short hardiness-resilience scale (DRS-15R) as a screening instrument to identify defence workers at elevated risk for substance abuse. The primary hypothesis to be tested is: Military personnel who are low in psychological hardiness-resilience are significantly more likely to experience stress-related alcohol and drug abuse problems.

Study Design & Methods:

This research will evaluate the utility of hardiness, as measured by the DRS-15R, as a screening tool for predicting alcohol and substance abuse risk in a large national survey sample of Norwegian military personnel. The Norwegian National Defence Health Survey (NDHS) is a comprehensive health survey that is administered annually to all members of the Norwegian Defence Forces, including officer and enlisted, active duty and reserve, uniformed and civilian. The University of Bergen has an agreement with the Norwegian Defence Ministry that permits sharing of anonymized data from the NDHS with researchers at the University of Bergen, in order to explore and address questions of interest to the Norwegian Defence Ministry and Medical Department.

Beginning in 2007, the NDHS included the DRS-15 due to their interest in improving health and resiliency programs. Also, a standard set of demographic, health behaviour and outcome measures are repeated each year. The 2010 survey was administered in March – May 2010. Similar surveys are done in the USA, but there is a higher level of turnover among American military personnel, making it more difficult to draw inferences about possible causal effects (e.g. Defense Survey of Health Related Behaviors; Bray et al, 2005). The 2010 survey included questions relating to alcohol use (e.g., CAGE, see description of survey instruments below), and will permit a test of the primary hypotheses of the present study, namely that low levels of hardiness are predictive of regressive stress coping patterns expressed in terms of alcohol abuse.

The contribution of psychological hardiness to alcohol abuse will be assessed using regression models that will control for other influences, to include stress exposure levels, duration of deployments, age, and sex. The database extract(s) obtained for this study will be completely anonymized to protect individual privacy and confidentiality.

Survey Instruments:

Hardiness is measured with the DRS-15R (Dispositional Resilience Scale), a short, valid and reliable instrument that has been developed and refined over 25 years (Bartone, 1989; Bartone, 1995). The DRS has been used extensively in U.S. military and non-military samples, with excellent results (eg., Bartone, Ursano, Wright & Ingraham, 1989; Britt, Adler & Bartone, 2000). In a critical review of hardiness theory and research, Funk (1992) recommended the DRS as the best available instrument to measure hardiness. Also using the DRS, Sinclair & Tetrick (2000) confirmed a factor structure of three facets, commitment control and challenge, nested under a more general hardiness construct. An updated Norwegian adaption of the DRS-15 was used in the present study (Hystad, Eid, Johnsen, Laberg, & Bartone, 2010). In a recent study with 213 undergraduate students this scale predicted health under academic stress, and demonstrated an overall internal consistency (Cronbach's alpha) of .71 (Hystad, Eid, Laberg, Johnsen & Bartone, 2009).

Avoidance coping is measured with the 10-item avoidance coping scale from the Coping Style Questionnaire (Joseph, Williams & Yule, 1992).

Alcohol use patterns are measured with the four-item self-report instrument CAGE (Ewing, 1984). The CAGE (Cut down, Annoyed, Guilty, Eye-opener) is an easy to use scale designed as a screening instrument for harmful drinking and alcoholism. Previous research with this instrument have shown that a

CAGE scores of one is associated with a 46% probability of alcohol abuse or dependence, and CAGE scores of two or more are associated with more than 72% probability dependence (Buchsbbaum, Buchanan, Centor, Schnoll, & Lawton, 1991). Consistent with conventions, we defined CAGE scores of one as being *at risk* for alcohol abuse and scores of two or more as indicative of *current alcohol problems*.

All of the above-named instruments have been used extensively in published studies, and have shown acceptable levels of validity and reliability.

Experience during service: Two scales were devised for the current study; *stress during service* and *fulfilment of basic needs*. The stress scale consisted of five items questioning about stressful and potentially lethal experiences during deployment (e.g., “Were you / your team ever involved in combat involving open fire?”). The needs scale consisted of five questions inquiring about the fulfilment of personal and basic needs during deployment (e.g., “Was it possible to rest adequately between each mission?” and “Did you get the privacy that you needed?”). All items were scored on a five-point scale and aggregated into indexes so that high scores equal high levels of stress and low levels of need fulfilment.

Demographics: In addition to the instruments mentioned above, the current study included information about the sex of participants, age in groups (29 yrs or younger, 30yrs-39yrs, 40yrs-49yrs, and 50yrs or older), and total length of deployment during the past three years (“none,” “up to six months,” and “more than six months”).

Statistical Analysis Plan:

The contribution of psychological hardiness to risk and current problems of alcohol abuse will be assessed using logistic regression models that will control for other influences, to include stress exposure levels, out-of-country deployments, age and sex. Potential interaction between hardiness and variables such as sex, age and stress exposure will also be evaluated. Results will be summarized and reported at the planned NATO HFM (Human Factors and Medicine) research committee symposium in Bergen, April 2010.

RESULTS

Figure 1 shows the distribution of alcohol patterns among military personnel deployed (panel a) and personnel not deployed during the past three years (panel b). Although the percentages characterized as at risk and current problem were slightly higher among personnel deployed, this difference was not statistically different ($\chi^2 [2, N = 1369] = .229, p = .89$).

Insert Figure 1 here

Predicting Risk for Abuse

To evaluate the contribution of hardiness in predicting personnel at risk, a sequential logistic regression analysis was employed. Personal characteristics (age and sex) and deployment (not deployed last three years vs. deployed last three years) were entered in Step 1 and Step 2, respectively. Contrary to expectations, age was positively related to being at risk (see Table 1). That is, compared to the “50 yrs or older group,” all other age groups were less likely to be at risk for abuse, with the youngest group (29 yrs or younger) having the least likelihood.

In step 3, hardiness made a significant contribution in predicting personnel at risk. A one-point increase in hardiness was associated with an odds ratio (OR) of 0.92, or an 8% decrease in probability of being at risk of abuse. Finally, avoidance coping entered in Step 4 was positively and statistically significantly related to risk (OR = 1.11, 11% increase in probability). When the three hardiness dimensions were entered in Step 3 instead of the total score, only challenge approach statistical significance (OR = .80, $p = .06$). Entered in Step 4, avoidance coping was still significant in this analysis (OR = 1.11, $p = .013$).

Insert Table 1 here

Next, we repeated the regressions including only personnel deployed during the last three years. In these analyses we included the additional variables length of deployment, combat stress, and deprivation of personal / basic needs. With the exception of hardiness, the same patterns emerged. Age and avoidance coping significantly predicted risk, but the coefficients for hardiness did not reach conventional levels of statistical significance in these analyses.

However, a significant interaction between the challenge dimension and deprivation of needs emerged (OR = .96, $p = .02$). This interaction is illustrated in Figure 2 and shows that for personnel low in challenge, deprivation of personal / basal needs was associated with increased risk of alcohol abuse.

Insert Figure 2 here

Predicting Current Problems

In the regression analyses with current alcohol problem as the outcome, only avoidance coping emerged as a significant predictor. The ORs were 1.23 ($p = .001$) and 1.23 ($p = .044$) in the sample as a whole and the deployed personnel, respectively.

DISCUSSION

As with other high stress, high risk occupations, military and defense workers are at increased risk for alcohol and substance abuse due to the stressful nature of the job. The current study set out to identify novel factors associated with high levels of alcohol use in defense workers, in order to provide additional tools for early identification of those at risk and facilitate prevention efforts.

Results confirm that as predicted, being low in psychological hardiness increases the risk of alcohol abuse. Logistic regression results show that for every one point increase in hardiness scores, there is a concomitant 8% decrease in risk for alcohol abuse. These results obtained after controlling for any effects of age and sex. Also as predicted, avoidance coping style, which is commonly seen in low hardiness individuals, is independently associated with alcohol abuse risk. With every point increase in avoidance coping scores, there is an 11% increased risk for alcohol abuse.

These effects pertain for the entire sample, and are not significantly influenced by recent deployment experience (over the previous three years). However, the job of a defense worker, whether deployed or not, in most cases involves considerable stress. Defense workers generally work long hours, and in some respects are never “off-duty” even when not officially working. As Goffman (1961) has argued, the

military is like a “total institution” in which the boundaries between work, family and play are blurred for its workers. Many defense workers are subject to be called back to work at any time, should the national defense situation warrant it. There is often less liberty or freedom of choice in defense jobs, where project activities can be highly regimented and must follow strict time schedules.

Defense workers may be required to move to new duty stations multiple times over a career. Add to this the stress of recent reductions in national defense spending, which can mean pay and benefits reductions. So even without deploying out of country, the job is a stressful one and can lead some to use avoidance coping strategies such as alcohol abuse. This interpretation is consistent with our finding that older defense workers, those who have been on the job longer and so have higher levels of cumulative stress, are also at higher risk for alcohol abuse.

In examining the effects of hardiness on alcohol abuse more closely, our findings revealed that none of the three hardiness facets individually predicted alcohol abuse risk; challenge, however, approached conventional levels of significance with a *p*-value of .06. Future research should make use of SEM – Structural Equation Modeling techniques to evaluate several possible models suggested by the present work, including one in which the effects of hardiness on alcohol abuse risk are mediated by avoidance coping approaches.

When the analyses were restricted only to those respondents who had deployed out of country at some time during the previous three years, hardiness – challenge was seen to interact with the basic needs variable in predicting alcohol abuse. As Figure 2 reveals, under the more difficult deployment conditions in which basic needs or comforts are lacking, those who are low in hardiness – challenge are at elevated risk for alcohol abuse, whereas those high in challenge appear to be protected. This finding is consistent with the hypothesis that psychological hardiness functions as a stress buffer (Kobasa, 1979; Bartone, 1999). In the present sample, there were very few individuals reporting combat related deployment stressors, such as being shot at. Thus, it is not surprising that this combat stress variable did not show any significant effect.

However, the “basic needs” variable is able to distinguish more uncomfortable and stressful deployments from those that are in a way “easier,” with fewer discomforts experienced by the individuals involved. Thus, the best way to test the hardiness stress-buffering hypothesis in the present sample was by using the basic needs variable as our deployment stress measure. Here, our results suggest that the challenge hardiness dimension is most important in providing military and defense personnel with some protection against the ill-effects of deployment-related stress, and that those who are low in challenge, and more insecure in dealing with change and uncertainty, are also more likely to slip into alcohol abuse as an avoidance coping strategy when they come home.

One limitation to the present study is that alcohol use was measured cross-sectionally, and we therefore have no information on potential increases in alcohol consumption over time. It would thus be important and desirable for future research to follow a longitudinal design, assessing the potential influence of variables such as psychological hardiness and avoidance coping on actual changes or increases in subsequent alcohol consumption that may be stress-related. At the same time, the present results were obtained with a fairly large sample (*N*=1,315) for this kind of research, and stringent significance criteria, suggesting that results are robust and provide important leads for future prospective research to test.

Another potential limitation is that the present study relies upon self-report, assuming that respondents will answer questions honestly and accurately. For multiple reasons including self-enhancement bias and social desirability, individuals may provide untrue responses to survey questions, especially when the questions concern socially sensitive issues such as alcohol use or abuse (Krueger, 1998). Future research in this area should seek to control for potentially confounding influences like social desirability (Crowne & Marlowe, 1960).

A third limitation is that apart from some specific survey questions aimed at respondents with recent deployment experience, this research did not specifically aim to assess sources and extent of job-related stress for military and defense workers. It would be beneficial for future studies with this occupational group to have more direct indicators regarding on-the-job stress.

Alcohol and drug abuse among military and defense personnel is a growing problem for many countries, with increases apparently related to rising stress levels in the military occupation. In order to intervene early and prevent substance abuse, better tools and strategies are needed for identifying those at high risk. With more effective screening approaches, high-risk sub-groups could be targeted for focused support and prevention efforts. Results of the present study indicate that individuals who are low in psychological hardiness, and high in avoidance coping tendencies are at significantly higher risk for alcohol problems. In addition, defense workers who are older (50 years or greater) also are at higher risk. While additional research is needed to confirm these results, the present study provides an important advance in identifying military workers at higher risk for alcohol and substance abuse. This research points the way to new screening tools to benefit not only the military, but also other occupations that routinely place workers in high-risk, high stress environments.

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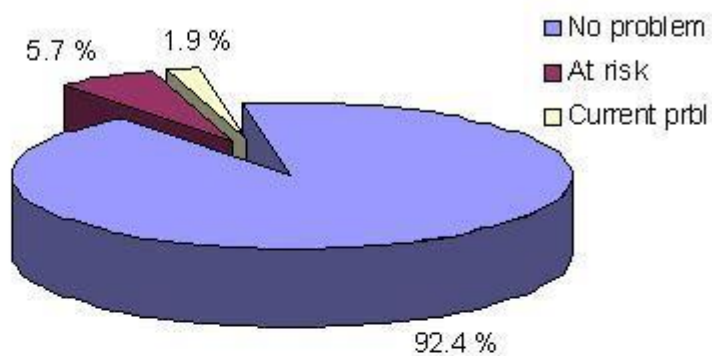
Table 1
Logistic Regression Predicting Likelihood for At Risk for Alcohol Problem ($N = 1076$)

Variable	Odds ratio			
	Step 1	Step 2	Step 3	Step 4
Sex	0.60	0.60	0.63	0.66
Age ₁	0.35*	0.32*	0.32*	0.29*
Age ₂	0.35**	0.34**	0.35**	0.32**
Age ₃	0.40*	0.40*	0.42*	0.40*
Deployed		1.3	1.3	1.25
Hardiness			0.92*	0.93*
Avoidance				1.11*
Pseudo R^2	.02	.02	.04	.06
χ^2	7.987±	2.154	11.818*	5.897**

Note: Age₁ = 29yrs or younger; Age₂ = 30yrs-39yrs; Age₃ = 40yrs-49yrs. Ages 50yrs or older is the reference category with which the other groups are compared. Not deployed during last three years = 0; Deployed during last three years = 1. Men = 0; Women = 1. Final model $\chi^2(7) = 20.081$, $p = .005$.

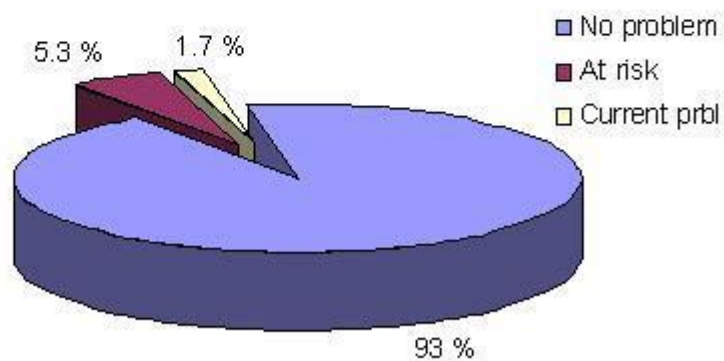
** $p < .01$. * $p < .05$. ± $p < .10$

Deployed past 3yrs (N = 591)



Panel a)

Not deployed past 3yrs (N = 724)



Panel b)

Figure 1. Percentage distribution of alcohol patterns (no problem, at risk, current problem) in military personnel deployed and not deployed during the past three years.

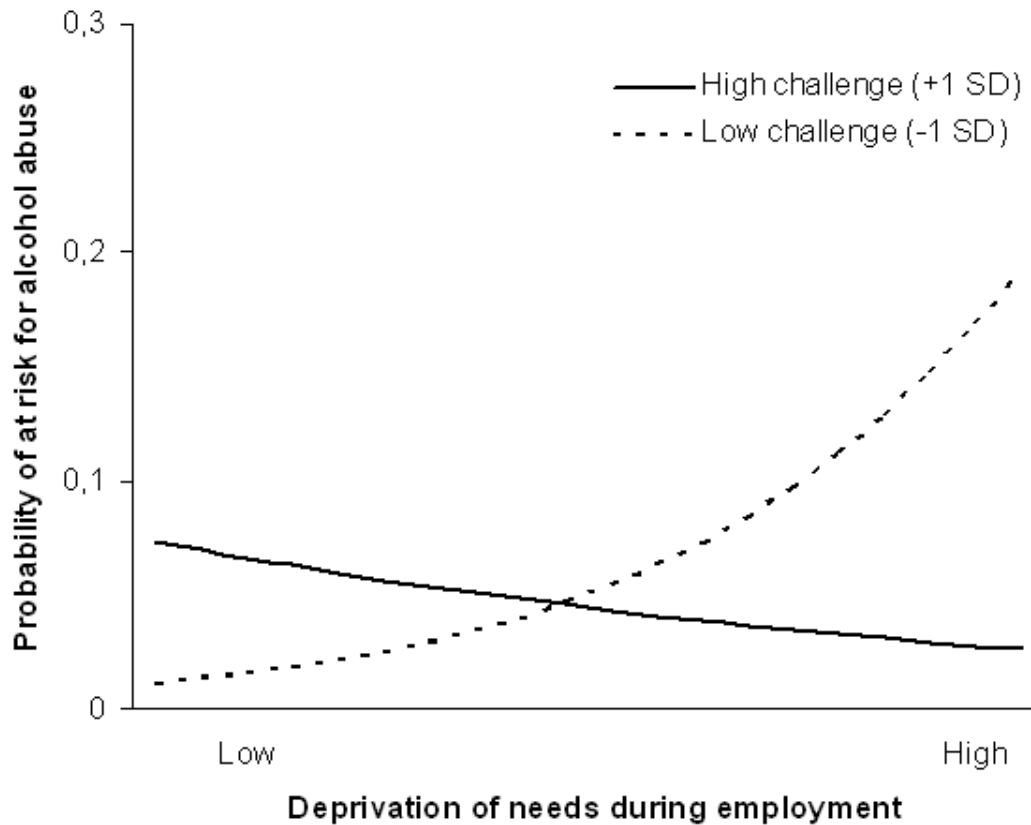


Figure 2. Interaction between the challenge dimensions of hardiness and deprivation of personal / basic needs during deployment predicting personnel at risk for alcohol abuse ($N = 474$).