

Hardiness as a Predictor of Mental Health and Well-Being of Australian Army Reservists on and After Stability Operations

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ABSTRACT This study tested whether cognitive hardiness moderates the adverse effects of deployment-related stressors on health and well-being of soldiers on short-tour (4–7 months), peacekeeping operations. Australian Army reservists ($N = 448$) were surveyed at the start, end, and up to 24 months after serving as peacekeepers in Timor-Leste or the Solomon Islands. They retained sound mental health throughout (Kessler 10, Post-Traumatic Checklist—Civilian, Depression Anxiety Stress Scale 42). Ratings of either traumatic or nontraumatic stress were low. Despite range restrictions, scores on the Cognitive Hardiness Scale moderated the relationship between deployment stressors and a composite measure of psychological distress. Scatterplots revealed an asymmetric pattern for hardiness scores and measures of psychological distress. When hardiness scores were low, psychological distress scores were widely dispersed. However, when hardiness scores were higher, psychological distress scores became concentrated at a uniformly low level.

INTRODUCTION

Australian Army reservists, like their counterparts from other nations, face a series of distinctive challenges to their mental health and well-being before, during, and after an overseas deployment.^{1,2} These challenges are a consistent feature of a deployment, even when the likelihood of trauma is very low. Specifically, over a period of 5 to 12 months, they transition out of their civilian lives, in which military service is a modest component, into full-time military service. They then experience the rigors of the deployment itself in a foreign location, a decompression period of a few days, and, finally, an often abrupt return to their civilian lives.^{3–7}

At a minimum, these multiple transitions and their successive adjustments have been recognized as potentially effecting a sense of dislocation and diminished well-being.^{8,9} Conversely, deployment has often been salutary and produced personal growth.^{10–12} For example, among Vietnam veterans, 75% reported that they had undergone a major change in their emotional temperament, split almost evenly as to whether the change was positive or negative.¹³ Similarly, for Australian deployments on stability operations in Bougainville, Timor-Leste, and Somalia, an estimated 60 to 70% of the returning personnel reported that their experiences changed them for the better, which left 30 to 40% feeling less than positive about their experience.¹⁴

Among the individual differences that may be associated with this divergence in the impact of deployment, the personality disposition of “hardiness” has been hypothesized to help individuals adapt successfully to potentially stressful circumstances.^{15–17} In brief, hardy individuals are seen as predisposed

to appraise challenging circumstances as opportunities for growth, to be engaged in a committed manner rather than as threats to be avoided. These individuals also are thought to have a robust internal locus of control combined with a willingness to mobilize social support when appropriate. Hardiness, when controlling for personality dispositions, has been positively associated with stress mitigation (e.g., active coping strategies and satisfaction with social support), job performance (e.g., role clarity, job satisfaction, and job involvement), and physical health (e.g., fewer work absences and fewer symptoms of illness).¹⁵

In military settings, hardiness scores have been associated positively with performance in the training of Israeli Army conscripts,¹⁸ Israeli officer candidates,¹⁹ U.S. Army Special Forces candidates,²⁰ Norwegian Navy officer cadets,²¹ and casualty-assistance officers.²² Among former Israeli prisoners-of-war, those with high hardiness scores reported more positive changes in their desirable personal characteristics and fewer negative changes from captivity than those with lower hardiness scores.²³

For purposes of this study, two previous sets of findings were of particular interest.

First, a study of U.S. Army National Guard and Reserve medical units mobilized for the 1992 Gulf War demonstrated that personnel with hardiness scores above the median reported fewer symptoms of psychological distress and physical illness than personnel with below median scores.²⁴ This relationship was amplified among personnel who were deployed to the war zone rather than to Germany.

Second, Dolan and Adler¹⁶ assessed self-reported depression, physical symptoms, deployment stressors, and hardiness among U.S. soldiers who were deployed for 6 months to peacekeeping duty in Kosovo. Hardiness scores had low, but significant negative, correlations with depression scores during the deployment ($r = -0.23$) and 1 to 2 months post deployment ($r = -0.16$). No association was discernible between hardiness scores and physical symptoms ($r's < 0.03$).

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This study was aimed at further clarifying the relationship of hardiness with outcomes of deployment of reservists on a stability operation. Previous studies have commonly grouped together all deployment-related stressors into a single variable. However, nontraumatic stressors have been factored into at least three types, arising from work-related sources (e.g., leadership and living and working with same people), separation (e.g., isolation from family, friends, and Australia), and the operational environment (e.g., living conditions and language barriers)²⁵ (cf. Waller et al for a similar four-factor solution²⁶). Orme and Kehoe² found that deployed reservists experienced more stress from work-related sources than regulars deployed at the same time. Accordingly, this study tested three hypotheses concerning whether or not hardiness buffers the relationship between these three types of nontraumatic stressors, psychological distress, and physical ill-health.

H1. As seen previously, hardiness scores will be negatively associated with measures of psychological and physical ill-health.

H2. Hardiness scores will also be negatively associated with ratings of the three nontraumatic stressors.

H3. Hardiness scores will moderate the relationships between the three nontraumatic stressors and measures of psychological distress and physical ill-health.¹⁶

METHOD

Respondents

The respondents were reservists deployed as peacekeepers to either Timor-Leste for 7 months (*n* = 92)² or the Solomon Islands (*n* = 356) for 4 months.²⁷ All respondents were males (mean age = 29.0, standard deviation [SD] = 7.7). However, a solid majority (63%) were 18- to 29-years old, because each contingent was organized around an infantry company, which, in the Australian Army, consists largely of younger soldiers, primarily privates and corporals in rank. The data for this study were collected on up to five occasions over a period of 28 months. Table I shows, for each contingent, response rates on each measurement occasion. The Timor-Leste data were obtained from a single contingent (Group A) deployed during October 2002 to May 2003. The Solomon Islands data were obtained from three consecutive rotations: Group C deployed December 2006 to April 2007, Group D deployed April to August 2007, and Group E deployed August to December 2007, respectively.

On two occasions, specifically, on the first day of deployment (Day 1) and at the end of deployment, the respondents were given a group presentation and invited to participate in the survey on a voluntary basis. They were given an information sheet, including a list of military and civilian support services, consent forms, the questionnaires, and a sealable envelope to take away to complete in private, and subsequently return, whether filled in or left blank. On three occasions following the deployment, the questionnaires, plus reminders about the research and the right to refuse to participate, were mailed to the respondents' home addresses. Not all contingents could be surveyed on all occasions.

MATERIALS AND PROCEDURES

On all measurement occasions, three questionnaires were administered as follows:

- (1) The Cognitive Hardiness Scale contains 30 items using a 5-point Likert scale (“strongly disagree” to “strongly agree”) to rate both positive and negative statements concerning the challenge, commitment, and control that one perceives in their activities, e.g., “Becoming a success is mostly a matter of working hard”²⁸
- (2) The Depression Anxiety Stress Scale (DASS) contains 42 items using a 4-point scale (“did not apply to me at all” to “applied to me very much, or most of the time”) designed to assess the severity of the core symptoms of depression, anxiety, and stress, e.g., (Depression) “I just couldn’t seem to get going.”²⁹
- (3) The Current Health Scale contains 12 items using a 5-point scale concerning how often (“no times” to “four or more times”) symptoms of ill-health (e.g., infections and headaches) were experienced in the previous 3 to 6 months.³⁰

In addition, on one occasion before leaving the operational area, a standardized assessment of psychological status was conducted, designed to identify personnel needing further professional assistance, validate their deployment experience, and gather data for personnel research.³¹ The screen was conducted on a face-to-face basis by uniformed members of the Australian Army Psychology Corps, which were led by the first author. This assessment contained a battery of questionnaires, including the following that were of interest in this study:

- (4) Kessler 10 (K10) contains 10 items on a 5-point scale of how often (“All of the time” to “none of the time”)

TABLE I. Group Size and Response Rates

Group	Theatre	N	Day 1	End (%)	3–6 Months	12 Months	24 Months
A	Timor-Leste	92	*	96	78%	57%	74%
C	Solomon Islands	106	*	89	*	55%	48%
D	Solomon Islands	131	89%	85	42%	*	48%
E	Solomon Islands	119	35%	73	*	40%	*

*Not assessed.

a range of feelings, e.g., nervousness, restlessness, hopelessness, and tiredness, have occurred in the past 4 weeks.³²

- (5) Post-Traumatic Checklist—Civilian (PCL-C) contains 17 items on a 5-point scale (“Not at all” to “Extremely”) asking “how much you have been bothered by,” inter alia, the recall of past stressful experiences and adverse emotions.³³
- (6) Traumatic Stress Exposure Scale—Revised contains 12 yes/no items concerning exposure to traumatic experiences, e.g., “seeing or handling dead or seriously injured people,” “feeling that your action or inaction led to a death or serious injury.”³⁴
- (7) Major Stressors Inventory contains 36 items on a 5-point scale concerning the amount of deployment-related stress (“No stress” to “Extreme stress”) from nontraumatic sources, e.g., leadership, boredom, and living and working with the same people.²⁵

Preliminary comparisons were conducted to detect differences between the subsamples, personnel deployed to Timor-Leste versus Solomon Islands, using the method of O’Brien and Kaiser.³⁵ For each comparison, the effect size (d) was expressed as 95% confidence interval in SD units.³⁶ Standardized effect sizes of 0.2, 0.5, and 0.8 have been regarded as small, medium, and large effect sizes, respectively.³⁷

These comparisons revealed that the Timor-Leste group showed lower hardiness scores (medium effect size), while showing higher scores on the measures of psychological distress, physical illness, work stress, and trauma exposure relative to the Solomon Islands group. With the exception of a medium effect size for trauma exposure, the effect sizes were small. The differences did not appear to interact with the tests of the hypotheses under consideration, and accordingly the data were consolidated into a single sample for subsequent reporting.

RESULTS

Overall Hardiness

An analysis of the total hardiness scores revealed that they were nearly constant over the 2-year period of the study. Specifically, on the first day of deployment, the mean hardiness score was 113 (SD = 10). At subsequent time points, the mean of the available scores varied downward by only 2 points. For the participants who provided scores at all time points ($N = 35$), any apparent trend in the scores was not significant, linear trend $F(1, 34) = 1.70, p > 0.10, 95\% \text{ CI} [-0.108, 0.495]$. Within respondents, individual scores demonstrated little variability over time (average SD = 5.7, corresponding to 5% of the total score range of 120). For subsequent analyses, each participant’s mean hardiness score across available measurement occasions was used as the index of the construct.

To provide an overall appreciation of the hardiness variable, Figure 1 shows the frequency distribution of the hardi-

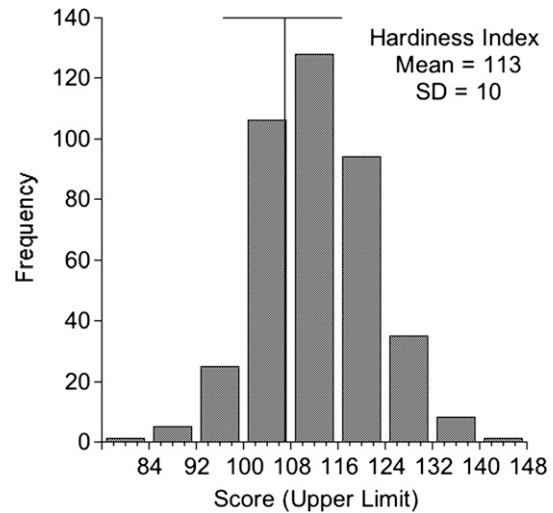


FIGURE 1. Frequency distribution of hardiness scores. The T-bar symbol indicates the available norm’s mean score and SD.

ness scores across all respondents. For a rough comparison with available norms, the T-shaped bar superimposed on the distribution indicates the mean hardiness score and its SD ($M = 107, SD = 10$).³⁸ This norm figure is based on a sample of 531 individuals from a nonclinical population of American males (mean age = 39.5 years). As can be seen, the bulk of the hardiness scores of the reservists was clustered within one SD of the norm’s mean. Although slightly higher than the norm group, the multiple differences between the reservist and norm groups made it unwise to argue that this difference was meaningful.

Psychological Distress

The DASS scores were low and nearly constant over the 2-year period of the study. On the first day of deployment, the mean scores for depression, anxiety, and stress were 1.16 (SD = 2.03), 0.87 (SD = 1.44), and 2.70 (SD = 3.57), respectively. Thereafter, the mean scores varied by a maximum of 1.43 points within the total range of 42 points for each subscale. For the participants who provided scores at all time points ($N = 40$), any apparent trends were not significant, linear trend $F's < 1$. Individual scores demonstrated little variability over time; for the depression, anxiety, and stress subscales, the average individual SDs were 1.6, 0.8, and 2.2 points, respectively, corresponding to 5% of the scale. For subsequent analyses, each participant’s mean score across available measurement occasions was used as the index for each of the three constructs.

Table II lists the means, SDs, sample sizes, and distribution of scores in bands for the measures of psychological distress collected from the Timor-Leste and Solomon Islands subsamples, as well as the combined group of respondents. The scores on all the measures—K10, PCL-C, and DASS subscales—showed a similar pattern, which has been described in part in previous reports.^{2,27} Specifically, a large

TABLE II. Measures of Psychological Distress

	Timor-Leste	Solomons	Combined
K10			
Mean	14.9	13.7	13.9
SD	5.1	4.0	4.3
Total (N)	72	350	422
Score Bands			
10–15	67%	77%	75%
16–29	32%	22%	24%
30–50	1%	1%	1%
PCL-C			
Mean	21.5	19.9	20.2
SD	5.9	4.6	4.9
Total (N)	71	349	420
Score Bands			
17–29	92%	96%	95%
30–39	4%	3%	3%
40–49	4%	1%	2%
50–85	0%	0%	0%
DASS—Depression			
Mean	2.8	1.5	1.8
SD	4.3	3.0	3.4
Total (N)	92	319	411
Score Bands			
0–9	92%	97%	96%
10–13	2%	1%	1%
14–20	4%	2%	2%
21–27	1%	0%	1%
28+	0%	0%	0%
DASS—Anxiety			
Mean	1.4	0.7	0.9
SD	2.9	1.7	2.1
Total (N)	92	319	411
Score Bands			
0–7	95%	99%	98%
8–9	2%	0%	1%
10–14	1%	0%	0%
15–19	2%	1%	1%
20+	0%	0%	0%
DASS—Stress			
Mean	4.8	2.8	3.3
SD	5.0	4.4	4.6
Total (N)	92	319	411
Score Bands			
0–14	95%	95%	96%
15–18	2%	2%	2%
19–25	3%	3%	2%
26–33	0%	0%	0%
34+	0%	0%	0%

majority of the respondents fell in the lower scores bands. For K10, 75% of the total sample fell in the lowest band (10–15), which is regarded as having a low risk of psychological distress and unlikely to require intervention.³⁹ Most of the remaining scores (24%) were in the 16 to 29 band, which is regarded as indicative of “moderate risk.” According to guidelines, individuals scoring in this band should be given information on self-help and support services, with encouragement to seek assistance if experiencing an adverse impact on their quality of life.³⁹ For the PCL-C and DASS subscales, 90% or more of the respondents’ scores were in the lowest band.

Hardiness and Psychological Distress

Although measures of psychological distress were uniformly low, there was nevertheless a negative relationship between hardiness and these measures of psychological distress. Figure 2 shows scatterplots for each of the five measures (K10, PCL-C, and three DASS subscales) versus hardiness scores. In addition, a sixth plot shows the scatterplot for a composite measure of all five variables derived from a principle component analysis that revealed a single factor, which had eigenvalue of 3.70 and accounted for 74% of the variance. The open and filled circles depict the scores for the respondents who were deployed to Timor-Leste and the Solomon islands, respectively. As a reference point, the vertical line in each panel indicates the mean hardiness score (113).

The pattern of scores was consistent across all six measures. Lower hardiness scores were associated with a wide dispersion of scores on each measure. As hardiness scores increased, the dispersion diminished and the scores converged to a very low level. This pattern was confirmed by a moderate negative correlation coefficient for hardiness and each of the individual psychological distress measures, which ranged from -0.31 to -0.40 , p 's < 0.001 . There was a negative correlation between hardiness and the composite score, $r (N = 403) = -0.385$, $p < 0.001$.

Hardiness and Physical Illness

Examination of the physical illness index revealed that the frequency of illness was low across the 2-year period of the study; the maximum score for any individual was 2.03. On the first day of deployment, the mean index was near zero, $M = 0.44$ ($SD = 0.38$), and the index remained near zero thereafter, largest $M = 0.59$ ($SD = 0.55$). Any apparent trends were not significant, linear trend F 's < 1 , and individual scores were relatively invariant over time (average $SD = 0.26$). Each participant’s mean score across measurement occasions was used as the index in subsequent analyses.

Figure 3 shows a scatterplot of the physical illness index versus hardiness, which is laid out in the same fashion as Figure 2. As seen with the measures of psychological distress, lower hardiness scores were associated with a moderate dispersion of scores. As hardiness scores increased, the physical illness index converged to zero. There was a moderate negative correlation coefficient for hardiness and the physical illness index, $r (N = 403) = -0.374$, $p < 0.001$.

Nontraumatic and Traumatic Stressors

Table III lists the means, SDs, and sample sizes for the three measures of nontraumatic stress—work, separation, and the operational environment— plus the scores for traumatic exposure (Traumatic Stress Exposure Scale—Revised). Examination of the table indicates that the scores were generally low. Nevertheless, significant differences appeared across the measures and the two subsamples.

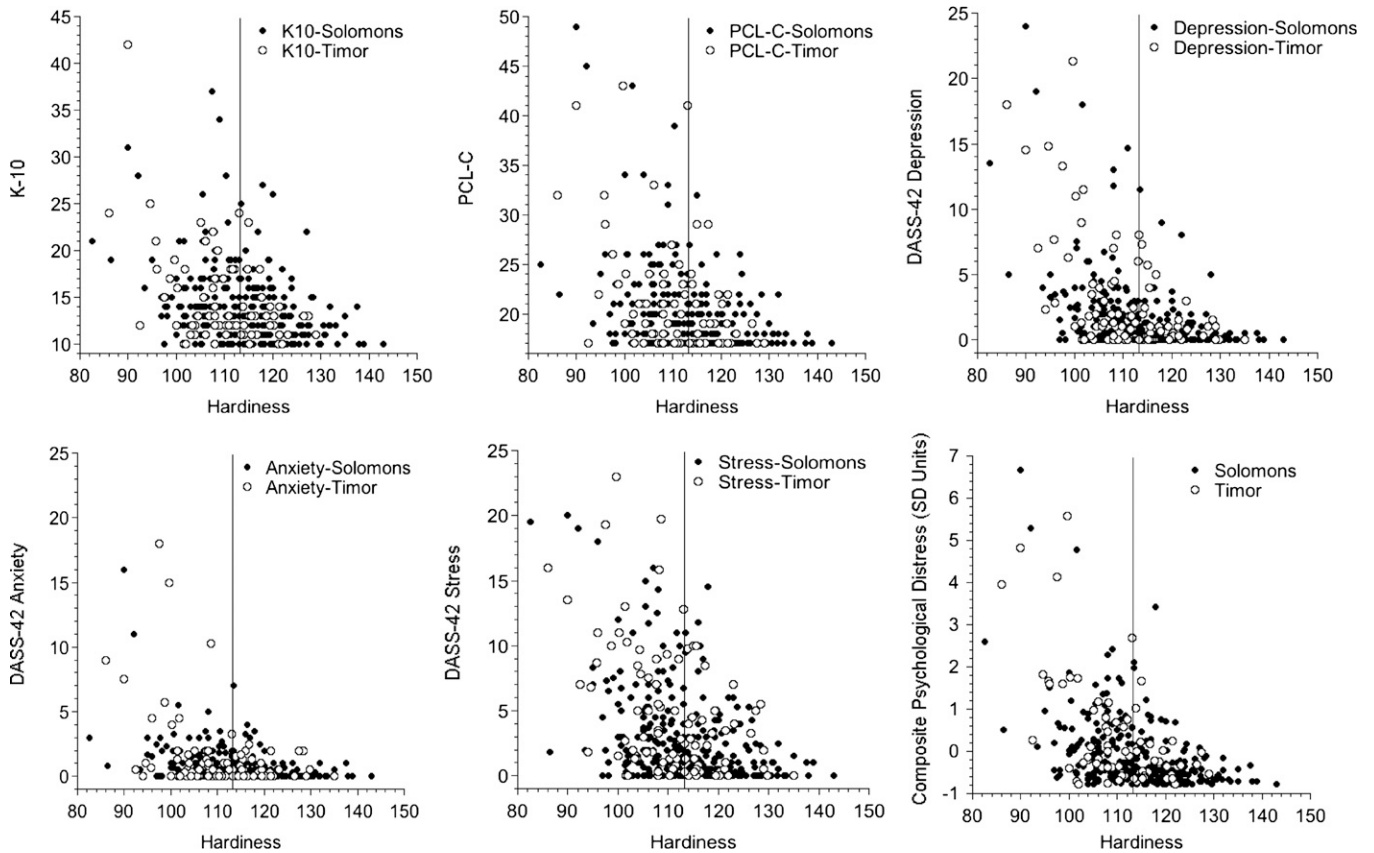


FIGURE 2. Scatterplots for each of the five measures of self-reported psychological distress and their composite measure versus hardiness scores.

Across all respondents, work-related stress ($M = 1.82$) was significantly higher than that of separation stress ($M = 1.58$), which in turn was significantly higher than that of the operational environment, smallest pairwise $F(1, 416) = 108.20, p < 0.01$.³⁵ The effect sizes were small to medium, the largest being work versus operational environment, 95%

CI [0.574, 0.705]. Examination of the scores reveals that 63% of the respondents reported some stress—usually slight—from work-related factors, 44% respondents reported stress from separation factors, and only 15% of the respondents reported stress from the operational environment. With regard to traumatic exposure, 64% of the respondents reported one or more exposures to danger, human suffering, injury, and/or death.

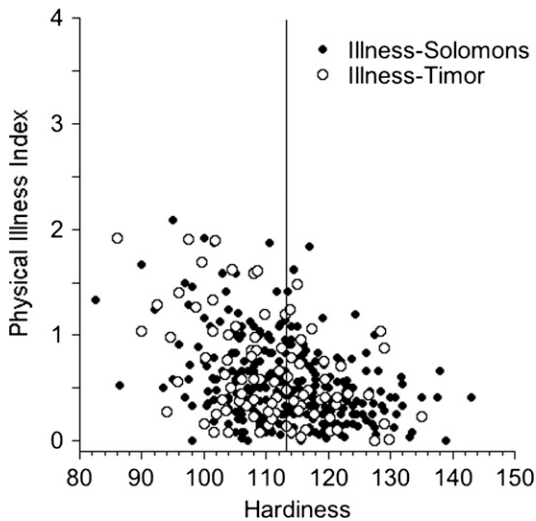


FIGURE 3. Scatterplot of the self-reported physical ill-health scores versus hardiness scores.

TABLE III. Measures of Deployment Stressors

	Timor-Leste	Solomons	Combined
Work			
Mean	2.08	1.77	1.82
SD	0.84	0.61	0.66
Total (N)	73	349	422
Separation			
Mean	1.51	1.59	1.58
SD	0.51	0.49	0.49
Total (N)	73	350	423
Operational Environment			
Mean	1.31	1.26	1.27
SD	0.37	0.31	0.32
Total (N)	73	350	423
Traumatic Exposure			
Mean	2.99	1.89	2.07
SD	2.95	2.54	2.64
Total (N)	71	349	420

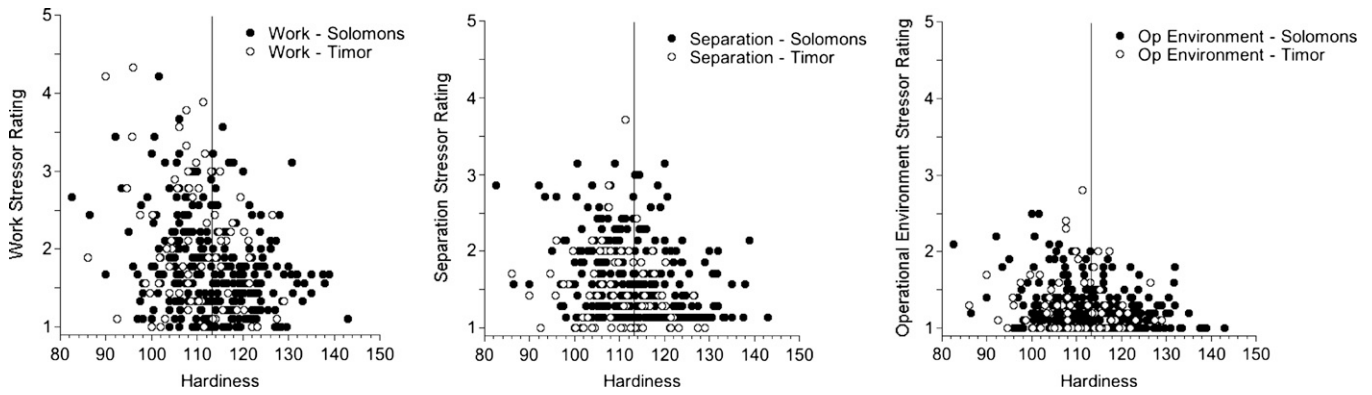


FIGURE 4. Scatterplots of the work, separation, and operational environment measurements of nontraumatic stressors versus hardiness.

Hardiness and Deployment Stressors

Figure 4 shows scatterplots of the work, separation, and operational environment measurements of nontraumatic stressors versus hardiness. The plots are laid out in the same manner as Figures 2 and 3. The relationships between hardiness and the nontraumatic stressors broadly resembled those seen for psychological distress and physical illness. However, the convergence of stressor scores at higher hardiness levels was less pronounced, and the correlation coefficients were small. Specifically, for the three measures, the *r*'s (*N* = 403) were -0.188 , -0.168 , and -0.146 , all *p*'s < 0.01.

A plot was also created for the traumatic stress exposure. However, because the exposure scores were whole numbers and concentrated in a narrow range, the plot was uninformative. The correlation between the exposure scores and hardiness was nearly zero and nonsignificant, *r* (*N* = 403) = -0.080 , *p* > 0.10.

Although Deans and Byrne²⁵ found evidence for separate work, separation, and operational environment dimensions of nontraumatic stressors, the three derived variables were, in fact, highly correlated in a pairwise fashion, smallest *r* (*N* = 450) = 0.702 , *p* < 0.01. To avoid collinearity among these three variables in subsequent analyses, they were summed to create a total nontraumatic stressor score. The trauma exposure score was only moderately correlated with the nontraumatic stressors, largest *r* (*N* = 450) = 0.355 , *p* < 0.01. Thus, the trauma exposure score was retained as a separate variable for subsequent analyses.

Modeling

The analyses described earlier indicate that hardiness scores were negatively correlated with measures of psychological distress, physical ill-health, and nontraumatic stress. In all cases, lower hardiness scores were associated with higher, but widely dispersed, scores on these outcome variables, whereas higher hardiness scores were associated with low, more tightly concentrated outcome scores. This type of relationship converges with results of previous studies, in which regression modeling indicated that relationships between deployment-related stressors and subsequent distress were moderated by hardiness.^{16,24} Specifically, the interaction terms for hardiness × stress scores predicted distress and/or illness outcomes.

To test whether hardiness moderated the corresponding relationships in the present data, multiple regression analyses consistent with those of Dolan and Adler¹⁶ were conducted for psychological distress and physical illness as the dependent variables, using SPSS Version 21. The predictor variables were the scores for (1) hardiness, (2) total nontraumatic stress, and (3) trauma exposure. In addition, interaction terms were computed for the predictor variables: (4) hardiness × total nontraumatic stress, (5) hardiness × trauma exposure, and (6) hardiness × total nontraumatic stress × trauma exposure. These variables were *z*-transformed and entered simultaneously into the regression analyses.⁴⁰

Tables IV and V list the tested variables, their standardized coefficients (β), the *t* test scores, their *p* values, and the

TABLE IV. Summary of Regression Analyses for Predictors of Psychological Distress Scores

Predictor Variable	β	<i>t</i> (403)	<i>p</i>	95% Confidence Interval for β	
				Lower Bound	Upper Bound
(Constant)		0		-0.07	0.07
Hardiness	0.12	1.33	<0.19	-0.06	0.29
Total DS	1.79	4.47	<0.00	1.01	2.58
TE	2.21	5.59	<0.00	1.43	2.99
Hardiness × DS	-1.19	-3.03	<0.00	-1.97	-0.42
Hardiness × TE	-1.71	-4.62	<0.00	-2.44	-0.98
Hardiness × DS × TE	-0.39	-2.60	<0.01	-0.68	-0.09

DS, deployment stressors; TE, trauma exposure. Adjusted $R^2 = 0.55$; $F(6, 396) = 84.02$; *p* < 0.001.

TABLE V. Summary of Regression Analyses for Predictors of Physical Illness Reports

Predictor Variable	β	<i>t</i> (403)	<i>p</i>	95% Confidence Interval for β	
				Lower Bound	Upper Bound
(Constant)		0		-0.09	0.09
Hardiness	-0.23	-1.97	<0.05	-0.47	0.00
Total DS	0.54	1.01	<0.32	-0.51	1.59
TE	0.06	0.11	<0.92	-0.98	1.09
Hardiness \times DS	-0.56	-1.06	<0.29	-1.59	0.48
Hardiness \times TE	-0.06	-0.12	<0.91	-1.03	0.91
Hardiness \times DS \times TE	0.29	1.45	<0.15	-0.10	0.67

DS, deployment stressors; TE, trauma exposure. Adjusted $R^2 = 0.20$; $F(6, 396) = 18.29$; $p < 0.001$.

upper and lower bounds of the 95% confidence intervals for the β coefficients. Examination of Table IV reveals that, in predicting psychological distress, hardiness interacted significantly with the total nontraumatic stress and trauma exposure in the two-way and three-way interactions (p 's < 0.001). With these interactions in hand, hardiness by itself was not a significant predictor of psychological distress. According to Baron and Kenny,⁴¹ these interactions indicate that hardiness moderated the relationship between the nontraumatic stress and psychological distress. (Analyses for mediation effects failed to reveal that adding hardiness to the joint effect of the nontraumatic stress and trauma exposure significantly reduced their relationship with psychological distress.⁴¹) In contrast to the modeling of psychological distress, Table V reveals that no main effect or interaction term had a strong relationship with physical illness. The only significant predictor was hardiness, but its β coefficient (-0.23) was small.

DISCUSSION

The major findings of this study were as follows:

H1. Consistent with previous results, hardiness scores were negatively associated with measures of psychological distress and physical ill-health. Furthermore, these relationships were more complex than a linear correlation coefficient would suggest. Individuals with high hardiness scores had uniformly low scores for distress and ill-health. In contrast, individuals with medium to lower hardiness scores had a greater dispersion in distress and ill-health scores. Most of these individuals had scores of distress and ill-health that were low as those of the individuals with higher hardiness scores. However, those modest numbers of individuals who did have higher scores for distress and ill-health predominately had hardiness scores below 113, the available normative mean.

H2. In support of *H2*, hardiness scores were negatively associated with ratings of nontraumatic stress arising from work, separation, and the operational environment. Although the correlation coefficients were small (<0.20), the same pattern of dispersion and convergence across hardiness scores appeared as for distress and ill-health.

H3. The results of modeling supported *H3*. The hardiness scores moderated the relationship between the stressors—total nontraumatic stress and trauma exposure—and the composite measure of psychological distress. On the other hand, a moderating effect was not observed for the relationship between hardiness and physical ill-health, despite the significant correlations of hardiness scores with physical ill-health.

This pattern of results confirms previous findings that higher hardiness scores are associated with lower levels of reported psychological distress and physical ill-health.^{16,24} The present results also extend previous observations that the majority of personnel exposed to deployment-related stress retain sound psychological and physical health, responding to potentially traumatic events with resilience.^{42,43} In this study, even respondents with lower hardiness scores generally showed low scores for distress and ill-health. As was seen in the scatterplots (Figs. 2 and 3), only a smattering of individuals showed any elevation in measures of distress and/or ill-health.

This consistent pattern of dispersion and convergence allows for asymmetric inferences regarding the utility of hardiness scores in predicting who may or may not suffer adverse consequences of deployment.

Individuals scoring on the high side of hardiness appear to be highly resistant to adverse consequences, even under more extreme circumstances than experienced by the respondents in this study.^{20,23} High levels of hardiness have been thought to promote sustained performance and adaptation across the entire spectrum of stressors.⁴⁴

On the low side of hardiness, the greater dispersion in measures of distress and ill-health indicates that it is difficult to predict how individuals will function in the face of stress. As stress increases, so will the dispersion of scores. An increasing proportion of individuals will show elevations in distress. Nevertheless, a substantial portion of individuals may remain unaffected and function satisfactorily.

For future research, two alternative hypotheses suggest themselves. First, as stress increases, the pattern of dispersion and convergence in distress and ill-health may be amplified. Dispersion at the lower levels of hardiness may increase, whereas the convergence at the higher levels of hardiness could remain largely unchanged. Second and

alternatively, the asymmetry may be diminished, and a more linear pattern could appear. Across the entire range of hardiness, distress and ill-health could be elevated and their dispersion would increase.

In practical terms, the present results indicate that one can have increased confidence that those who score higher on hardiness will be more resistant to stressors than those who score lower. However, the presence of a lower score does not automatically imply that the person will display a deficit in their ability to resist stress. Only a modest proportion, except perhaps those few individuals with the very lowest scores are likely to exhibit signs of psychological distress. However, this pattern needs to be tested in higher threat environments and for a wider range of military personnel beyond Army reservists, e.g., Army regulars, Navy personnel, Special Forces, and even perhaps civilian aid workers.⁴⁵

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