Protective Effects of Psychological Strengths Against Psychiatric Disorders Among Soldiers

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ABSTRACT This study prospectively examined psychological strengths targeted in U.S. Army training programs as predictors of psychiatric diagnosis in active duty soldiers. At baseline, the cohort (140,584 soldiers) was without psychiatric disorder. Soldiers were then followed for 2 yr and classified as healthy, or acquiring a psychiatric diagnosis (adjustment disorder, anxiety disorder, depression, or post-traumatic stress disorder), or being prescribed psychotropic medication without a psychiatric diagnosis. Soldiers who remained healthy reported significantly higher strengths scores at baseline, compared with soldiers who were diagnosed with a psychiatric disorder. In addition, soldiers in the worst strengths decile were twice as likely to develop a psychiatric disorder, compared with soldiers in the top 50% on baseline strengths. Strengths afforded the greatest protection against depression. Offering tailored resilience training programs could help the Army steel vulnerable soldiers against the challenges of life, military training, and combat.

INTRODUCTION

Over the past two decades, armed operations in the two major theaters of conflict (Iraq and Afghanistan) have led to a major increase in health care needs and costs. Soldiers returning from prolonged deployments are sometimes afflicted with a wide range of psychiatric symptoms.[1–4] This upsurge in diagnosis and treatment has resulted in tremendous psychiatric treatment costs, which totaled approximately $4 billion between FY 2007 and FY 2012, with an overwhelming majority of the costs (89%) attributed to active duty service members.[5] Furthermore, Department of Defense (DoD) psychiatric treatment costs nearly doubled during this time.[4] The ripple effects of psychiatric disorders in the military are untold, with some percentage of soldiers leaving the military (attrition) and others lacking readiness to serve in their units, engaging in alcohol or drug use, or committing suicide.[6–10]

Routine monitoring of psychiatric symptoms among active duty servicemen suggests a 65% increase in diagnosable cases between 2001 and 2011.[5] Adjustment disorder, anxiety disorder, depression, and post-traumatic stress disorder (PTSD) rank among the most prevalent psychiatric disorders diagnosed in U.S. Army (hereafter, "Army") active duty soldiers.[11–14] Prescribing psychotropic medications in the absence of a corresponding diagnosed psychiatric disorder has also become a more common treatment practice,[15,16] and in the military, the stigma of mental health problems may result in this practice of underdiagnosis;[17] however, this stigma will not alter physicians' medication prescribing.

The rising cost of health care and the need to maintain an elite military force provided an impetus for the DoD to search for ways to promote and maintain mental health. In recent years, the Army, under the rubric of the Army Resilience Directorate (ARD), has offered universal, skills-based training programs targeting coping, problem-solving, and self-management, with the goal of reducing stress, improving readiness, and preparing soldiers for life's challenges, including combat.[18,19] As a whole, these programs blend cognitive-behavioral approaches to skills training including mental rehearsal, goal setting, emotion regulation, cognitive restructuring, self-talk, and other anxiety reducing techniques to relieve stress and eliminate unwarranted or intrusive thoughts.[20] Army resilience training programs are preventive and seek to equip service members with the necessary resolve and mental fortitude to meet the demands of the Army profession.[19] In addition, these programs are intended to improve baseline psychological health, while reducing costs that can arise from loss of service while soldiers receive treatment for any number of medical or psychiatric symptoms.

Defining Strengths That Promote Resilience

Definitions of resilience vary widely across the medical and psychological research literature.[21] The ARD defines resilience as "the mental, physical, emotional and behavioral ability to face and cope with adversity, adapt to change, recover, learn and grow from setbacks."[19] This definition of resilience dovetails with the developmental psychopathology literature, which defines psychological resilience as the ability to bounce back and adapt in the face of adversity, trauma, tragedy, threats or even significant sources of stress.[22–27] In the current study, we

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The views expressed in this article are those of the authors and do not reflect the official policy or position of the Department of the Army, DOD, or the U.S. Government.

doi: 10.1093/milmed/usx189

hypothesized that several psychological strengths including optimism, coping, adaptability, positive affect, meaning, lack of catastrophic thinking, and lack of loneliness would protect soldiers against psychiatric disorders, and we tentatively call them "resilience" factors. These are the psychological strengths targeted in Army training programs to help soldiers overcome adversity.

The likelihood that these factors would protect against psychiatric disorder follows from studies of resilience in the general population, which generally reference the beneficial effects of optimism, coping, social support, and positive affect (e.g., joy, ebullience, and excitement), all of which protect against the development of psychiatric disorders.[28–30] Additionally, both cross-sectional and longitudinal studies of military samples have linked these strengths (e.g., dispositional optimism and greater functional mental health status) to a reduced risk of developing PTSD.[31,32] A recent study of 1,889 Army soldiers, for example, linked greater psychological capital (including hope, efficacy, resiliency, and optimism) prior to deployment with a reduced likelihood of developing PTSD, anxiety disorder, or depression disorder following deployment.[33] Resilience training in military samples has also been linked to fewer behavioral health symptoms and lower rates of acute stress in both deployed and non-deployed soldiers.[15,34,35]

Although numerous studies implicate these protective factors against various negative outcomes, few studies have emphasized the prospective role of resilience in preventing psychiatric disorders in military samples. The handful of military studies that examine these strengths in relation to behavioral or psychiatric outcomes either rely on cross-sectional or retrospective study designs[36–40] or begin following soldiers after the event of interest (i.e., potential stressor) has already occurred, weakening any hope of establishing temporal precedence, a requirement for causal inferences.[41] Toward this end, we designed a natural cohort study within the context of a nonclinical Army population to rigorously address these concerns. We operationalized resilience in terms of several qualities of psychosocial functioning (optimism, coping, adaptability, positive affect, meaning, lack of catastrophic thinking, and lack of loneliness) using an annual soldier assessment and so tested this instrument's utility for predicting the major Army cost driver of psychiatric treatment.

METHODS

Study Population

The initial cohort included 140,584 active duty Army soldiers, all of whom completed an online, self-report assessment of strengths (Global Assessment Tool, or GAT) between January 1, 2010, and December 31, 2010.[42] Additional inclusion criteria necessitated that soldiers be free of psychiatric diagnoses (*International Classification of Diseases, Ninth Revision, Clinical Modification* [ICD-9-CM] codes 290–319) and not receiving military prescribed psychotropic medications (see Psychotropic Medication section below) in the 12 mo preceding their GAT assessment. This ensures that our cohort was free from any of the psychiatric conditions designated as study outcomes. Soldiers were then followed for 2 yr after their GAT completion date. Of the 140,584 soldiers who formed the baseline cohort, 23,598 soldiers were lost to attrition (e.g., separated from the Army).

Soldiers were assigned to one of three mutually exclusive groups based on their psychiatric and prescription medication status during the 2-yr follow-up window: (1) Healthy group (soldiers with no psychiatric diagnoses and no psychotropic prescriptions), (2) Diagnosed group (soldiers who received a psychiatric diagnosis of adjustment disorder, anxiety disorder, depression, or PTSD), and (3) Prescription only group (soldiers who received a psychotropic prescription medication in the absence of a qualifying psychiatric or pain diagnosis).[43] Soldiers who did not fall into one of these three groups (i.e., received a psychiatric diagnosis other than adjustment disorder, anxiety disorder, depression, or PTSD [e.g., personality disorder]) were excluded ($N = 46{,}322$). This resulted in a longitudinal analysis cohort of 70,664 soldiers.

The Army Human Research Protections Office and the University of Pennsylvania institutional review board both approved the study protocol. Soldiers in this study indicated through an electronic "opt-in" procedure that their data could be used for research purposes. All data management and analysis work was conducted in the Person-Event Data Environment (PDE), a secure, virtual and HIPAA-compliant data repository that houses Army personnel, manpower, medical, performance, and psychological data.[44,45]

Measures

Psychological strengths

In the current study, we hypothesized that resilience could be operationally defined by a cluster of psychological strengths targeted in Army training programs to help soldiers overcome adversity. We included seven GAT scales (culled from well-validated psychometric instruments tested in the general population) to assess these psychological strengths.[42] All the GAT scales culled for this study use a 5-point Likert-type response format ranging either from "not at all like me" to "very much like me," "strongly disagree" to "strongly agree," or "never" to "most of the time." Initial validation of the GAT reveals the scales under investigation, for the most part, form distinct reliable factors.[46] For this reason, we averaged responses from each scale to create scale scores. These scale scores were moderately correlated (average $r = 0.44$), ranging from a low of $r = 0.25$ (between meaning and absence of catastrophic thinking) to a high of $r = 0.58$ (between positive affect and absence of loneliness). Because the seven scales were moderately correlated, we also created a single composite score from the seven scales, with higher scores indicating greater hypothesized "resilience."

Optimism
Four items ($\alpha = 0.73$; e.g., "Overall, I expect more good things to happen to me than bad") taken from the revised Life Orientation Test assess a generalized expectance for positive future events.[47,48]

Problem-focused coping
Five items ($\alpha = 0.78$; e.g., "When something stresses me out, I try to solve the problem") assess active or problem-focused coping skills.[49]

Adaptability and flexibility
Three items ($\alpha = 0.69$; e.g., "I am good at changing myself to adjust to changes in my life") assess adaptability and perceived cognitive flexibility.[50]

Positive affect
Ten items ($\alpha = 0.93$) adapted from the Positive and Negative Affect Schedule Expanded Form (PANAS-X)[51] assess general positive affect (e.g., inspired), joviality (e.g., happy), self-assurance (i.e., proud), and serenity (i.e., calm).

Catastrophic thinking
Seven items ($\alpha = 0.85$; e.g., "When bad things happen to me, I expect more bad things to happen") reflecting the basic tenets of learned helplessness theory were designed to assess stable, global, and internal attributions (i.e., explanatory style) formed in response to negative events.[52,53] Responses were reverse scored so that higher scores would indicate the absence of catastrophic thinking.

Loneliness
Three items ($\alpha = 0.79$; e.g., "How often do you feel left out?") from the UCLA Loneliness Scale assess feelings of loneliness.[54] Responses were reverse scored so that higher scores would indicate the absence of loneliness.

Spirituality and meaning
Five items ($\alpha = 0.82$; e.g., "I believe there is a purpose for my life") assessing meaning and purpose were adapted from the Purpose in Life scale.[55]

Psychiatric Disorders

Inpatient and outpatient electronic health records were obtained from the Medical Data Repository (MDR) and the Theater Medical Data Store (TMDS), capturing health care services provided stateside (MDR) and in combat (TMDS). We used the ICD-9-CM codes recognized by the Diagnostic and Statistical Manual of Mental Disorders, 4th edition, Text Revision (DSM-IV-TR) classifications for adjustment disorder (309.0, 300.24, 300.28, 300.3, 300.4, 300.9), anxiety disorder (300.00-.02, 300.21-.23, 300.29, 300.3), depressive disorder (296.2, 296.3, 300.4, 311), and PTSD (309.81).[56] Given the minimal improvement in prediction associated with requiring two or more encounters for psychiatric diagnosis, and concerns regarding underreporting of psychiatric disorders at Army behavioral health clinics, we defined psychiatric disorders as having at least one encounter for one of the four psychiatric disorders.[17,57–59]

Psychotropic Medications

Electronic pharmacy data records were obtained from the MDR. Psychotropic medications corresponding to psychiatric disorders were classified according to the American Hospital Formulary Service coding:[60] Opiate Agonist (28.08.08), Opiate Partial Agonists (28.08.12), Opiate Antagonists (28.10), Barbiturates (28.24.04), Benzodiazepines (28.12.08, 28.24.08), Anxiolytics, Sedatives and Hypnotics-Miscellaneous (28.28.92), Anticonvulsants-Miscellaneous (28.12.92), Antidepressants (28.16.04), Antipsychotics (28.16.08), and Anti-Manic Agents (28.28). We defined prescription medications as having at least one prescription for any of the above-mentioned psychotropic medications.

Demographic and Army Characteristics

Demographic and Army service data came from the Defense Manpower Data Center (DMDC)–West, Seaside, CA. Demographic measures included age, gender, race/ethnicity, marital status, and highest education level attained. Army service measures included service branch, date of entry into service, date of separation from service, rank, and number of deployments.

Statistical Analysis

We began by examining differences between the psychiatric status groups (Diagnosed vs. Healthy and Prescription only vs. Healthy) on the seven baseline strengths measures using one-way multivariate analysis of covariance. Given the categorical nature of the outcome classification measure, we then used multinomial logistic regression analyses to examine the likelihood of being in the healthy, diagnosed, or medication only group at follow-up, as a function of baseline strengths. As a crude sensitivity analysis, we also used a "threshold" approach to categorize soldiers into discrete strengths quartiles. Next, we used logistic regression to examine the likelihood of developing each psychiatric disorder (e.g., 1 = depression, 0 = no depression) based on baseline measures of strengths. The multivariate and regression models controlled for demographic and Army characteristics. In addition, all tests were two-sided with Type I error rate = 0.05. Analyses were performed using SAS, version 9.4 software.

RESULTS

Higher strengths scores at baseline were consistently associated with protection against developing a psychiatric disorder. In the remainder of this section, we present specific findings that support our original hypotheses and research design.

Incident Psychiatric Disorders

Of the 70,664 soldiers who formed the longitudinal panel cohort, 64.1% remained healthy, 11.3% received a psychotropic prescription and no diagnosis, and 24.6% were diagnosed with a specified psychiatric disorder (with or without a corresponding prescription medication) over the 2-yr study follow-up. Soldiers in the longitudinal analytic cohort, compared with those who were lost to attrition or excluded, were significantly more likely to be non-White, married, officer status, educated, report more positive affect and less loneliness, and have deployed more at baseline. All other differences were relatively small ($0.95 < OR < 1.05$) and not of practical significance. Table I reports the longitudinal cohort characteristics for each classification group. Given the very large sample size, many differences in Table I were statistically significant but not practically or clinically significant. We highlight, in text, the largest differences in demographic characteristics across groups. Females and soldiers with less than a high school degree were substantially more likely to receive a psychiatric diagnosis during the study follow-up (The percentage of soldiers in our

TABLE I. Demographic and Army Characteristics, by Psychiatric Status Group

Characteristics	*n*	Group: Healthy *N* = 45,303 64.1% %	Group: Diagnosed *N* = 17,347 24.6% %	Group: Prescription Only *N* = 8,014 11.3% %
Age group, years				
17–29	46,795	61.9	25.6	12.5
30–39	18,636	67.9	22.5	9.6
40–49	4,921	70.4	22.6	7.1
≥50	297	70.7	19.9	9.4
Gender				
Female	8,322	54.5	38.7	6.8
Male	62,335	65.4	22.7	11.9
Race/Ethnicity				
White	43,448	63.5	24.6	11.9
Black	14,029	65.0	25.6	9.4
Asian	2,990	70.5	16.8	12.6
Hispanic	5,896	61.5	25.7	12.8
Other	611	60.6	29.8	9.7
Education				
No HSD	434	52.5	36.9	10.6
HSD or equivalent	50,521	59.8	28.7	11.5
Some college	2,712	66.0	24.6	9.4
College degree or greater	16,160	77.0	11.8	11.2
Marital status				
Never married	26,725	63.6	23.1	13.3
Married	40,420	64.7	25.0	10.3
Separated/divorced/widowed	3,461	61.0	31.1	7.8
Rank				
Enlisted	55,257	60.0	28.7	11.3
Officer	15,370	79.0	9.6	11.4
Length of service (years)				
0–3	19,042	58.9	27.0	14.0
4–8	21,801	61.9	26.5	11.7
9–15	17,012	68.0	21.6	10.3
≥16	12,769	70.3	21.6	8.1
Number of deployments pre-GAT				
0	28,650	63.6	23.6	12.9
1	3,948	68.6	20.8	10.5
2	2,647	70.3	18.3	11.4
3	2,801	65.1	23.9	11.0
≥4	32,618	63.5	26.4	10.1
Number of deployments post-GAT				
0	32,049	61.0	28.9	10.0
1	7,468	65.2	21.9	12.9
2	6,205	65.9	20.4	13.7
3	4,697	64.5	22.3	13.2
≥4	20,245	68.0	20.4	11.7

HSD, high school degree; GAT, Global Assessment Tool.

sample with less than a high school degree is consistent with published estimates of active duty Army soldiers with less than a high school degree in 2010.[61]). In contrast, officers and soldiers with a college degree or higher were substantially less likely to receive a psychiatric diagnosis during follow-up.

Group Strengths Comparisons

Table II presents summary descriptive statistics for the seven strengths scales for each classification group, adjusting for demographic and Army characteristics. Soldiers in the healthy group reported significantly higher strengths at baseline across all seven measures, compared with soldiers in the diagnosed group ($p < 0.0001$). However, these same differences did not occur in the comparison of healthy soldiers to those receiving prescription medication. No interesting differences emerged between the healthy and prescription only groups in any of the analyses. Results are therefore provided in tables for completeness; however, these results are not described in text.

Protective Role of the Strengths

Table III shows the adjusted odds ratios contrasting the three classification groups on baseline strengths scores, stratified by quartile and controlling for demographic and Army characteristics. Compared with soldiers in the lowest strengths quartile (reference group), soldiers in the second, third and fourth quartiles had significantly lower odds of receiving a psychiatric diagnosis (all p's < 0.001). Being in the highest strengths quartile, relative to the lowest quartile, was associated with approximately a 50% reduced odds of receiving a diagnosis during the study window for four of the seven psychological strengths examined: optimism, positive affect, lack of catastrophic thinking, and lack of loneliness. The remaining psychological strengths, particularly meaning, were less protective. Moreover, with only one exception, the odds of being in the psychiatric diagnosed group decreased with each quartile increase in strengths (both for the separate scales and the composite measure).

We next plotted the percentage of soldiers who developed a psychiatric diagnosis over the 2-yr study follow-up, by composite strengths score decile. This provides a more granular view of the incremental protection afforded at each level of strengths. Figure 1 shows that soldiers in each of the highest five deciles (i.e., top 50% on baseline strengths) were approximately half as likely to develop a psychiatric disorder (average = 19.5%), compared with soldiers in the lowest decile (42.1%).

Specificity of the Protective Effects of Strengths

Finally, we examined the odds of developing each of the four psychiatric disorders (presence and absence) based on baseline strengths and controlling for demographic and Army characteristics. This analysis provides a more fine-grained means of establishing whether any one diagnostic classification is more or less dominant in explaining the overall greater protection against psychiatric diagnosis. With one minor exception, we found that with every 1-unit increase in each of the seven individual strength scores, the odds of developing each one of the four psychiatric disorders decreased significantly (i.e., greater protection against psychiatric disorders; Table IV). For example, the odds of developing an adjustment disorder is 27% smaller for every 1-unit increase in optimism (The 27% reduction value was obtained by subtracting 1 from the odds ratio (0.73) and then multiplying by 100%.). The exception to this finding was meaning, which was not significantly associated with the odds of being diagnosed with an anxiety disorder. Additionally, across the four psychiatric disorders examined, optimism, positive affect, lack of catastrophic thinking, and lack of loneliness again afforded the greatest protection, while meaning remained the least protective. Overall, the magnitude of the odds ratios indicated that baseline strengths afforded the greatest protection specifically against depression.

DISCUSSION

To our knowledge, this is one of the first studies to examine the extent to which psychological strengths targeted in Army

TABLE II. Adjusted Mean Differences in 2010 Strengths, by 2012 Psychiatric Status Group

GAT Scale	Group			*p-V*alue
	Healthy Mean (SD)	Diagnosed Mean (SD)	Prescription Only Mean (SD)	
Optimism	4.00 (0.80)^{a*}	3.76 (0.89)^{b*}	4.00 (0.80)^{a*}	<0.0001
Coping	3.91 (0.65)^{a*}	3.76 (0.74)^{b*}	3.93 (0.65)^{a**}	
Adaptability	4.06 (0.69)^{a*}	3.91 (0.77)^{b*}	4.06 (0.69)^{a*}	
Positive affect	3.87 (0.74)^{a*}	3.64 (0.83)^{b*}	3.88 (0.73)^{a*}	
Meaning	4.02 (0.92)^{a*}	3.91 (1.00)^{b*}	4.03 (0.92)^{a*}	
Lack of catastrophic thinking	4.18 (0.68)^{a*}	3.97 (0.76)^{b*}	4.19 (0.69)^{a*}	
Lack of loneliness	3.79 (0.81)^{a*}	3.53 (0.92)^{b*}	3.82 (0.80)^{a*}	
Composite strengths	3.97 (0.54)^{a*}	3.78 (0.62)^{b*}	3.99 (0.54)^{a*}	

Mean comparisons are adjusted for age, gender, race and ethnicity, education, rank, marital status, number of deployments pre-GAT and post-GAT, and length of service.

^{a,b}Different letters indicate statistically significant mean differences. *$p < 0.001$.

Matching letters indicate means are not significantly different. Tukey's honest significance test method was used to adjust for multiple comparisons and the increased probability of making false positive Type I errors.

TABLE III. Adjusted Odds Ratios, Based on 2010 Strengths Quartiles and 2012 Psychiatric Status Groups

	Diagnosed vs. Healthy			Prescription Only vs. Healthy		
GAT Scale	%	OR	CI	%	OR	CI
Optimism						
Lowest quartile	35.2	1	—	23.4	1	—
Second quartile	27.6	0.68***	0.65–0.71	28.2	1.02	0.95–1.09
Third quartile	17.1	0.57***	0.54–0.61	21.0	1.02	0.95–1.10
Highest quartile	20.2	0.52***	0.49–0.55	27.4	1.01	0.95–1.09
Coping						
Lowest quartile	31.1	1	—	20.3	1	—
Second quartile	29.5	0.66***	0.63–0.70	31.1	1.01	0.94–1.08
Third quartile	20.1	0.61***	0.58–0.64	25.1	1.09*	1.02–1.18
Highest quartile	19.4	0.59***	0.56–0.63	23.5	1.05	0.97–1.13
Adaptability						
Lowest quartile	30.1	1	—	21.2	1	—
Second quartile	32.5	0.70***	0.67–0.73	35.1	1.02	0.96–1.09
Third quartile	13.3	0.68***	0.64–0.72	15.0	1.02	0.94–1.11
Highest quartile	23.9	0.62***	0.58–0.65	28.6	1.01	0.95–1.09
Positive affect						
Lowest quartile	34.8	1	—	21.3	1	—
Second quartile	26.1	0.62***	0.59–0.65	28.2	1.07	1.00–1.15
Third quartile	18.0	0.51***	0.48–0.54	24.5	1.12**	1.04–1.20
Highest quartile	21.1	0.50***	0.47–0.52	25.9	1.04	0.97–1.12
Meaning						
Lowest quartile	30.9	1	—	25.1	1	—
Second quartile	23.7	0.80***	0.76–0.84	26.5	1.10**	1.03–1.10
Third quartile	19.6	0.75***	0.71–0.79	21.8	1.05	0.97–1.13
Highest quartile	25.8	0.79***	0.75–0.83	26.6	1.01	0.94–1.09
Lack of catastrophic thinking						
Lowest quartile	34.5	1	—	22.1	1	—
Second quartile	22.8	0.66***	0.63–0.70	23.5	1.04	0.97–1.12
Third quartile	25.8	0.54***	0.51–0.57	31.7	1.01	0.95–1.08
Highest quartile	16.8	0.49***	0.46–0.52	22.7	1.02	0.95–1.10
Lack of loneliness						
Lowest quartile	36.8	1	—	22.5	1	—
Second quartile	22.2	0.65***	0.62–0.69	23.0	1.06	1.00–1.14
Third quartile	24.3	0.53***	0.51–0.56	32.4	1.10**	1.03–1.18
Highest quartile	16.7	0.50***	0.48–0.53	22.1	1.07	0.99–1.15
Composite strengths						
Lowest quartile	35.9	1	—	21.2	1	—
Second quartile	24.4	0.61***	0.58–0.64	25.6	1.07	0.99–1.15
Third quartile	50.5	0.51***	0.48–0.53	27.1	1.09*	1.02–1.17
Highest quartile	19.2	0.46***	0.43–0.48	26.1	1.06	0.98–1.14

OR, odds ratio; CI, 95% confidence interval.

The lowest quartile (1–25%) served as the reference category for each analysis. ORs reflect the odds of receiving a diagnosis (left) or prescription medication (right) associated with each strengths quartile. ORs and associated CIs are adjusted for age, gender, race and ethnicity, education, marital status, rank, length of service, and number of deployments pre-GAT and post-GAT.

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

training programs to help soldiers overcome adversity prospectively protect soldiers against the onset of psychiatric disorders. Whereas prior studies have primarily isolated the protective effects of single strengths (e.g., dispositional optimism, mental health status, positive emotions, or coping) or examined broader constructs (e.g., psychological capital)[28–33] these studies have not extended this same focus to examine the protective role of strengths against psychiatric outcomes over multiple years in an initially healthy cohort of soldiers. This may be an important oversight, especially in light of emerging health care costs in the DoD,[5] relatively high rates of psychiatric symptoms among soldiers returning from theater[1–4] and reliance on prescription medication to treat symptoms of distress and agitation in soldiers.[15,16]

Strengths as Protective Influences

The current study took a naturalistic life course approach to creating meaningful classification groups and applied this methodology to a relatively large-scale, prospective, cohort study of soldiers. Back tracing soldiers' medical records proved quite fruitful and led to the creation of a completely *healthy* group of

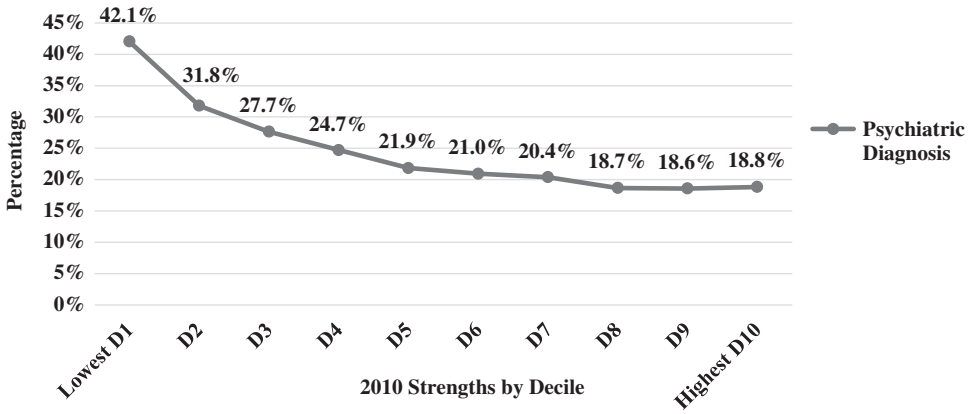

FIGURE 1. Percentage of soldiers diagnosed with a psychiatric disorder by 2012, based on 2010 strengths deciles.

TABLE IV. Adjusted Odds Ratios, Based on 2010 Strengths, Estimated Separately for Each Psychiatric Disorder

	Adjustment (n = 11,842)		Anxiety (n = 5,728)		Depression (n = 6,205)		PTSD (n = 2,851)	
GAT Scale	OR[a]	CI[a]	OR	CI	OR	CI	OR	CI
Optimism	0.73*	0.71–0.75	0.81*	0.78–0.83	0.67*	0.65–0.69	0.77*	0.73–0.81
Coping	0.75*	0.73–0.78	0.81*	0.78–0.85	0.69*	0.66–0.72	0.81*	0.77–0.85
Adaptability	0.76*	0.75–0.80	0.84*	0.81–0.87	0.71*	0.68–0.73	0.85*	0.81–0.90
Positive affect	0.70*	0.69–0.72	0.79*	0.77–0.82	0.63*	0.61–0.65	0.72*	0.68–0.75
Meaning	0.89*	0.87–0.91	0.97	0.94–1.00	0.81*	0.79–0.83	0.90*	0.86–0.94
Lack of catastrophic thinking	0.70*	0.68–0.72	0.77*	0.74–0.80	0.65*	0.62–0.67	0.75*	0.71–0.78
Lack of loneliness	0.71*	0.70–0.73	0.81*	0.79–0.84	0.65*	0.63–0.67	0.79*	0.76–0.83
Composite strengths	0.85*	0.56–0.60	0.71*	0.67–0.74	0.48*	0.46–0.51	0.65*	0.61–0.70

OR, odds ratio; CI, 95% confidence interval.
Soldiers without the specific diagnosis were included in the reference category for each analysis.
[a]ORs and associated CIs are adjusted for age, gender, race and ethnicity, education, marital status, rank, length of service, and number of deployments pre-GAT and post-GAT.
*$p < 0.001$.

soldiers, free from any precipitating psychiatric conditions that might exacerbate (or confound) their vulnerability. Therein, we followed this cohort for 2 yr and created three categorically distinct status groups: those who received one of the four psychiatric diagnoses, those who were prescribed psychotropic medication in the absence of a corresponding diagnosis, and those who remained healthy. Going back in time a year and creating a cohort of soldiers free from psychiatric diagnosis and prescription medication provides the opportunity to examine the role of these strengths as protective factors against subsequent psychiatric outcomes.

The demographic and military service characteristics of the current sample reflect the Army active duty population in 2010.[61] Across all four psychiatric diagnostic categories, adjustment disorder was the most common diagnosis in our sample, followed by depression, anxiety, and PTSD. The sheer prevalence of adjustment diagnoses may, in part, reflect the high degree of difficulty associated with the soldier profession (e.g., stringent physical training requirements). Overall, descriptive comparisons of the different classification groups revealed that soldiers who remained healthy were more likely to be officers and have obtained a college degree or even graduate education. In contrast, soldiers who received a psychiatric diagnosis were more likely to be female and have a high school education or less.

The nature of our design enabled us to pinpoint with greater precision the protective function of strengths in preventing incident psychiatric disorder. Optimism, positive affect, lack of catastrophic thinking, and lack of loneliness consistently afforded the greatest protection against being diagnosed with a psychiatric disorder, both when we examined disorders collectively (i.e., any disorder) and when we examined each of the four disorders separately. Prior factor analytic work on the GAT suggests lack of catastrophic thinking, along with a subset of optimism items, may reflect a single latent factor (lack of negative cognitions), whereas the positive affect and loneliness scales form distinct latent factors.[46] Boosting positive affect and reducing negative cognitions through Army resilience training programs may offer an efficient opportunity to reduce soldiers' vulnerability to psychiatric disorders. Positive future thinking exercises (e.g., writing about one's best possible self) and gratitude exercises (e.g., counting one's blessings) also

offer promising and inexpensive opportunities to boost positive affect and positive future expectancies outside of formal resilience training.[62,63] Additionally, U.S. Army Family and Morale, Welfare and Recreation and related programs may be uniquely positioned to help combat loneliness in the Army through enhancing community-based services for soldiers.

Because the strengths examined jointly protected soldiers against psychiatric disorders, we feel entitled to call this group of strengths, resilience. The current findings comport with a previous Army technical report that describes a protective relation between increased optimism and adaptability following Army resilience training and lower odds of developing a psychiatric disorder (i.e., anxiety disorder, depression, or PTSD).[35] In addition, low mental health prior to deployment has been linked to a greater risk of developing PTSD (symptoms or diagnosis) following deployment.[32] Overall, in the current study, higher strengths were most protective against depression (19–37% reduced odds of diagnosis), and this effect was strongest when we modeled resilience as a single composite score (52% reduced odds of diagnosis). Collapsing the seven scale scores into a single composite increases reliability and at the same time preserves the multidimensional nature of resilience. Additional and more fine-grained analyses using multinomial logistic regression and modeling the composite resilience score indicated that the odds of having a psychiatric disorder decrease with every increase in resilience quartile, showing a dose-response relation. Collectively, these findings suggest there may be an *a priori* basis for identifying soldiers at increased risk of developing psychiatric disorders, and the mechanism can capitalize on a single reliable scale that captures different, albeit important, facets of resilience. The findings also highlight the importance of tailoring resilience-building programs that maximize the psychological health of highly vulnerable soldiers in a cost-effective and efficient manner.

The finding that a large number of Soldiers were prescribed psychotropic medication without a corresponding psychiatric or psychological diagnosis in the medical record was unexpected. There are a number of possible explanations. The simplest explanation is that some providers prescribe medications for mild symptoms that do not meet diagnostic criteria. This is perhaps analogous to prescribing antibiotics for a viral condition. Both are likely to be self-limiting, and the prescriptions are unlikely to help or harm the individual. Some providers may simply want to "give" the patient something for coming to the clinic. A second possible explanation is that the patient admitted more significant symptoms to the provider but did not want a psychiatric or psychological diagnosis on record. If the patient was high-functioning, a provider might be willing to oblige if the provider believed the medication would indeed benefit the patient. Both of these explanations are consistent with the finding that the resilience of the patients who were prescribed psychotropic medication in the absence of a diagnosis was similar to the resilience of individuals with neither medication nor a diagnosis. There are other possible explanations; however, the two proposed explanations seem the most likely. Using coded, secondary data, it is of course not possible to determine which, if any, of these explanations most accurately describes this population of patients.

Study Limitations

There are several limitations to this study. First, we only examined strengths in relation to four major psychiatric disorders, albeit these are the most prevalent diagnoses among current active duty soldiers. Conceivably, our study of the protective effects of strengths could provide a much different picture had we accounted for the potential use of alcohol to self-medicate or examined other disorders including substance abuse, psychotic and other major psychiatric disorders. Additionally, under-diagnosis may have led us to overestimate the number of healthy individuals in our sample. Any number of factors may influence whether a diagnosis is ultimately recorded in a soldier's military medical chart, including the provider's training (psychiatrist vs. psychologist or social worker)[17] and sector (military or civilian).[64] Although the accuracy of ICD diagnostic codes can always be doubted, a recent large military cohort study found that diagnoses culled from electronic records and made by physicians or clinically trained personnel generally agree with patients' self-reports of medical conditions.[65] We also examined a limited set of strengths coinciding with military and developmental psychopathology literatures and available on the GAT. Other, more expansive assessments[66] might provide a more refined picture of what protects soldiers from psychiatric symptoms. At some conceptual level, however, many purported resilience instruments overlap with the GAT contents and include similar measures assessing coping, affect, support, and self-management, all of which appear to strengthen an individual's resolve when faced with adversity.[66]

Notwithstanding, the present findings identify a set of core strengths that warrant further attention in Army resilience training programs. Psychological stressors and disorders have long been linked to a number of negative health outcomes in the military, and the associated health care costs are staggering. It is thus imperative that the Army continue to seek ways to promote soldier health by screening for and building strengths, rather than merely waiting to treat disease. We believe that these findings may help Army leadership identify soldiers who are at increased risk of developing a psychiatric disorder and so tailor Army resilience training programs in order to maintain and improve the psychological health of the force.

ACKNOWLEDGMENTS

We acknowledge the significant support provided to this project by the men and women of the Office of the Deputy Under Secretary of the Army, the Army Analytics Group, and the Research Facilitation Laboratory. We also thank Dr. Les McFarling and Captain Kristin Saboe, PhD from the Army Resiliency Directorate for assisting us with acquiring GAT data.

PRESENTATIONS

Presented as an oral presentation at the 2016 Military Health System Research Symposium (Abstract number: MHSRS-16-0005).

FUNDING

This project is supported in part by the Robert Wood Johnson Foundation through a grant (#68709) to the Positive Psychology Center of the University of Pennsylvania, Martin E. P. Seligman, principal investigator. The U.S. Army provides support for the Research Facilitation Laboratory (PBL). The Person-Event Data Environment is supported by the Departments of Defense and the U.S. Army.

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