Dispositional Gratitude and Mental Health in the U.S. Veteran Population: Results from the National Health and Resilience Veterans Study

Adam P. McGuire[a,b,c], Brienna M. Fogle[d], Jack Tsai[d,e,f], Steven M. Southwick[d], and Robert H. Pietrzak[d,g,h]

[a] Department of Psychology and Counseling, The University of Texas at Tyler, Tyler, TX, USA;
[b] VISN 17 Center of Excellence for Research on Returning War Veterans, Waco, TX, USA;
[c] Central Texas Veterans Health Care System, Temple, TX, USA;
[d] Department of Psychiatry, Yale School of Medicine, New Haven, CT, USA;
[e] VA National Center on Homelessness Among Veterans;
[f] School of Public Health, University of Texas Health Science Center at Houston, Houston, TX, USA;
[g] U.S. Department of Veterans Affairs National Center for Posttraumatic Stress Disorder, VA Connecticut Healthcare System, West Haven, CT, USA;
[h] Department of Social and Behavioral Sciences, Yale School of Public Health, New Haven, CT, USA

ABSTRACT

Dispositional gratitude may be linked to positive mental health outcomes, yet population-based data on this association are lacking. Military veterans are an ideal population in which to examine this question given high rates of psychiatric morbidities and efforts to promote psychological resilience in this population. Data were analyzed from a nationally representative sample of 3151 U.S. veterans. Veterans were separated into three groups based on an assessment of level of dispositional gratitude: high gratitude (weighted 79.8%), moderate gratitude (9.6%), and low gratitude (10.5%). Multivariable analyses examined the associations between level of dispositional gratitude, and measures of mental health and psychosocial variables. A "dose-response" association was observed between levels of dispositional gratitude and odds of psychiatric morbidities. Higher dispositional gratitude was associated with decreased risk for lifetime history of posttraumatic stress disorder (PTSD), major depressive disorder (MDD), social phobia, nicotine dependence, and suicide attempts, and decreased risk for current PTSD, MDD, generalized anxiety disorder, and suicidal ideation (odds ratio range = 0.16–0.65). Higher dispositional gratitude was additionally associated with resilience-promoting characteristics such as optimism, curiosity, purpose in life, perceived social support, and religiosity/spirituality (Cohen's d range = 0.11–0.73). Dispositional gratitude is prevalent in U.S. veterans, is negatively associated with psychiatric morbidities, and may help promote psychosocial factors linked to resilience in this population. Stratification of veterans with low, moderate, and high dispositional gratitude may help identify those who are at increased risk for psychiatric illness and in need of additional support.

KEYWORDS
Resilience; depression; anxiety/ PTSD; substance use disorders; suicide/self-harm; trauma; quality of life; religion/spirituality

Corresponding Author: Adam P. McGuire, PhD; The University of Texas at Tyler, Department of Psychology and Counseling, 3900 University Blvd, HPR 237, Tyler, TX 75799; Telephone: 902-566-6268; Email: amcguire@uttyler.edu

CITATION
McGuire, A. P., Fogle, B. M., Tsai, J., Southwick, S. M., & Pietrzak, R. H. (2021). Dispositional gratitude and mental health in the U.S. veteran population: Results from the National Health and Resilience Veterans Study. *Journal of Psychiatric Research, 135*, 279-288. https://doi.org/10.1016/j.jpsychires.2021.01.020

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1. Introduction

Dispositional gratitude is defined as the tendency to be aware of situations in which one is the benefactor of a positive outcome or good deed by someone else, and experience state gratitude in response to such situations (McCullough et al., 2002). A grateful disposition is widely recognized as a protective factor with a wide range of psychosocial benefits (e.g., Wood et al., 2010), including reported negative associations between gratitude and mental health symptoms such as depressive symptoms (Krause, 2009; Petrocchi & Couyoumdjian, 2016), anxiety (Kashdan et al., 2006; Petrocchi & Couyoumdjian, 2016), suicidality (Kleiman et al., 2013), posttraumatic stress disorder (PTSD) symptoms (Richardson & Gallagher, 2020), and alcohol (Leppma et al., 2018), and substance use (Leung & Tong, 2017). Accordingly, gratitude could be important to consider for those at greater risk of psychological distress, such as military veterans, for whom there is interest in identifying and treating psychiatric illness.

One limitation of extant studies is the use of small convenience samples; thus, the generalizability of these findings is unclear. One of the few population-based studies found mixed effects suggesting that dispositional gratitude predicted lower general symptoms of psychopathology in a sample of Dutch adults over time, but only in models that did not account for previous levels of gratitude or subjective well-being (Jans-Beken et al., 2018). These findings suggest the relation between dispositional gratitude and mental health may be more complicated than results of individual studies, and highlight the importance of examining dispositional gratitude in large, population-based samples. This study also focused on broad psychopathology as measured by a summed score on the Symptom Checklist-90 (Derogatis, 1992). Given the identified associations with a wide range of mental health symptoms, a nuanced examination with the same population-based approach may identify unique associations between dispositional gratitude and different domains of mental health, including specific psychiatric disorders.

Past work has also identified lower prevalence of psychiatric disorders among individuals with higher dispositional gratitude. For example, a population-based study of twins found that a disposition toward thankfulness was linked to significantly lower risk of major depressive disorder (MDD), generalized anxiety disorder (GAD), phobias, bulimia nervosa, nicotine, alcohol, and other substance use (Kendler et al., 2003). However, this study was not designed to assess gratitude more generally and was limited to religious-specific gratitude (e.g., “I wonder whether God has abandoned me” [reverse score]). Although these findings support the theorized

benefits of gratitude on psychiatric illness, further work is needed to better understand whether general dispositional gratitude outside the context of religiosity has a similar effect. Few studies have also assessed for history of adverse life events, a known risk factor for psychiatric disorders (e.g., Pompili, et al., 2014), to better understand if a grateful disposition may serve as a protective factor from developing psychopathology following stressful life events (Jans-Beken, 2018). Therefore, attempts to advance our understanding of the specific relation between dispositional gratitude and psychiatric morbidities should also account for trauma history.

If dispositional gratitude may have salutogenic effects as suggested by previous research (e.g., Watkins, 2014), it is also imperative to understand *who* is considered high in dispositional gratitude. With some exceptions (e.g., Chopik et al., 2019; Jans-Beken et al., 2018), few studies have examined how trait gratitude is reported and distributed across the overall population. More importantly, it is unclear which demographic and psychosocial characteristics distinguish people with varying levels of dispositional gratitude. If a grateful disposition is negatively associated with psychiatric morbidities, then isolating relevant characteristics of people low in dispositional gratitude could help identify those at risk for mental health problems who may benefit from gratitude-based interventions aimed at enhancing resilience and well-being. Additionally, psychosocial characteristics that differentiate levels of dispositional gratitude may help identify potential target areas to enhance gratitude in general and identify areas of future exploration to determine specific mechanisms by which gratitude may exert positive effects on mental health.

Despite burgeoning interest in dispositional gratitude and its benefits to mental health, there are several gaps in our understanding of who endorses dispositional gratitude and how it relates to psychiatric illness in population-based samples. Military veterans are an ideal population to explore these gaps given their high levels of trauma exposure, increased likelihood to experience psychological distress (Hoge et al., 2004; Prigerson et al., 2002), and ongoing efforts to promote resilience in this population (Litz, 2014). We had four exploratory aims in the current study: 1) characterize the distribution and prevalence of levels of dispositional gratitude in a nationally representative sample of U.S. military veterans; 2) identify demographic and military characteristics that differentiate veterans who endorse low, moderate, or high levels of dispositional gratitude; 3) examine how a gratitude disposition is uniquely associated with a range of mental disorders above and beyond other risk factors; and 4) evaluate associations between dispositional gratitude, and functioning, quality of life, and psychosocial characteristics.

2. Materials and methods

2.1 Sample

Data were drawn from the National Health and Resilience in Veterans Study (NHRVS), a nationally representative study of a general population-based sample of 3,157 U.S. veterans conducted from October to December 2011. Participants in the NHRVS completed a 60-minute anonymous web survey. The NHRVS sample was drawn from a research panel of more than 50,000 households that is developed and maintained by Knowledge Networks, Inc. (now Ipsos), a survey research firm. Knowledge Networks, Inc. maintains KnowledgePanel, a probability-based, online non-volunteer access survey panel of a nationally representative sample of U.S. adults that covers approximately 98% of U.S. households, including cell phone-only households. Panel members are recruited through national random samples, originally by telephone and now almost entirely by postal mail. Households are provided with access to the Internet and computer hardware if needed. Unlike Internet convenience panels, also known as *opt-in* panels that include only individuals with Internet access who volunteer themselves for research, KnowledgePanel recruitment uses dual

sampling frames that include both listed and unlisted telephone numbers, telephone and non-telephone households, and cell phone-only households, as well as households with and without Internet access. Only persons sampled through these probability-based techniques are eligible to participate in KnowledgePanel. Unless invited to do so as part of these national samples, no one on their own can volunteer to be part of the panel. To permit generalizability of study results to the entire population of U.S. veterans, post-stratification weights were applied based on demographic distributions (i.e., age, gender, race/ethnicity, education, Census region, and metropolitan area) drawn from the most contemporaneous (October 2010) Current Population Survey (U.S. Census Bureau, 2010).

2.2 Assessments

Dispositional gratitude was assessed using the following item from the Gratitude Questionnaire-6 (McCullough et al., 2002): "I have so much in life to be thankful for" (response options: 1=Strongly Disagree to 7=Strongly Agree). A histogram of scores on this item revealed a positively skewed, non-normal distribution (median score = 6); therefore, to explore possible "dose-response" associations between trait gratitude and dependent variables, veterans were divided into three groups based on their degree of agreement on this item. Specifically, veterans who scored 6 or 7 (i.e., Agree or Strongly Agree) on this item were grouped into a *high gratitude* group; those who scored 5 (i.e., Slightly Agree) into a *moderate gratitude* group and those who scored 1-4 (i.e., Strongly Disagree, Disagree, Slightly Disagree, and Neither Agree or Disagree) into a *low gratitude* group. Table 1 shows all of the sociodemographic, military, psychiatric, and psychosocial variables examined in relation to dispositional gratitude group status.

2.3 Data analysis

Data analyses proceeded in four steps. First, we conducted chi-square analyses and analyses of variance (ANOVAs) to compare sociodemographic, military, trauma, and psychiatric by gratitude group status; Bonferroni-corrected pairwise contrasts were computed to identify significant group differences. Second, we conducted a series of binary logistic regression analyses to examined the relation between gratitude group status and psychiatric variables; sociodemographic, military, and trauma variables that differed by gratitude group status at the $p < .05$ level in bivariate analyses were entered as fixed factors/covariates in these analyses. Third, we conducted a series of multivariable analyses of covariance and logistic regression analyses to examine the relation between gratitude group status, and functioning, quality of life, personality, psychosocial, posttraumatic growth, and religiosity/spirituality variable; sociodemographic, military, and trauma variables that differed by gratitude group status at the $p < .05$ level in bivariate analyses (i.e., age, education, marital status, income, retirement status, enlistment status, branch of service, number of years in military, and number of lifetime traumas) were entered as fixed factors/covariates in these analyses, and Bonferroni-corrected pairwise contrasts were computed to identify significant group differences. Fourth, we conducted a multinomial logistic regression analysis to identify variables that were independently associated with gratitude level; sociodemographic, military, and psychosocial variables were included in this analysis.

3. Results

A total of 2,583 (weighted 79.8%) were classified as having high dispositional gratitude; 287 (weighted 9.6%) as moderate dispositional gratitude; and 259 (weighted 10.5%) as low dispositional gratitude. Table 2 shows sociodemographic, military and trauma characteristics by level of dispositional gratitude. The high gratitude group was older than the low and moderate gratitude groups; and was more likely to have completed some college or higher education, to be

married/partnered, and to be retired. The high gratitude group also had higher household income than the moderate gratitude group, who had higher income than the low gratitude group. The low gratitude group was more likely than the moderate and high gratitude groups to have enlisted in the military, and was more likely than the high gratitude group to have served in the Marine Corps and less likely to have served in the Air Force; they also reported fewer years in the military and more traumatic life events.

Table 3 shows psychiatric variables by level of dispositional gratitude. Bivariate analyses revealed a "dose-response" association between level of gratitude and prevalence of most of the psychiatric disorders assessed, with declining prevalence of these disorders as a function of increasing gratitude level. Multivariable analyses adjusted for sociodemographic, military, and trauma variables revealed that, relative to the low gratitude group, the moderate gratitude group had lower odds of lifetime PTSD, MDD, and suicide attempt, and current MDD, GAD, and suicidal ideation; and the high gratitude group had lower odds of lifetime PTSD, MDD, social phobia, nicotine dependence, and suicide attempt; and current PTSD, MDD, GAD, and suicidal ideation. Relative to the moderate gratitude group, the high gratitude group had lower odds of lifetime MDD, and current PTSD and suicidal ideation.

Table 4 shows functioning, quality of life, and psychosocial variables by gratitude group status. Results again revealed a "dose-response" association with higher scores on measures of functioning, quality of life, and psychosocial variables observed as a function of increasing gratitude level for most of the measures assessed. Relative to the low gratitude group, the moderate gratitude group scored higher on measures of dispositional curiosity, overall mental health, purpose in life, and dispositional optimism; and the high gratitude group scored higher on measures of resilience, purpose in life, and perceived social support. Relative to the moderate gratitude group, the high gratitude group scored higher on measures of purpose in life, resilience, and overall quality of life.

Table 5 shows results of a multinomial logistic regression analysis of variables associated with level of dispositional gratitude. Relative to the low gratitude group, the moderate gratitude group scored higher on measures of optimism, curiosity, perceived social support, PTGI-personal strength, and frequency of engagement in private spiritual activities; while higher household income, conscientiousness, purpose in life, optimism, curiosity, perceived social support, and frequency of engagement in private spiritual activities emerged as significant correlates of high versus low gratitude. Finally, relative to the moderate gratitude group, the high gratitude group was older and more likely to be married/partnered, and scored higher on measures of agreeableness, conscientiousness, purpose in life, optimism, curiosity, perceived social support, PTGI-spiritual changes, and intrinsic religiosity.

4. Discussion

Overall, results from this study suggest a "dose-response" association between levels of dispositional gratitude and odds of psychiatric morbidities, as well as higher levels of resilience-promoting characteristics. To our knowledge, this is the first study to examine the association between dispositional gratitude, and demographic characteristics, psychosocial characteristics, and psychiatric morbidities in a nationally representative sample of military veterans—a unique but important group to study given their military experience, service to the country, and distinction in American society. In this sample, the majority—79.8%—of veterans was classified as having high dispositional gratitude. Given that this sample was older on average (M_{age}=60.1), the large proportion of veterans with high dispositional gratitude is consistent with previous findings that indicate successful aging in older populations (Chopik et al., 2019).

Veterans with high gratitude tended to be older, married or living with their partner, retired, have some college or higher education, and had higher household incomes. These demographic characteristics are similar to findings from one of the few population-based studies on gratitude (Jans-Beken et al., 2018), with the exception of previous findings that women were higher in trait gratitude, whereas there were no gender differences in this veteran population. Notably, higher dispositional gratitude was also associated with more years in the military and fewer lifetime traumas. Taken together, these findings provide a "profile" of demographic characteristics of veterans who might be more predisposed to experience gratitude and its benefits, as well as veterans who are at risk for low gratitude, and concomitant psychiatric and psychosocial correlates. Consistent with previous studies, a higher grateful disposition was associated with higher scores on measures of functioning (Wood, Joseph, et al., 2008), personality traits (Breen et al., 2010), social connectedness (Wood, Maltby, Gillett, et al., 2008), resilience and posttraumatic growth (Vieselmeyer et al., 2017), religiosity and spirituality (Rosmarin et al., 2010), as well as other resilience-promoting factors.

Higher levels of dispositional gratitude were associated with reduced odds of a range of lifetime and current mental disorders, above and beyond known correlates. These results extend findings from Kendler and colleagues (2003) to suggest that dispositional gratitude outside the context of religion-specific gratefulness may be linked to reduced odds of psychiatric morbidities. This study also extends prior population-based findings demonstrating an association between dispositional gratitude and general psychopathology by identifying disorder-specific links (Jans-Beken et al., 2018). Given the cross-sectional design of the current study, however, the causal relation between these variables is unclear. Higher levels of dispositional gratitude may buffer against risk for psychiatric morbidities and/or living with psychiatric morbidities may lead to an erosion of dispositional gratitude. Nevertheless, these results suggest a potential "dose-response" relationship between higher levels of dispositional gratitude and risk for a broad range of psychiatric morbidities. These findings also highlight the importance of assessing for dispositional gratitude and the utility of single-item measures of this construct, which could be used to identify a potential risk factor for psychiatric disorders in veterans, and possibly the general, civilian population. Given the other identified correlates, assessing for dispositional gratitude may also identify those who might benefit from psychosocial growth or resilience-enhancing efforts in related domains, such as optimism, purpose in life, and social functioning.

Results of the current study should be interpreted in light of several limitations. First, these data are cross-sectional; therefore, causality/directionality cannot be ascertained. Second, reflective of the national sample of U.S. veterans, most veterans in this sample were older, male, and Caucasian; therefore, further research in more diverse samples is needed to evaluate the generalizability of these findings including non-veterans. Third, there were significant differences in the size of low, moderate, and high gratitude groups, with most veterans being categorized as high gratitude (79.8%). It is possible the disproportionate group sizes could have impacted results and the ability to detect meaningful effects in veterans with lower levels of dispositional gratitude. Fourth, dispositional gratitude was only measured with a single item. There is support for this method in previous research, particularly given the importance of reducing participant survey burden, but future studies should test for these same outcomes when using a larger, validated measure of trait gratitude (e.g., Gratitude Questionnaire-6; McCullough et al., 2002), which would provide insight into different aspects of gratitude (e.g., Adler & Fagley, 2005; Watkins et al., 2003) that may be linked to mental health and related outcomes.

Despite these limitations, results of the current study provide the first known nationally representative data on the prevalence and mental health correlates of dispositional gratitude in U.S. veterans. Results revealed that nearly 8 of 10 veterans report high dispositional gratitude, which was associated with reduced odds of a range of psychiatric morbidities, higher levels of resilience-promoting psychosocial characteristics, and higher functioning and quality of life. Results of this study underscore the importance of dispositional gratitude in etiologic models of psychiatric disorders and resilience promotion efforts. Further research is needed to examine the prospective role of dispositional gratitude in predicting risk for incident psychiatric disorders, and identify mechanisms underlying the link between gratitude and mental health outcomes.

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Table 1. Variables examined as potential correlates of dispositional gratitude

Measure	Assessment
Sociodemographic characteristics	A general sociodemographic questionnaire was used to assess age, gender, race/ethnicity, education, marital status, employment status, and household income
Military and trauma characteristics	
Enlisted vs. Drafted	Were you drafted or did you enlist or earn a commission into the military?
Combat veteran	Did you ever serve in a combat or war zone?
Years in military	How many years did you spend in the military?
Number of lifetime traumas	Trauma History Screen (Carlson et al., 2011)
Psychiatric measures	
Lifetime PTSD	PTSD Checklist – Specific Stressor Version (lifetime) (Weathers et al., 1993)
Lifetime MDD	Major depressive disorder module from the Mini International Neuropsychiatric Interview (Sheehan et al., 1998)
Lifetime social phobia	Social phobia module from the Mini Neuropsychiatric Interview
Lifetime alcohol dependence	Alcohol abuse/dependence module from the Mini Neuropsychiatric Interview
Lifetime drug use disorder	Drug abuse/dependence module from the Mini Neuropsychiatric Interview
Lifetime nicotine dependence	Positive screen for nicotine dependence on the Fagerström Test for Nicotine Dependence (Heatherton et al., 1991)
Lifetime suicide attempt	"Have you ever tried to kill yourself?" Response options: No vs. Yes
Current PTSD	PTSD Checklist – Specific Stressor Version (past-month)
Current depression	Patient Health Questionnaire-2 (Kroenke et al., 2009)
Current GAD	Generalized Anxiety Disorder-2 (Kroenke et al., 2009)
Current suicidal ideation	Question 9 of the Patient Health Questionnaire-9 (Kroenke & Spitzer, 2002)
Current alcohol use disorder	Alcohol Use Disorders Identification Test-Consumption (Saunders et al., 1993)
Functioning and Quality of Life	
Mental health	Mental health subscales from the Short Form Health Survey-8 (Ware et al., 2001)
Physical health	Physical health subscales from the Short Form Health Survey-8
Cognitive functioning	Medical Outcomes Study Cognitive Functioning Scale (Stewart et al., 1992)
Quality of life	Quality of Life Enjoyment and Satisfaction-Short Form (Endicott et al., 1993)
Personality	
Extraversion	Score on Extraversion subscale of the Ten-Item Personality Inventory (Gosling et al., 2003)
Agreeableness	Score on Agreeableness subscale of the Ten-Item Personality Inventory

Conscientiousness	Score on Conscientiousness subscale of the Ten-Item Personality Inventory
Emotional stability	Score on Emotional Stability subscale of the Ten-Item Personality Inventory
Openness to experiences	Score on Openness to Experiences subscale of the Ten-Item Personality Inventory
Psychosocial variables	
Resilience	Score on Connor-Davidson Resilience Scale-10 (Campbell-Sills & Stein, 2007)
Purpose in life	Score on Purpose in Life Test-Short Form (Schulenberg et al., 2011)
Dispositional optimism	Score on single-item measure of optimism from Life Orientation Test-Revised (Scheier et al., 1994); "In uncertain times, I usually expect the best"); rating 1=strongly disagree to 7=strongly agree
Dispositional curiosity	Score on single-item measure of curiosity/exploration from Curiosity and Exploration Inventory-II (Kashdan et al., 2009); "I frequently find myself looking for new opportunities to grow as a person (e.g., information, people, resources") rating 1=strongly disagree to 7=strongly agree
Structural social support	Response to question: "About how many close friends and relatives do you have (people you feel at ease with and can talk to about what is on your mind)?"
Perceived social support	Score on 5-item version of the Medical Outcomes Study Social Support Scale (Amstadter et al., 2010; Sherbourne & Stewart, 1991)
Loneliness	Brief Loneliness Scale (adapted from UCLA Loneliness Scale)
Attachment style	Endorsement of secure attachment (response a) to the following question: "Please select the statement below that best describes your feelings and attitudes in relationships[24]: (a) feeling that it is easy to get close to others and feeling comfortable with them (secure); (b) feeling uncomfortable being close to others (avoidant); or (c) feeling that others are reluctant to get close (anxious/ambivalent)
Community integration	Perceived level of community integration: "I feel well integrated in my community (e.g., regularly participate in community activities)" rating 1=strongly disagree to 7=strongly agree
Volunteer weekly	Frequency of engagement in volunteer activities on weekly basis (Montross et al., 2006)
Posttraumatic Growth	Posttraumatic Growth Inventory-Short Form (Cann et al., 2010)
Religion/Spirituality	
Religious service attendance	Frequency of attending religious services on Duke University Religion Index (Koenig & Büssing, 2010)
Private spiritual activities	Frequency of private spiritual activities on Duke University Religion Index
Intrinsic religiosity	Score on measure of intrinsic religiosity on Duke University Religion Index; sample item: "In my life, I experience the presence of the Divine (i.e., God)"

Table 2. Sociodemographic, military, and trauma characteristics of full sample and by dispositional gratitude group.

	Full sample	Low Gratitude (1)	Moderate Gratitude (2)	High Gratitude (3)	Test of difference	Pairwise contrasts
N (weighted %)	3,129	259 (10.5%)	287 (9.6%)	2,583 (79.8%)		
	Weighted Mean (SD) or n (weighted %)	Weighted Mean (SD) or n (weighted %)	Weighted Mean (SD) or n (weighted %)	Weighted Mean (SD) or n (weighted %)	*F* or X^2, *p*	
Sociodemographic characteristics						
Mean age	60.1 (15.3)	53.7 (15.0)	54.2 (16.0)	62.0 (14.8)	78.87, 0.001	3>1,2
Male sex	2,808 (90.6%)	231 (93.3%)	260 (92.4%)	2,317 (90.0%)	5.06, 0.080	-
White, non-Hispanic race/ethnicity	2,616 (76.4%)	213 (77.4%)	243 (73.8%)	2,160 (76.6%)	1.41, 0.49	-
Some college or higher education	2,650 (66.7%)	201 (56.7%)	233 (61.2%)	2,216 (68.7%)	23.32, <.001	3>1,2
Married/living with partner	2,459 (75.5%)	167 (66.7%)	200 (64.5%)	2,092 (77.9%)	41.79, <.001	3>1,2
$60K or higher household income	1,634 (43.9%)	84 (26.6%)	129 (38.0%)	1,421 (46.8%)	52.69, <.001	3>2>1
Retired	1,458 (43.4%)	73 (25.7%)	99 (29.3%)	1,286 (47.5%)	83.29, <.001	3>1,2
Military and trauma characteristics						
Enlisted into military (vs. drafted)	2,694 (87.6%)	233 (91.7%)	252 (90.8%)	2,209 (86.7%)	9.93, 0.007	1>2,3
Combat veteran	1,093 (34.5%)	105 (37.9%)	95 (32.2%)	893 (34.4%)	2.39, 0.30	-
Branch of service					22.97, 0.003	
Army	1,256 (38.5%)	109 (41.9%)	116 (34.9%)	1,031 (38.5%)		-
Navy	715 (24.2%)	56 (24.5%)	68 (26.6%)	591 (23.9%)		-
Air Force	798 (22.6%)	64 (16.8%)	73 (22.4%)	661 (23.4%)		3>1
Marine Corps	254 (10.9%)	25 (15.3%)	21 (10.2%)	208 (10.4%)		1>3
Other	101 (3.8%)	5 (1.5%)	9 (5.9%)	87 (3.9%)		-
Number of years in military	6.8 (7.2)	5.7 (5.7)	6.6 (6.6)	7.0 (7.4)	4.82, 0.008	3>1
Number of lifetime traumas	3.4 (2.8)	4.3 (3.5)	3.4 (2.7)	3.3 (2.7)	17.64, <.001	1>3

Table 3. Psychiatric measures by dispositional gratitude group

	Full sample	Low Gratitude	Moderate Gratitude	High Gratitude	Bivariate X^2, *p*	Moderate Gratitude vs. Low Gratitude Adjusted OR (95% CI)	High Gratitude vs. Low Gratitude Adjusted OR (95% CI)	High Gratitude vs. Mod Gratitude Adjusted OR (95% CI)
N (weighted %)	3,129	259 (10.5%)	287 (9.6%)	2,583 (79.8%)				
Lifetime PTSD	209 (7.9%)	53 (21.9%)	31 (8.9%)	125 (6.0%)	98.48, <.001	0.43 (0.25-0.75)**	0.39 (0.27-0.58)***	0.92 (0.56-1.52)
Lifetime MDD	513 (17.0%)	84 (35.0%)	73 (23.3%)	356 (13.9%)	100.44, <.001	0.62 (0.42-0.93)*	0.44 (0.33-0.60)***	0.69 (0.50-0.96)*
Lifetime social phobia	270 (9.5%)	49 (20.5%)	40 (13.4%)	181 (7.6%)	61.52, <.001	0.70 (0.44-1.12)	0.52 (0.37-0.74)***	0.76 (0.51-1.13)
Lifetime alcohol dependence	403 (14.1%)	53 (17.7%)	58 (16.1%)	292 (13.4%)	5.49, 0.064	1.16 (0.83-1.61)	0.98 (0.76-1.26)	1.02 (0.72-1.44)
Lifetime drug use disorder	385 (13.4%)	47 (17.7%)	47 (16.1%)	291 (12.6)	8.70, 0.013	1.03 (0.65-1.62)	1.14 (0.81-1.61)	1.11 (0.77-1.58)
Lifetime nicotine dependence	579 (19.6%)	73 (28.4%)	67 (23.6%)	439 (17.9%)	23.84, <.001	0.90 (0.62-1.31)	0.65 (0.49-0.86)**	0.72 (0.53-0.97)
Lifetime suicide attempt	161 (6.8%)	41 (20.2%)	30 (8.3%)	90 (4.8%)	109.93, <.001	0.43 (0.25-0.72)**	0.35 (0.24-0.51)***	0.81 (0.50-1.33)
Current PTSD	100 (4.8%)	36 (16.0%)	19 (8.7%)	45 (2.8%)	109.54, <.001	0.72 (0.40-1.29)	0.24 (0.15-0.39)***	0.32 (0.18-0.56)***
Current MDD	210 (7.8%)	75 (29.2%)	36 (8.9%)	99 (4.9%)	233.42, <.001	0.25 (0.15-0.41)***	0.16 (0.11-0.23)***	0.66 (0.41-1.07)
Current GAD	200 (7.9%)	56 (24.3%)	34 (9.9%)	110 (5.6%)	136.60, <.001	0.40 (0.24-0.66)***	0.29 (0.21-0.42)***	0.77 (0.48-1.21)
Current suicidal ideation	230 (9.5%)	79 (31.9%)	38 (12.9%)	113 (6.2%)	221.07, <.001	0.35 (0.22-0.54)***	0.20 (0.14-0.27)***	0.55 (0.36-0.82)**
Current alcohol use disorder	423 (14.9%)	48 (15.9%)	58 (19.9%)	317 (14.1%)	7.45, 0.024	1.26 (0.83-1.93)	1.03 (0.74-1.44)	0.82 (0.60-1.13)

Note. ORs (95%CIs) for analyses of mental health variables are adjusted for age, education, marital status, income, retirement status, enlistment status, branch of service, number of years in military, and number of lifetime traumas. Significant group difference: *p<.05; **p<.01; ***p<.001.

Table 4. Functioning, quality of life, and psychosocial variables by dispositional gratitude group.

	Full sample	Low Gratitude (1)	Moderate Gratitude (2)	High Gratitude (3)					
N (weighted %)	3,129	259 (10.5%)	287 (9.6%)	2,583 (79.8%)					
	Mean (SEM) or *n* (weighted %)	Weighted Mean (SEM) or *n* (weighted %)	Weighted Mean (SEM) or *n* (weighted %)	Weighted Mean (SEM) or *n* (weighted %)	*F*, *p*	Pairwise contrasts	Mod Gratitude vs. Low Gratitude Cohen's *d* or Adjusted OR (95% CI)	High Gratitude vs. Low Gratitude Cohen's *d* or Adjusted OR (95% CI)	High Gratitude vs. Mod Gratitude Cohen's *d* or Adjusted OR (95% CI)
Functioning and quality of life variables									
SF-8 Mental summary	53.0 (0.2)	46.0 (0.5)	51.2 (0.6)	54.1 (0.4)	155.63, <.001	3>2>1	0.56	0.41	0.15
Vitality	50.3 (0.1)	45.6 (0.5)	47.1 (0.5)	51.3 (0.3)	111.98, <.001	3>1,2	-	0.39	0.29
Social functioning	50.2 (0.1)	45.6 (0.5)	49.1 (0.5)	51.2 (0.3)	85.36, <.001	3>2>1	0.42	0.38	0.14
Role-emotional disability	49.5 (0.1)	45.1 (0.4)	48.5 (0.4)	50.2 (0.3)	113.24, <.001	3>2>1	0.51	0.35	0.12
Mental health	52.0 (0.1)	46.1 (0.5)	50.9 (0.5)	52.7 (0.3)	120.36, <.001	3>2>1	0.58	0.45	0.12
SF-8 Physical summary	47.2 (0.2)	44.2 (0.7)	45.4 (0.7)	48.3 (0.4)	34.74, <.001	3>1,2	-	0.21	0.15
Physical functioning	47.3 (0.2)	44.1 (0.6)	45.8 (0.6)	47.8 (0.4)	31.14, <.001	3>2>1	0.17	0.19	0.10
Role-physical disability	47.7 (0.2)	44.5 (0.6)	46.2 (0.6)	48.5 (0.4)	41.76, <.001	3>2>1	0.17	0.20	0.12
Bodily pain	48.6 (0.2)	46.5 (0.6)	48.6 (0.6)	49.6 (0.4)	18.67, <.001	2,3>1	0.21	0.16	-
General health	48.4 (0.1)	44.6 (0.5)	45.8 (0.5)	49.8 (0.3)	96.51, <.001	3>1,2	-	0.35	0.27
Cognitive functioning	89.2 (0.3)	81.4 (1.0)	82.8 (1.0)	89.5 (0.7)	65.03, <.001	3>1,2	-	0.24	0.20
Quality of life	53.8 (0.2)	45.3 (0.7)	49.5 (0.7)	55.8 (0.4)	210.87, <.001	3>2>1	0.36	0.24	0.32
Personality									
Extraversion	4.1 (0.03)	3.2 (0.1)	3.4 (0.1)	3.9 (0.1)	48.83, <.001	3>1,2	-	0.14	0.10
Agreeableness	5.1 (0.02)	4.3 (0.1)	4.7 (0.1)	5.3 (0.1)	112.36, <.001	3>2>1	0.24	0.21	0.12
Conscientiousness	5.7 (0.02)	4.9 (0.1)	5.5 (0.1)	6.0 (0.1)	159.90, <.001	3>2>1	0.36	0.23	0.10
Emotional stability	5.2 (0.02)	4.4 (0.1)	4.8 (0.1)	5.5 (0.1)	122.49, <.001	3>2>1	0.24	0.23	0.14
Openness to experiences	4.9 (0.02)	4.2 (0.1)	4.5 (0.1)	5.1 (0.1)	99.40, <.001	3>2>1	0.18	0.18	0.12
Psychosocial variables									
Resilience	29.4 (0.1)	22.9 (0.5)	27.1 (0.5)	31.7 (0.3)	271.86, <.001	3>2>1	0.51	0.60	0.31
Purpose in life	21.4 (0.1)	16.5 (0.3)	19.2 (0.3)	22.4 (0.2)	355.68, <.001	3>2>1	0.54	0.60	0.33
Dispositional optimism	4.8 (0.03)	3.1 (0.1)	4.0 (0.1)	5.0 (0.1)	323.46, <.001	3>2>1	0.54	0.39	0.21
Dispositional curiosity	5.2 (0.02)	3.4 (0.1)	4.6 (0.1)	5.6 (0.1)	466.55, <.001	3>2>1	0.73	0.45	0.21
Structural social support	8.4 (0.2)	5.9 (0.7)	6.9 (0.7)	9.5 (0.5)	25.40, <.001	3>1,2	-	0.15	0.11
Perceived social support	19.3 (0.1)	14.5 (0.3)	17.1 (0.3)	19.6 (0.2)	186.95, <.001	3>2>1	0.52	0.52	0.26
Loneliness	4.5 (0.03)	5.8 (0.1)	5.2 (0.1)	4.3 (0.1)	148.81, <.001	1>2>3	0.36	0.31	0.19

Secure attachment	2,271 (70.0%)	(41.8%)	(52.3%)	(76.1%)	209.21, <.001	3>2>1	1.46 (1.03-2.06)*	3.24 (2.48-4.25)***	2.24 (1.71-2.92)***
Community integration	4.3 (0.03)	3.3 (0.1)	3.6 (0.1)	4.6 (0.1)	44.96.<.001	3>2>1	0.18	0.27	0.21
Volunteer weekly	1,200 (36.4%)	44 (20.1%)	66 (22.3%)	1,083 (40.2%)	72.41, <.001	3>1,2	1.10 (0.73-1.65)	2.12 (1.55-2.89)***	1.92 (1.42-2.58)***
Posttraumatic growth									
Relation to others	3.2 (0.1)	1.8 (0.2)	2.4 (0.2)	3.6 (0.2)	54.45, <.001	3>1,2	-	0.18	0.12
New possibilities	3.1 (0.1)	1.7 (0.2)	2.2 (0.2)	3.4 (0.2)	45.72, <.001	3>1,2	-	0.17	0.12
Personal strength	3.9 (0.1)	2.2 (0.2)	3.1 (0.2)	4.2 (0.2)	50.33, <.001	3>2>1	0.27	0.21	0.11
Spiritual change	3.1 (0.1)	1.2 (0.3)	1.6 (0.3)	3.4 (0.2)	70.92, <.001	3>1,2	-	0.22	0.18
Appreciation of life	3.8 (0.1)	2.7 (0.2)	3.0 (0.2)	3.8 (0.2)	18.56, <.001	3>1,2	-	0.11	0.08
Religiosity/Spirituality									
Church attendance	3.0 (0.03)	2.0 (0.1)	2.2 (0.1)	3.1 (0.1)	83.24, <.001	3>1,2	-	0.23	0.19
Private spirituality	3.4 (0.04)	1.9 (0.2)	2.4 (0.2)	3.4 (0.1)	91.65, <.001	3>2>1	0.15	0.30	0.20
Intrinsic spirituality	10.1 (0.1)	7.5 (0.3)	7.8 (0.3)	10.3 (0.2)	112.62, <.001	3>1,2	-	0.29	0.26

Note. Means and ORs are adjusted for age, education, marital status, income, retirement status, enlistment status, branch of service, number of years in military, and number of lifetime traumas. Significant group difference: *p<.05; **p<.01; ***p<.001.

Table 5. Significant correlates of dispositional gratitude levels.

	Mod Gratitude vs. Low Gratitude Adjusted OR (95% CI)	High Gratitude vs. Low Gratitude Adjusted OR (95% CI)	High Gratitude vs. Mod Gratitude Adjusted OR (95% CI)
Sociodemographic characteristics			
Age			1.01 (1.01-1.03)
Married/partnered			1.65 (1.14-2.39)
$60K or higher household income		2.18 (1.38-3.44)	
Personality			
Agreeableness			1.22 (1.05-1.42)
Conscientiousness		1.23 (1.03-1.47)	1.20 (1.03-1.39)
Psychosocial variables			
Resilience			
Purpose in life		1.10 (1.04-1.16)	1.07 (1.02-1.12)
Dispositional optimism	1.53 (1.29-1.82)	1.81 (1.55-2.13)	1.19 (1.05-1.35)
Dispositional curiosity	1.55 (1.27-1.89)	2.14 (1.78-2.56)	1.38 (1.18-1.61)
Perceived social support	1.06 (1.01-1.11)	1.11 (1.06-1.16)	1.04 (1.01-1.09)
Posttraumatic growth			
Personal strength	1.27 (1.03-1.56)		
Spiritual change			1.26 (1.05-1.41)
Religiosity/Spirituality			
Private spirituality	1.27 (1.10-1.47)	1.25 (1.10-1.42)	
Intrinsic spirituality			1.08 (1.02-1.14)

Note. ORs are adjusted for age, education, marital status, income, retirement status, enlistment status, branch of service, number of years in military, and number of lifetime traumas. Only statistically significant ($p < 0.05$) independent variables identified using stepwise backward elimination are shown.