Psychological Resilience in West Point Graduates: Results From a Nationally Representative Study

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Abstract

Background: The purpose of this study was to examine factors associated with psychological resilience in a nationally representative sample of West Point graduates. **Aims:** The aims of this study were to (a) employ a dimensional approach to operationalizing psychological resilience in a trauma-exposed population that had been highly trained and educated in persisting in the face of stress, was previously unstudied, and in which we could examine correlates of resilience, (b) identify key psychosocial factors, character traits, health variables, military experiences, and coping strategies as potential correlates of psychological resilience; and (c) examine whether reported gender moderated any of these associations in this population. **Methods:** A nationally representative sample of 1342 West Point graduates after gender integration from classes 1980 to 2011 were surveyed. Psychological resilience was operationalized using a discrepancy-based approach in which a measure of composite psychological distress (current posttraumatic stress disorder, generalized anxiety and depression symptoms) was regressed on measures of cumulative trauma burden. A multivariable linear regression model was then employed to identify factors that were independently associated with psychological resilience scores. **Results:** Purpose in life (29.8% of relative variance explained [RVE]), fewer perceived negative experiences in the military (20.6% RVE), social support (9.6% RVE), and grit (9.5% RVE) were the strongest correlates of psychological resilience scores for both women and men. Time in service was positively associated with resilience in women only. **Conclusion:** This study identifies key correlates of psychological resilience in West Point graduates, individuals who are highly trained to persevere in the face of stress and then were trauma-exposed. Most of these factors are modifiable and can be targeted in stress prevention and treatment interventions, especially for high-stress professions such as the military, frontline health care providers, and first responders.

Introduction

Psychological resilience has been defined as the capacity to "bounce back" and adapt well in the face of stress and trauma.[1,2] A common thread across various definitions of resilience is the capacity to persevere in the face of adversity. Particularly now, considering the global, national, and personal stress and trauma resulting from the ongoing coronavirus disease 2019 pandemic, it is important to determine such factors so they can be potentially enhanced or learned in an effort to prevent and/or treat adverse health outcomes.

The concept of psychological resilience has been operationalized in various ways, including as a preexisting trait/characteristic; a response to trauma that may vary over time; and as a multidimensional construct.[3] Resilience has also been conceptualized as a dynamic process that may fluctuate over time, with emerging research suggesting an overlap in these various concepts of resilience, as well as key differences that may account for discrepancies in the prevalence of resilience across studies.[4,5] To date, the majority of resilience studies have employed psychological resilience as a

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categorical outcome or response, grouping individuals as resilient (exposed to trauma yet having no or minimal subsequent psychopathology) or nonresilient (exposed to trauma with subsequent psychopathology).[6,7] This approach has been applied in cross-sectional studies, as well as longitudinal studies of responses to traumatic events, which have identified a resilient trajectory characterized by minimal/no distress as the modal response to these events.[6-8]

In contrast to a binary approach of operationalizing resilience, Amstadter and colleagues (2014) developed a novel quantitative "discrepancy-based" approach that yields a dimensional measure of psychological responses to trauma that range from highly vulnerable to highly resilient.[9] Using this approach, a measure of psychological distress is regressed onto a measure of trauma burden, and residual scores are computed and then inverted for each individual.[10] Thus, individuals with a high trauma burden who have lower than expected distress scores would be considered resilient. A notable feature of this approach is that it generates a full spectrum of dimensional scores that range from highly vulnerable (low trauma, high distress) to highly resilient (high trauma, low distress).

A recent study of 1046 Iraq/Afghanistan combat veterans found that this discrepancy-based approach to operationalizing resilience yielded resilience scores that were strongly inversely associated with psychiatric diagnoses, physical health concerns, and alcohol and drug use.[5] More recently, a study of a nationally representative sample of 2704 US military veterans found that somatic symptoms, emotional stability, and a secure attachment style were most strongly associated with resilience scores.[11] Taken together, these initial studies provide empirical support for the utility of a discrepancy-based approach to operationalizing resilience on a dimensional continuum, and for using this approach to identify factors associated with psychological resilience.

A broad range of factors has been linked to psychological resilience, including psychosocial factors, character traits, health variables, military experiences, and coping strategies. With regard to psychosocial factors, previous studies have found that purpose in life, supportive relationships or social connectedness, active lifestyle, and intrinsic religiosity/spirituality are associated with resilience.[7,12–15] For example, greater sense of purpose in life has previously been linked with better mental health, quality of life, as well as reduced rates of depression and higher levels of perceived psychological resilience.[16] Similarly, a large body of research has demonstrated an association between strong social ties and reduced incidence of mental health problems, as well as reduced likelihood of developing psychopathology following traumatic stress.[1] Conversely, trauma may reduce resiliency, especially trauma occurring in early life.[17–20] Additional factors that may affect psychological resilience but are not generally studied in the resilience literature include health variables such as physical activity, sleep, medical conditions, as well as character traits such as grit, which is defined as

perseverance and the pursuit of long-term goals.[21] Of particular relevance to military populations, positive and negative experiences specific to military service may also contribute to resilience.

Accumulating evidence suggests that certain of these risk and protective factors may be differentially related to psychological resilience in men and women.[22–28] For example, military stressors such as low unit support, deployment-related injury, and concerns about life and family disruptions during deployment are more strongly associated with posttraumatic stress disorder (PTSD) symptoms in women than in men.[27] Women also are more likely than men to solicit social support and to use emotion-focused coping strategies to manage distress, and have been found to demonstrate an increased benefit from psychotherapy.[24,26] Collectively, these findings highlight the importance of considering the role of gender, meant to connote an internal sense of identity, as a potential moderator of risk and protective factors associated with psychological resilience.[29]

In the current study, our first aim was to apply a discrepancy-based approach to operationalizing resilience in a nationally representative sample of West Point graduates, a population that is both highly trained to negotiate adverse experiences and, given the nature of military service, has a high potential for stress and trauma exposure. This approach generated resilience scores using measures of cumulative trauma burden and distress (ie, posttraumatic stress, depressive, and anxiety symptoms). The second aim was to examine how a broad range of general (eg, purpose in life) and population-specific (eg, perceptions of military service) factors related to resilience. The third aim was to determine if gender moderated any of the risk and protective factors examined as potential correlates of psychological resilience when using this approach. Given that characterization of factors associated with resilience is critical to informing prevention and treatment efforts, results from the current study are particularly relevant to populations that require psychological resilience in the context of high stress, such as military personnel, first responders, and health care providers.

Method

Sample

Data were drawn from the Resiliency and Physical and Mental Health of Graduates of USMA Study, which was conducted from January through February 2018 using a web-based survey to assess sociodemographic, health, lived experience and psychosocial factors, as well as coping strategies. Validated measures were used that are similar to those of the National Health and Resilience in Veterans Study.[12] The study was approved by the Yale University Institutional Review Board, and reviewed by the West Point human protections committee. Our partnership with the West Point Association of Graduates achieved access to this population.

A survey recruitment announcement was emailed to 100% of contactable women graduates (n = 3126) and to a random sample (n = 5303) of 25% of contactable men graduates from the classes of 1980 to 2011. The study focused on classes starting with those enrolled in 1976, which was the first class to graduate women as well as men.[30] A second follow-up reminder email was sent to the same sample approximately 4 weeks later, and additional recruitment announcements were posted on the West Point Women Facebook group page and shared on individual class Facebook pages by volunteers, to reach a larger sample of women than the email recruitment. Participants in the study provided informed consent and completed an anonymous web-based survey.

The response rate for women was 20% (641 respondents) and for men was 13% (701 respondents); the overall response rate was 16%. Previous cohort studies of veterans using surveys have achieved response rates of 25% in the Millennium cohort study and 27% in the Connecticut OIF/OEF Veterans Needs Assessment Survey.[31,32]

The current sample achieved a demographic profile similar to the overall post-Vietnam era West Point graduate population, with the exception that our sampling strategy intentionally overrepresented women (48% of respondents vs 12% of total graduates 1980-2011) to be able to analyze gender differences. The mean age of the sample was 45.7 (SD 9.3) years, which was consistent with a calculated population age range of 44.2 to 50.2 (based on the number of graduates per year; by law, entrants to the 4-year academy must be between the ages of 17-23).[33] Survey responders self-identified as 85.5% White, non-Hispanic; 4.3% African American or Black; 4.5% Hispanic or Latino; 2.2% Asian; 1.0% American Indian or Pacific Islander; and 2.4% multiracial or other (Table 2). Class statistics provided by the West Point Office of Institutional Research for the classes of 1981 to 2011 were comparable: 81.6% Caucasian; 6.3% African American; 4.8% Hispanic; 4.7% Asian; 0.6% Native American; 0.6% Pacific Islander; and 1.5% other. The stated goal for assignment into combat arms (eg, infantry, armor, aviation, engineer) of this West Point cadet cohort was 80% of the male graduate population and 20% of female graduates.[34] In fact, 80% of our male sample and 22% of our female sample reported assignment to a combat arms branch. Based on available data on all West Point graduates, our sample is representative of the target population.

Assessments: Trauma/Stressor Burden and Resilience Factors

Table 1 lists and describes the assessments used in this study.

Data Analysis

Data analyses proceeded in 4 steps, consistent with Overstreet et al. (2021).[11] First, given that PTSD, anxiety, and depressive were highly correlated, loaded on a single factor, and demonstrated comparable magnitude associations with trauma exposures, we computed a composite index of current psychological distress (ie, the severity of current PTSD, anxiety, and depression symptoms) by conducting an exploratory factor analysis with promax rotation of total *Posttraumatic Stress Disorder Checklist-5* (PCL-5), *Patient Health Questionnaire-2* (PHQ-2), and *Generalized anxiety disorder-2* (GAD-2) scores. Results of this analysis revealed that depression, anxiety and PTSD scores on these scales loaded onto a single factor (eigenvalue 2.04, 67.9% total variance explained); factor loadings were 0.870 for the PHQ-2 measure of depressive symptoms, 0.835 for the GAD-2 measure of anxiety symptoms, and 0.763 for the PCL-5 measure of PTSD symptoms.

Second, discrepancy-based psychological resilience scores were computed. The regression model included (a) count of adverse life experiences; (b) each individual life experience, and (c) the nature of index/worst trauma. This allowed us to account for severity/count of experiences, as well as the specific nature of lifetime experiences and index events when computing discrepancy based scores. This is important given data suggesting that certain exposures (eg, sexual assault) are associated with a higher conditional probability of developing trauma-related distress.[35]

Total number of traumatic life experiences ($\beta = 0.22$, $t = 4.41$, $P < .001$), sexual assault ($\beta = 0.12$, $t = 2.95$, $P = -.03$), toxic exposure ($\beta = 0.11$, $t = 2.82$, $P = .005$), physical assault ($\beta = 0.10$, $t = 2.82$, $P = .005$), combat ($\beta = 0.09$, $t = 1.99$, $P = .047$), other sexual harassment ($\beta = 0.14$, $t = 3.31$, $P = .001$), and other trauma ($\beta = 0.18$, $t = 3.93$, $P < .001$) were significantly associated with psychological distress scores. Discrepancy-based psychological resilience scores (ie, residual scores) were computed for everyone by calculating the difference between actual and predicted distress score from this regression model. Resilience residual scores were inverted so that a positive value indicated greater psychological resilience (lower actual vs predicted score). By using this methodology, higher resilience scores are not attributed to an absence of stress or trauma exposure, but instead low psychological distress is relative to the level of exposure burden in the full sample. Figure 1 shows a histogram of the final calculated resilience residual scores for the sample.

Third, we conducted a multivariable hierarchical linear regression analysis in which standardized resilience residual scores were regressed onto sociodemographic and military characteristics (Step 1), psychiatric disorder and treatment history (Step 2), protective psychosocial characteristics (Step 3), and West Point-specific characteristics (Step 4) to determine factors that were independently associated with psychological resilience. To examine whether independent variables were moderated by gender, we incorporated interaction terms of each significant main effect × gender into this regression model.[29]

Fourth, we conducted relative importance analyses to compute the relative variance in resilience scores that were

Table 1. Measures Utilized in the Risk and Resiliency in Physical and Mental Health of Graduates of the US Military Academy Study

Variable	Validated questionnaire	Description	Scale range (sample range)	Internal Cronbach's alpha
Trauma/stressor burden				
Trauma exposure	LEC[71]	The LEC was developed at the National Center for PTSD concurrently with the CAPS to assess exposure to potentially traumatic events. These events included natural disaster, physical assault, and transportation accident. The total number of life events personally experienced by the respondent were summed to yield a total count.	0 to 17(0-13)	
PTSD	PCL-5[72]	The PCL-5 is a self-report instrument that assesses the 20 DSM-V diagnostic criteria for PTSD (from 0 = not at all to 4 = extremely) and was used to assess past-month PTSD symptoms. A total of ≥ 33 was used to indicate a positive screen.	0 to 80(0-71)	0.949
Anxiety	GAD-2[73]	The GAD-2 is a 2-item self-report screening instrument regarding the frequency of symptoms for anxiety over the previous 2 weeks (from 0 = not at all to 3 = nearly every day) with sum of ≥ 3 indicating a positive screen.	0 to 6(0-6)	0.82
Depression	PHQ-2[73]	The PHQ-2 is a 2-item self-report screening instrument component of the PHQ-4 regarding the frequency of symptoms about depression over the previous 2 weeks (from 0 = not at all to 3 = nearly every day) with sum of ≥3 indicating a positive screen.	0 to 6(0-6)	0.85
Variables examined in relation to resilience factor				
Sociodemographic and military characteristics	A sociodemographic questionnaire was used to assess age, gender, marital status, sexual orientation (heterosexual or other), education level obtained beyond bachelor's degree, and employment status. Military characteristics included time in service, branch of the Army: combat (including infantry, armor, aviation, field artillery, aviation and special forces) versus other (combat support or combat service support), and combat deployment status.			

Table 1. Continued.

Variable	Validated questionnaire	Description	Scale range (sample range)	Internal Cronbach's alpha
Psychiatric disorder and treatment				
Lifetime psychiatric history	Lifetime psychiatric history was assessed by asking participants whether they had been diagnosed or treated by a medical professional for a number of medical and psychiatric conditions. Participants who endorsed yes to one or more of the following: major depressive disorder, generalized anxiety disorder, PTSD, anorexia, bulimia, binge eating disorder, obsessive compulsive disorder, bipolar disorder, attention deficit disorder, alcohol use disorder and/or substance use disorder, were designated as having a psychiatric history.		
Lifetime therapy treatment	Lifetime therapy history was assessed by the following question: "Have you ever received mental health treatment in the form of psychotherapy (counseling/talk therapy)?"		
Lifetime psychiatric medication	Lifetime psychiatric medication history was assessed by the following question: "Have you ever been prescribed medication for a mental health condition, psychiatric or emotional problem?"		
Protective psychosocial characteristics				
Social connectedness	*Multidimensional scale of perceived social support*[74]	12 item questionnaire in which respondents rated items with a 7-point scale of how strongly they agree or disagree, which were subtotaled into three subscales: significant other, family, and friends, and an overall total score.	Subscales: 4 to 28 Total 12 to 84(12-84)	Significant other = 0.96 Family = 0.937 Friends = 0.95 Overall total score = 0.946

Table 1. Continued.

Variable	Validated questionnaire	Description	Scale range (sample range)	Internal Cronbach's alpha
Purpose in life	*Purpose in life test*[75]	The *purpose in life* test is a 4-question scale with each item rated from 1 to 7 and a total score summed	4 to 20(4-28)	0.87
Intrinsic religiosity	*DUREL*[76]	The DUREL, developed for large cross-sectional and longitudinal observational studies to examine relationships between religion and health outcomes, assess 3 major domains of religiosity identified by the National Institute on Aging: ORA, NORA, and IR. Each respondent is given a subscale score in each major domain and examined independently, so not summed for a total overall religiosity score. The intrinsic religiosity score was used in this analysis to focus on the degree of personal commitment and motivation as opposed to religiosity "for show" or as a means to some other end.[2]	1 to 5(1-5)	0.92
Coping mechanisms	*Brief COPE 14-factor structure*[77]	Respondents were asked to select the 3 coping strategies that they most commonly use to deal with symptoms selected during the PCL checklist or other stressful or upsetting events/situations.		
Additional West Point characteristics				
Activity level (total METS)	*The International Physical Activity Questionnaire Short version*[78]	Four generic questions were asked about time spent being physically active in the last 7 days, specifically minutes spent doing vigorous, moderate, walking, and sitting activities. The 2004 scoring protocol was used to calculate scores in MET-minutes per week (walking = 3.3 METs, Moderate physical activity = 4.0 METs, and vigorous physical activity = 8.0 METs) for each subgroup and totaled for a combined total activity score. Any values over 240 min per day were truncated (re-coded) as 240 min to permit a maximum of 28 h of activity per week.	0 to 13 440(0-12 000)	
Activity level compared to peers		Respondents were asked to rate their activity level compared to others of the same age and sex on a scale from 1 (*much less active*) to 5 (*much more active*).	1 to 5(1-5)	

Table 1. Continued.

Variable	Validated questionnaire	Description	Scale range (sample range)	Internal Cronbach's alpha
Medical conditions		Count of medical conditions was assessed by asking participants whether they had been diagnosed or treated by a medical professional for a number of medical conditions, such as arthritis, high blood pressure, chronic pain or cancer. The number of conditions a participant endorsed were summed for a total count.	0 to 15(0-10)	
Hours of sleep		Sleep was assessed by asking participants how many hours they usually sleep each day in a 24-h period and giving a choice of 5 or less; 6; 7; 8; 9; or ten or more.		
Positive military experiences	*Desirable and undesirable effects of military service scale*[44]	The effects of military service were assessed with a scale consisting of 28-items split evenly between desirable, such as "self-discipline" and "learned to cope with adversity," and undesirable items, such as "bad memories" and "separation from loved ones,". The scale is a 4-point rating scale (from 0 = *not at all* to 3 = *a lot*) with individual items dichotomized (0 vs 1-3) and desirable aspects and undesirable aspects summed as separate totals.	0 to 14(0-14)	Positive experiences at West Point = 0.70 Positive experiences in Military = 0.86
Negative military experiences			0 to 14(0-14)	Negative experiences at West Point = 0.82 Negative experiences in Military = 0.85
Grit	*Grit-S scale*[52]	8 questions using a self-reported scale ranging from not like me at all to very much like me. The average of the 8 items results in an overall grit scale ranging from 1 = *not at all gritty* to 5 = *extremely gritty*.	1 to 5(1.75-5)	0.76

Abbreviations: LEC, Life Events Checklist; PTSD, posttraumatic stress disorder; CAPS, Clinician Administered PTSD Scale; PCL-5, PTSD Checklist-5; GAD-2, generalized anxiety disorder-2; PHQ-2, Patient Health Questionnaire-2; DUREL, Duke University Religion Index; ORA, organizational religious activity; NORA, nonorganizational religious activity; IR, intrinsic religiosity.
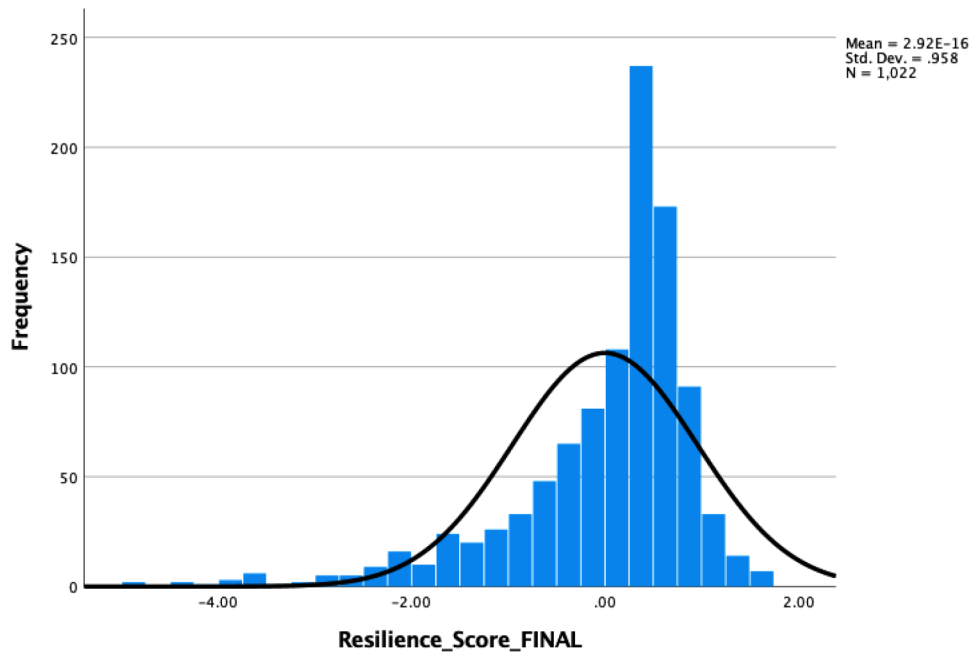
Mean = 2.92E-16
Std. Dev. = .958
N = 1,022

Figure 1. Correlation between Composite Traumatic Exposure Scale and Composite Index of psychological distress to calculate resilience residual.

explained by significant independent variables. All analyses were conducted using *IBM SPSS Statistics Version 26* and the relaimpo R package (R Core Team, 2015) to conduct the relative importance analyses.[36]

Results

Sample Characteristics

Table 2 shows characteristics of the full sample and by gender. Table 3 shows the full sample response to reporting current PTSD (PCL-5), depression (PHQ-2), and anxiety (GAD-2) scores. It also shows reported personal experience with each individual exposure to lifetime adverse experiences (as defined above). Participants reported experiencing an average of 3.3 (SD = 2.5; range = 0-13) such events in their lifetimes.

Psychosocial Factors, Character Traits, Health Variables, Military Experiences, and Coping Strategies Associated With Psychological Resilience

Table 4 shows results of a hierarchical linear regression model examining correlates of psychological resilience. The R^2 for the overall model was 0.39; Step 1 (sociodemographic and military factors) $R^2 = 0.05$; Step 2 (psychiatric history and treatment) $R^2 = 0.17$, R^2 change = 0.13; Step 3 (psychosocial factors and coping mechanisms) $R^2 = 0.36$, R^2 change = 0.18; and Step 4 (West Point factors) $R^2 = 0.39$, R^2 change = 0.04.

Ten variables emerged as being independently associated with greater psychological resilience: the psychosocial factors of (a) social connectedness and (b) purpose in life; the health factors of (c) absence of history of lifetime psychiatric condition, and (d) absence of treatment with psychiatric medication; the character trait of (e) increased grit; the military experiences of (f) increased activity level compared to peers, (g) fewer reported negative perceptions of military experiences, and (h) greater time in service was associated with greater resilience in women; (i) the coping mechanisms of acceptance, and (j) coping with substance use having a negative correlation with resilience. Post hoc analysis of the negative perceptions of military experiences suggested that this factor was driven by the perceived negative consequences of a "drinking problem" ($\beta = -.11$, $P < .001$), "death and destruction" ($\beta = -.10$, $P < .001$), and "lost my good health" ($\beta = -.07$, $P = .017$).

Relative importance analysis of the significant correlates of psychological resilience revealed that the strongest correlates of psychological resilience were purpose in life (29.8% of relative variance explained [RVE]), fewer perceived negative experiences in the military (20.6% RVE), social support (9.6% RVE), and grit (9.5% RVE).

Gender Differences

We additionally examined all significant predictors of resilience with a post hoc analysis by gender. Greater time in service is associated with greater resilience in women ($\beta = 0.14$, $t = 3.79$, $P < .001$) but not men ($\beta = 0.04$, $t = 1.19$, $P = .23$). None of the other interactions were significant, all P values > .10.

Table 2. Sociodemographic, Military and Trauma Characteristics of West Point Graduate Sample by Gender

	Mean (SD) or n (%)		
	Total	Graduates: Men	Graduates: Women
N	1344	701 (52.2%)	641 (47.7%)
Mean age	45.70 (9.31)	47.21 (9.31)	44.08 (9.04)
West Point Graduating Class	1995 (9.3)	1993 (9.3)	1996 (9.1)
Race/ethnicity			
White, not Hispanic	1141 (85.5%)	607 (87.5%)	534 (83.4%)
African American or Black	57 (4.3%)	25 (3.6%)	32 (5.0%)
Hispanic or Latino	60 (4.5%)	32 (4.6%)	28 (4.4%)
Asian	30 (2.2%)	12 (1.7%)	18 (2.8%)
Am. Ind. or Pacific Islander	14 (1.0%)	7 (1.0%)	7 (1.1%)
Multiracial or other	32 (2.4%)	11 (1.6%)	21 (3.3%)
Sexual orientation			
Heterosexual	1225 (94.3%)	664 (98.5%)	561 (89.8%)
Homosexual/Bi/other	74 (5.7%)	10 (1.5%)	64 (10.2%)
Marital status			
Married or cohabitating	1098 (82.7%)	611 (88.2%)	487 (76.7%)
Divorced, separated, or widowed	142 (10.7%)	55 (7.9%)	87 (13.7%)
Single/never married	88 (6.6%)	27 (3.9%)	61 (9.6%)
Number of times married	1.13 (1.03)	1.18 (1.32)	1.08 (0.58)
Education			
Professional degree	193 (14.5%)	90 (12.9%)	103 (16.2%)
Masters	758 (56.8%)	407 (58.4%)	351 (55.1%)
Some grad, not complete	134 (10.0%)	66 (9.5%)	68 (10.7%)
Other certification/school	68 (5.1%)	41 (5.9%)	27 (4.2%)
No additional (BS only)	181 (13.6%)	93 (13.3%)	88 (13.8%)
Employment situation			
Paid work	1099 (81.9%)	620 (88.4%)	479 (74.7%)
Retired	79 (5.9%)	38 (5.4%)	41 (6.4%)
Looking after home and family	69 (5.1%)	5 (0.7%)	64 (10.0%)
Student	42 (3.1%)	15 (2.1%)	27 (4.2%)
Voluntary or unpaid work	22 (1.6%)	6 (0.9%)	16 (2.5%)
Unemployed	18 (1.3%)	12 (1.7%)	6 (0.9%)
Unable to work: sick/dis.	13 (1.0%)	5 (0.7%)	8 (1.2%)
Time in service			
0 to 10 years	810 (60.8%)	396 (57.0%)	414 (64.9%)
11 to 20 years	220 (16.5%)	106 (15.3%)	114 (17.9%)
>20 years	303 (22.7%)	193 (27.8%)	110 (17.2%)
Combat deployment	790 (59.5%)	435 (63.0%)	353 (55.8%)
Number of months	16.56 (11.06)	18.35 (11.84)	14.42 (9.62)
Injuries[a]	181 (23.4%)	106 (24.9%)	75 (21.6%)
Combat experiences scale	28.22 (12.16)	32.30 (13.53)	23.31 (7.85)
Grit	3.69 (0.56)	3.70 (0.54)	3.69 (0.58)

[a]Percentages are of those who reported yes to a combat deployment

Discussion

To our knowledge, this study is the first to examine factors associated with psychological resilience in a nationally representative sample of West Point graduates. A notable strength of this investigation was access to and study of a sample of individuals extensively trained to be resilient who have high risk of exposure to stressful events. The assessment of psychological resilience used a discrepancy-based approach

Table 3. Lifetime Exposure to Traumatic Events, Current Anxiety (GAD-2), Depression (PHQ-2), and PTSD (PCL-5) Scores

	Total Mean (SD) or n (%)	
Lifetime experiences: Total	3.31 (2.54)	
Combat or war-zone exposure	559 (41.6%)	
Transportation accident	541 (40.3%)	
Any other stressful experience	421 (31.3%)	
Natural disaster	339 (25.2%)	
Sudden, unexpected death of someone close to you	337 (25.1%)	
Other unwanted sexual experience	329 (24.5%)	
Physical assault	266 (19.8%)	
Other serious accident	184 (13.7%)	
Fire or explosion	150 (11.2%)	
Life-threatening illness or injury	131 (9.7%)	
Toxic exposure	131 (9.7%)	
Sexual assault	130 (9.7%)	
Assault with a weapon	117 (8.7%)	
Causing serious injury, harm, or death	76 (5.7%)	
Severe human suffering	40 (3.0%)	
Sudden, violent death	27 (2.0%)	
Captivity	10 (0.7%)	
	n (%)	Screened positive(%)
Current GAD-2	0.87 (1.32)	115 (8.6%)
Current depression (PHQ-2)	0.63 (1.17)	80 (6.0%)
Current PTSD (PCL-5)	5.10 (10.31)	41 (3.1%)

Abbreviations: PTSD, posttraumatic stress disorder; PCL-5, PTSD Checklist-5; GAD-2, generalized anxiety disorder-2; PHQ-2, Patient Health Questionnaire-2.

Table 4. Results of Bivariate Association Analyses and Multivariable Regression Model of Factors Associated With Discrepancy-Based Resilience Scores

	Bivariate association		Regression model	
	χ^2	P	Beta	t, P
Sociodemographic and military characteristics				
Male sex	0.005	.880		
Age	0.141	.000	−0.001	0.571, .568
Caucasian race/ethnicity	0.001	.970		
Married or living with spouse	−0.100	.001	−0.013	−0.578, .563
Heterosexual	0.069	.029	−0.007	−0.237, .813
Employed full time	0.049	.132		
Higher education	0.093	.003	0.031	1.592, .112
Greater time in service	0.121	.000	0.088	2.606, .009
Combat arms branch	0.039	.215		
Combat deployment	0.017	.579		
Psychiatric disorder and treatment				
Lifetime psychiatric history	−0.323	.000	−0.080	−2.268, .024
Lifetime therapy treatment	−0.289	.000	−0.036	−1.392, .164
Lifetime psychiatric medication	−0.332	.000	−0.084	−2.471, .014
Protective psychosocial characteristics				
Social connectedness	0.313	.000	0.103	3.308, .001
Purpose in life	0.487	.000	0.265	7.877, .000
Intrinsic religiosity	0.106	.001	−0.018	−0.978, .328
Coping mechanisms				
Acceptance	0.134	.000	0.076	2.785, .005
Religion	0.092	.003	0.052	1.615, .107
Positive reframing	0.089	.004	0.005	0.256, .798
Humor	0.089	.005	0.042	1.633, .103
Active	0.088	.005	0.011	0.289, .773
Emotional support	0.040	.197		
Plan	0.024	.435		
Instrumental support	0.015	.631		
Other	0.031	.318		
Self-blame	−0.217	.000	−0.041	−1.622, .105
Substance use	−0.203	.000	−0.052	−2.306, .021
Disengagement	−0.176	.000	−0.041	−1.384, .167
Venting	−0.103	.001	−0.008	−0.039, .969
Denial	−0.094	.003	0.021	0.486, .627
Self-distraction	−0.079	.012	−0.003	0.103, .918
Additional West Point Characteristics				
Activity level (METS)	0.069	.029	−0.026	−0.863, .388
Activity level compared to peers	0.216	.000	0.063	2.226, .026
Medical conditions	−0.178	.000	0.009	0.003, .998
Hours of sleep	0.112	.000	0.038	1.345, .179
Positive military experiences	0.190	.000	−0.061	−0.375, .708
Negative military experiences	−0.415	.000	−0.190	−3.467, .001
Grit	0.321	.000	0.067	2.505, .012

that computes each participant's individual level of distress in relation to what is expected at the population level. This approach generates a measure of psychological resilience that spans the full-dimensional spectrum from high vulnerability to high resilience. Given previous criticisms that operationalizations of psychological resilience should not be limited to PTSD symptoms, we chose to employ a more comprehensive assessment of psychological distress that included PTSD, anxiety, and depressive symptoms. In addition, a wide range of psychosocial factors, character traits, health variables, military experiences, as well as coping strategies that could be linked to psychological resilience were measured and assessed.

Results revealed that purpose in life, social support, and grit were most strongly associated with resilience. Report of fewer negative experiences in the military was also associated with resilience and, for women, greater time in service was correlated with resilience. Results of the current study suggest multiple factors contribute to the capacity to weather adversity. Importantly, these factors are modifiable and thus use of multimodal prevention and treatment efforts may be effective in

maintaining and building psychological resilience for both men and women.

Purpose in life was most strongly associated with psychological resilience. Potential behavioral mechanisms underlying this association include a positive relationship between purpose in life and physical activity, internal locus of control, better sleep quality, better emotion regulation, and use of preventive health care services.[37–39] Interventions that may help enhance

purpose in life for high-risk populations exposed to stress and trauma include using meaning-based therapies, such as logotherapy, and integration of meaning- and purpose-centered activities in other established psychotherapies, such as cognitive-behavioral therapy.[40–43] Development of purpose in life also might lead to an increase in other protective factors, such as motivation to engage in social interactions.[37]

Military service provides both subjective positive and negative experiences that influence veterans' mental health later in life.[44] For example, veterans who report more negative military experiences may be more likely to develop PTSD symptoms later in life and have increased odds of current suicidal ideation and current mental health disorders.[45,46] Results of our study extend this work to suggest that reports of drinking problems, witnessing death and destruction, and worsening physical health may be linked to reduced psychological resilience. Although witnessing death and destruction as a negative consequence of military service may appear to be embedded in our trauma exposure calculation, the trauma exposure measure is based on whether exposure to an event occurred, not whether it is perceived as having a negative consequence in one's life. It is the *perception* of the event being negative that we found to be related to lower psychological resilience. Given the cross-sectional design of our study, however, we are unable to ascertain whether negative perceptions of reported events are influenced by current mental health difficulties, or if the endorsement of more negative effects drives risk for psychological distress and general maladaptive perceptions of one's life (eg relationships, finances, health).[46] Nevertheless, this finding underscores the importance of addressing negative mental and physical health consequences of perceived trauma, as well as screening for and treating current risky drinking behaviors and poor health in efforts to help promote resilience.

Social support was also strongly associated with psychological resilience. Greater perceptions of social support may help increase psychological resilience by promoting self-esteem, active coping strategies, a sense of control, evaluation of potentially stressful events as less threatening, and motivation to adopt healthfully and reduce risky behaviors.[1] Encouraging involvement in one's community, as well as community policies and programs that support and enhance connection by promoting safe neighborhoods, affordable housing, and public spaces for assembly and exercise are all methods of promoting and improving social support.[47] Of note, positive social support has been shown to activate the parasympathetic nervous system and brain regions implicated in the processing of safety cues and stimulate the release of oxytocin, which is known to have anxiolytic effects.[48,49]

Grit has 2 main components, perseverance of efforts and consistency of interest.[21,50–52] The first component, perseverance of efforts is thought to overlap with the construct of resilience since it refers to maintaining goals even when obstacles are encountered. Some studies show grit is associated with a reduced tendency for suicide ideation and

decreased burnout in doctors and surgical residents.[53–55] In studying West Point cadets, Duckworth and colleagues found that those who had higher grit at the entry to the academy were less likely to drop out of the first basic training summer than less gritty peers, even after controlling for SAT scores, high school class rank, and conscientiousness.[52] Recently, Duckworth et al.[56] also found that grit and physical ability in a cohort of West Point cadets were better predictors of 4-year graduation from the Academy than cognitive ability. Additionally, grit has been associated with resilience itself but, to our knowledge, this is only based on self-reported resilience scales, such as the *Connor–Davidson Resilience Scale©.*[57,58] Our study adds to this literature by identifying a relationship between grit and psychological resilience using a resilience score measured on a continuum. This is an important identified relationship since grit is also a modifiable factor. Therapeutic interventions to promote a growth mindset and work on goal-setting and discovering one's passions may help increase grit.[59,60]

Results did not indicate gender differences in factors associated with resilience except for the greater time in service, which was associated with greater resilience in women only.[61-63] This is perhaps a result of women who stay in the military longer being those who have accommodated to the military environment and learned to cope and survive in a male-dominated hierarchical environment.[64] It is also possible that there are psychological vulnerabilities from leaving military service that are inherent to women only. One reason women are more likely to leave the service than men are due to family obligations, such as having children. Driven, gritty women who obtain training and education by attending West Point then no longer work or fill the role of a military officer may become more vulnerable to mental health issues later in life. This is perhaps due to a loss of purpose in life or career goals, whereas men who leave the military are more often pursuing a different career. For those who opt to leave the military and pursue a different career, female veterans often seek careers in similarly male-dominated fields and have reported difficulty integrating into the civilian workforce due to differences in dress, behavior (posture, assertiveness), identity issues, and disconnection from their civilian female counterparts.[64,65] Efforts to support a smooth transition for women into civilian careers may alleviate these experiences, particularly regarding the unique challenges they may face.

Limitations of this study include the use of self-report measures, which may be subject to recall bias, although this is a similar possibility with clinician-administered scales. The response rate of the survey was also a limitation. However, with our sampling strategy of overrepresenting women, we achieved statistically significant results for gender comparisons; and, through age, class year, racial, and branch demographics for the population, we were able to achieve a representative sample of the targeted population. Although social support and grit appear to play a role in psychological

resilience, the amount of variance explained by each was relatively low. Finally, given the cross-sectional design, we cannot establish temporal or causal associations. Consequently, it is unclear if the greater purpose in life, social support, and grit give rise to greater resilience or vice versa, or if these associations are bidirectionally linked over time. To date, all of the known studies that have employed a discrepancy based psychological resilience approach to operationalizing resilience have done so using cross-sectional data.[9,10] Longitudinal studies employing prospective designs are needed to evaluate the application of a discrepancy-based approach and evaluate the role of flexible self-regulation and other time-varying factors in contributing to resilience.[66]

Conclusion

Taken together, results of this study demonstrate the utility of a novel dimensional approach to operationalize and identify factors associated with resilience in West Point graduates. Results revealed that greater purpose in life and fewer perceived negative experiences in the military, and to a lesser extent, social support and grit, all of which have been shown to be modifiable, were most strongly linked to resilience.[41,43,59,60,67–69] Findings lend themselves to consideration of assessing and building resilience for West Point graduates and individuals in other leadership roles and high-stress occupations. Notably, the approach to operationalizing and understanding resilience described in this paper can be applied to a broad range of stress/trauma-affected populations. For example, we considered both general and population-specific exposures (eg, count of traumas and combat exposure, respectively) and potential correlates (eg, purpose in life and perceptions of military service, respectively) of resilience in our analyses, as they were relevant to the study population. Studies of other stress and trauma-affected populations, such as first responders, might assess occupational and personal stressors (eg, knowing a colleague who died in the line of duty) and resilience-promoting factors (eg, perceived preparedness) that are specific to these populations and the evolving context of a stressful experience. One framework for conceptualizing potential factors associated with resilience is the PERMA model, which posits that positive emotion (P), engagement (E), relationships (R), meaning (M), and accomplishments (A) are core components of well-being.[70] Further research is needed to evaluate how factors that comprise these multidimensional components—individually and interactively—may contribute to resilience in various stress—and trauma-affected populations.

Another future direction is to examine the potential utility of a discrepancy-based approach to operationalizing resilience in measuring specific aspects of resilience, such as functional resilience (ie, maintaining a high level of functioning in the face of high psychological distress). Additional research is also needed to investigate biological factors in understanding underlying mechanisms associated with

psychological resilience, evaluate longitudinal associations between resilience-promoting factors and resilience, and develop and test the efficacy of interventions to promote psychological resilience in populations at high risk of exposure to trauma and significant sources of stress.

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