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Demographic, deployment and post-deployment experiences predict trajectories of meaning in life in OEF/OIF/OND veterans

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ABSTRACT

Research consistently links U.S. military veterans' meaning in life to better mental health and well-being. Yet, because meaning in life is usually studied as a precursor of other aspects of wellbeing, much remains to be learned about veterans' meaning in life itself. Two key questions are (1) how well do veterans maintain a sense of meaning in life over time? and (2) what determines their sense of meaning in life over time? We sought to answer these questions across a one-year period in a sample of 542 Operation Iraqi Freedom/Operation Enduring Freedom/Operation New Dawn veterans following military service. Three distinct meaning trajectories were identified: (1) moderately high and stable, (2) low and increasing, and (3) low and decreasing, with group membership approximately 79%, 16% and 5%, respectively. Predictors of trajectory membership included demographic factors (i.e., gender and race), deployment experiences (i.e., combat exposure and aftermath, unit support, and meaningful engagement) and post-deployment resources (i.e., social support and religiousness). These results suggest that a substantial minority of veterans experience low and even declining meaning in life that may substantially impair their quality of life and well-being. Suggestions for identifying veterans vulnerable to low levels of life meaning and for interventions to increase meaning are provided.

Meaning in life refers to the comprehension of, and importance directed towards, one's life experiences and individuality, or 'the sense made of, and significance felt regarding, the nature of one's being and existence' (Steger et al., 2006, p. 81). Philosophical perspectives have long held that a sense of meaning in life is an important aspect of well-being (see Ryff & Singer, 2008). In recent decades, empirical research conducted in many different populations has demonstrated that a sense of meaning in life is consistently and positively associated with a wide range of mental and physical health indicators (Czekierda et al., 2017; King et al., 2016; Steger et al., 2009). While much of this work has focused on inverse relations between meaning and negative aspects of well-being (e.g., suicidality; Marco et al., 2016), some of this research has also demonstrated favorable associations between meaning and positive aspects of well-being (e.g., happiness; Cavazos Vela et al., 2015).

Mirroring these findings from studies of other populations, research specifically among U.S. military veterans has shown that meaning relates favorably to many aspects of veterans' mental and physical health and well-being. Indeed, among military veterans, meaning in life is strongly and inversely related to many negative psychological states, particularly post-traumatic stress disorder (PTSD) (e.g., see Fischer et al., 2020, for a review). Veterans' meaning in life also relates to lower levels of depression (Blackburn & Owens, 2015; Bryan et al., 2020; Sinclair et al., 2016), feelings of guilt (Owens et al., 2009), and emotional distress (Bryan et al., 2013). Importantly, meaning in life appears to be a strong protective factor against suicide, with lower rates and less severity of suicidal ideation reported in U.S. active duty personnel and veterans (Braden et al., 2015; Bryan et al., 2015; Sinclair et al., 2016).

Veterans' meaning in life is associated with positive psychological states as well, such as better functioning in domains of work, relationships with family and friends, and recreational activities (Bryan et al., 2013). Several studies of college student military veterans found that higher meaning in life was associated with better physical health as well (e.g., Kinney et al., Kinney, et al., 2021). Thus, current research consistently links meaning in life

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to greater well-being and suggests it may play a key role in maintaining psychological health and well-being in military veterans. Meaning in life is a highly valued aspect of life on its own (Bryan et al., 2017).

Yet, much remains to be learned about meaning in life in U.S. military veterans. Two key unanswered questions are, (1) how well do veterans maintain a sense of meaning in life over time?, and (2) what determines their sense of meaning in life over time? Because researchers tend to conceptualize meaning in life as a precursor of the outcomes of interest (e.g., depression, suicidality), relatively little research has focused on the factors that determine levels of meaning in life itself nor changes in meaning in life over time.

These questions about change in meaning in life are important for all populations, given the central role meaning plays in well-being (King & Hicks, 2009). Yet trajectories of life meaning may be particularly important for veterans as they navigate the transition from the Armed Forces into civilian life. For example, serving in the Armed Forces may promote meaning through providing an identity as being part of a larger cohesive group with an important collective mission (Bryan et al., 2019). However, after separating from military service, veterans' meaning in life may be adversely affected by losing those potent sources of meaning.

Predictors of meaning in life

Research in other populations has indicated that social relationships/support and religiousness are perhaps the largest and most common contributors to meaning in life (King & Hicks, 2009); having meaningful work is also a strong predictor of meaning in life (Ward & King, 2017). Conversely, having experienced more trauma and adverse life events is related to lower meaning in life (Krause, 2005, 2007). Few studies have thoroughly reported on potential demographic differences in meaning in life, although higher levels of meaning have been associated with older age (e.g., Steger et al., 2009) and female gender (e.g., Klein, 2017).

Although relatively little research has been conducted on meaning in life in veterans, findings regarding its predictors or correlates is consistent with that in the general population. One study of college student veterans found meaning in life positively associated with age but unrelated to gender or race (Bryan et al., 2020), but a study of veterans from earlier service eras did not find a relationship between age and meaning in life (Owens et al., 2009).

Military experiences have been inconsistently related to current levels of meaning in life. For example, combat exposure has been linked in some studies with lower levels of meaning in life (e.g., Blackburn & Owens, 2015) while other studies of veterans have found no relationship (e.g., Owens et al., 2009). For example, Kinney et al. (Kinney, et al., 2019) found combat exposure was not directly related to meaning in life in their sample of college student veterans but suggested that combat exposure may impact veterans' meaning in life through decrements in their physical health (Kinney et al., Kinney, et al., 2021). In a study of active duty Air Force, a greater number of deployments, less exposure to non-combat stressors and traumas, less intense combat exposure, and less intense negative affect were associated with higher levels of meaning in life (Bryan et al., 2017). However, in a sample of Vietnam veterans, meaning in life was unrelated to years since veterans' most severe stressor or severity of that stressor (Steger et al., 2015). One study of Operation Iraqi Freedom/Operation Enduring Freedom/Operation New Dawn (OEF/OIF/OND) veterans with PTSD symptoms referred to VA mental health care found unit support while deployed was highly associated with current meaning in life (DeViva et al., 2016). Finally, some scholars have suggested that appraising one's military engagement or service as fulfilling an important purpose is associated with higher levels of meaning in life, although empirical work on this issue is scant (Schok et al., 2010, 2008).

Little research has documented post-discharge determinants of veterans' meaning in life. One study of older male veterans in Taiwan found meaning in life was related to having friends and family and to higher levels of religiousness (Niu et al., 2016). In the above-mentioned studies, for OEF/OIF/OND veterans with PTSD symptoms referred to VA mental health care, post-deployment social support was highly associated with meaning in life (DeViva et al., 2016) and for college student veterans (Kinney et al., Kinney, et al., 2019), social support was strongly related to higher levels of meaning in life. In a large sample of U.S. veterans, higher religiousness was related to higher purpose in life (Sharma et al., 2017).

Changes in meaning in life over time

Studies examining changes in meaning in life are rare. A handful of longitudinal studies in community samples (King et al., 2006), people living with chronic pain (Dezutter et al., 2015, and college students (Mascaro & Rosen, 2008;Steger and Kashdan, 2007) have generally shown meaning in life is stable over periods of several months to several years, but with substantial variation across individuals. Similarly, few studies have documented how veterans' meaning in life changes over time. Consistent with studies conducted in non-

military samples, the available literature suggests veterans' meaning in life is generally stable and at fairly high levels, but with some individual variation. One study found that across approximately six months, college student veterans experienced a slight but significant decline in meaning in life (Kinney et al., Kinney, et al., 2019). Another study of college student veterans who had served in Iraq or Afghanistan displayed a small decline in meaning in life (purpose) across two months (Bergmann et al., 2019). A study of National Guard soldiers surveyed 6 and 12 months after their return from deployments in Iraq and Afghanistan demonstrated fairly high and stable meaning in life across that time period (Kim et al., 2017), and a study of older veterans (mean age of 74) found that purpose was fairly stable on average across three years but noted substantial variation across individuals (Hill et al., 2015). However, none of these studies modeled trajectories of change in meaning in life nor identified determinants of individuals' change over time.

Study aims/Hypotheses

We aimed to examine trajectories of stability and change in meaning in life over one year, and to identify demographic, deployment-related, and post-deployment factors related to these trajectories in a sample of recent-era OEF/OIF/OND veterans. We relied on theory, previous research, and latent class analysis to test the possible presence of multiple trajectories over time, where each identified class explained a different underlying trajectory. We then examined likelihood of class membership based on demographic characteristics and relevant deployment experiences and post-deployment resources.

We hypothesized that our sample of OEF/OIF/OND veterans would demonstrate at least two trajectories/classes of post-deployment meaning in life over one year such that differences in intercepts and slopes would be present between classes, demonstrating a 'low' and 'high' intercept for meaning. We also tentatively hypothesized that there may be additional intermediate classes. We anticipated the possibility that at least one class would demonstrate change over time (e.g., decreasing, increasing). We also hypothesized that demographic information, deployment experiences, and post-deployment resources would predict class membership, whereby class trajectories would align with demographic, deployment, and post-deployment factors.

Method

Participants

The current investigation draws from the Survey of Experiences of Returning Veterans (SERV), a cohort study examining post-deployment experiences of post-9/11 veterans that oversampled women veterans. Study eligibility included having served in Iraq, Afghanistan, or surrounding areas or waters. The nationwide convenience sample was recruited through Veteran's Health Administration, Student Veteran Associations, Facebook, YouTube, community listservs, and posted flyers. Written informed consent was obtained from all participants, and the study was approved by the Institutional Review Board of the Department of Veterans Affairs.

Procedures

Potential participants were contacted via postal mail. If they agreed to be contacted (i.e., by mailing back the consent form), the research coordinator verified eligibility by confirming that the veteran 1) served in Iraq, Afghanistan or surrounding waters, 2) separated from the military within the last five years and was unlikely to be redeployed, and 3) was willing and able to complete telephone interviews. Telephone interviews to administer the questionnaires were conducted by trained personnel and lasted approximately one hour. The core study included five time points: enrollment (baseline) and then 3, 6, 9, and 12 months and participants were compensated ($40, $45, $50, $55, and $60, respectively). A total of 673 veterans were sampled, given one study site was excluded because they could not collect follow-up data (n = 177). See Park et al. (2021) for full cohort details. For the purposes of this current study, participants who had at least three waves of data collection were examined (n = 542).

Measures

Demographic information
Demographic information was assessed utilizing a self-report questionnaire. The present study was concerned with age, gender, race, ethnicity, and date of last discharge from deployment. Date of interview was also recorded. Time between baseline interview and discharge was calculated by converting date of last discharge and date of baseline interview to months and subtracting the values.

Deployment experiences

Deployment experiences were measured using The Combat Experiences Scale; CES), aftermath of battle exposure (Aftermath of Battle Scale; ABS), and deployment relationships (Relationships with Unit Scale; RUS), all from the Deployment Risk and Resilience Inventory-II (DRRI-II; Vogt et al., 2012), along with the MME (Britt et al., 2001) to assess meaningful military engagement.

The DRRI-II is a suite of 17 distinct scales aimed at assessing military deployment-related risk and resilience factors that have implications for Service members' and veterans' long-term health. The CES includes 17 items and asks participants if they have experienced a range of combat-specific events, such as direct exposure to firing a weapon, being fired upon, witnessing injury and death, and going on special missions and patrols. Responses range from 0 'Never' to 5 'Daily or almost daily'. The ABS includes 13 items and asks participants about the experience of a range of events associated with the outcome or consequences of combat, such as observing or handling human remains, dealing with prisoners of war, and seeing devastated communities and homeless refugees. Responses range from 0 'Never' to 5 'Daily or almost daily'. The RUS includes 16 items and asks participants about their negative social experiences with their unit, such as being treated overly critically, having unit members behaving uncooperatively, and being sexually threatened. Responses range from 1 'Never' to 4 'Many times'. This scale was originally derived from the DRRI-I and included in the present study along with DRRI-II subscales since this construct was of interest and not examined otherwise. Each DRRI scale is summed separately. All scales have demonstrated reliability (>0.85) and in a validation study, correlated in the expected directions with measures of psychological distress among Iraq veterans (Vogt et al., 2008). For the current sample, estimates of internal consistency reliability were .92, .92, and .89, respectively.

Meaningful military engagement was assessed with the MME, developed by Britt et al. (2001) in a study of troops deployed to Bosnia. MME is designed to tap the extent to which a person feels personally responsible for and committed to one's performance in the military. Participants responded to the items 'regarding your experience during deployment,' nonspecific to a single mission. Two items were assessed job importance ('I played an important role in the mission') and three measured service member engagement ('How I did in my job mattered a great deal to me'). Participants rated their agreement with each item on a Likert scale from 1 'very low' to 5 'very high'. The scale showed good internal consistency reliability in our sample ($a = 0.76$).

Post-deployment social support

Post-deployment social support was measured by the Post-Deployment Social Support Scale (PDSSS) from the Deployment Risk and Resilience Inventory (DRRI; King et al., 2006) and modified for this analysis. Two of the original items appeared to assess a cross-sectional component of social support (e.g., appreciation from the public when they returned home) and were excluded in examining longitudinal changes in social support. Although this scale is not usually separated into subscales in scoring, the present parent study found that a two-factor solution had better fit, describing emotional social support (Items 3 to 7) and instrumental social support (Items 8 to 11). See Park et al. (2021) for full details on the factor analysis. Cronbach's alphas at baseline were .88 and .84, respectively.

Post-deployment religiousness

Post-deployment religiousness was measured by a single item, drawn from the Brief Multidimensional Measure of Religiosity/Spirituality (BMMR/S; Fetzer/NIA, 1999): 'To what extent is your religion involved in understanding or dealing with stressful situations in any way?' Participants responded from 1 'not at all' to 4 'a great deal'; 0 was included as 'I don't believe in God'.

Post-deployment meaning in life

Post-deployment meaning in life was assessed with the 5-item presence scale of the Meaning in Life Scale (Steger et al., 2006). The presence scale assesses perceived purpose and meaning in an individual's life. Responses range from 1 'Absolutely False' to 7 'Absolutely True'. The Meaning in Life Scale has demonstrated good psychometric properties in previous studies (Steger et al., 2006). In the present sample, internal consistency reliability of the presence subscale was .92.

Data analysis

R version 4.0.2 (R Core Team, 2013) and the *lcmm* package (Proust-Lima et al., 2015) was used to run all analyses. Alpha for two-tailed tests was set to 0.05. Firstly, logistic regression was conducted to determine if included participants differed from excluded participants on demographic and study variables. Within included participants, descriptive information was examined through frequency analysis (means, standard deviations, and normality for continuous variables; percentages for categorical variables). To examine basic relationships between continuous demographic and study variables at baseline, bivariate correlations were conducted, and to examine differences in continuous

study variables by categorical demographic variables at baseline, two-sample *t*-tests with robust standard errors were used. Correlations and *t*-tests were bootstrapped (*n* = 1000), and bootstrapped means and standard deviations were reported for these tests.

Trajectories and possible latent classes were then examined via constructing a series of latent class mixture models with varied parameters. Manipulated parameters included regression equation (only intercept, linear terms, and exponential terms), outcome function (linear, beta, splines), and number of latent classes (range 1–5). For linear and exponential term models, time (visit) was entered as the predictor in the trajectory regression equation. For each model, information criteria for model fit was calculated and compared, including: AIC, BIC, adjusted BIC, loglink, adjusted loglink, and entropy. Further, models with more than one class were compared insofar as the sample size of each latent class and posterior probabilities for each class.

Once best candidate models were chosen by comparing best-fitting information criteria and theory, demographic (time since military discharge, age, gender, race, and ethnicity), deployment experience variables (combat, aftermath, problematic relationships, and military meaning), and post-deployment resource variables (emotional and instrumental social support, and religiousness), were entered as predictors into a multinomial logistic model of class membership. Model statistics were bootstrapped (*n* = 1000). The probability (odds) of demographic and deployment predictors describing outcomes was assessed via the magnitude and significance of predictor beta coefficients within class membership models.

Results

Descriptive information

Compared to excluded veterans (*n* = 131), included veterans who completed at least three timepoints (*n* = 542) were 2.4 more likely to be male (B = −0.87, SE = 0.26, *p* = .001). Further, veterans were 16.3% and 8.4% more likely to be included for each point increase in instrumental social support (B = 0.15, SE = 0.03) and military meaning (B = 0.08, SE = 0.04), *p*'s<.03. Included and excluded veterans did not differ significantly on any other demographic or study variables, *p*'s>.08.

Veterans included in our sample consisted of slightly more men (56.6%; *n* = 307), were mostly white (77.9%; *n* = 422) and non-Hispanic or Latinx (87.5%; *n* = 474). Participants had an average age of 35.8 years (SD = 9.1)

and time between last military discharge and baseline interview of 3.4 years (SD = 2.5). A full description of this sample is available elsewhere (see Park et al., 2021).

CES, ABS and RUS average scores were all around the 20th to 30th percentile of possible scores (Ms = 18.6, 18.4, and 25.8; SDs = 16.0, 14.6, and 8.1, respectively). Military meaningful engagement on average was fairly high at the 87th percentile of possible scores (M = 22.4; SD = 2.6). The average score for religiousness was 2.0 (SD = 1.3), indicating participants 'somewhat' involved religion in understanding or dealing with stressful situations. Emotional and instrumental social support average scores were at the 60th and 77th percentile of possible scores, respectively (Ms = 17.1 and 16.4; SDs = 5.4 and 3.6, respectively). Meaning in life on average ranged from around the 70th percentile at baseline to the 73rd percentile at 12 months (M_{T1}, M_{T2}, M_{T3}, M_{T4}, M_{T5} = 26.0, 26.0, 26.4, 26.6, 26.8, respectively; SD_{T1}, SD_{T2}, SD_{T3}, SD_{T4}, SD_{T5} = 6.9, 6.8, 6.5, 6.4, 6.3, respectively).

Men had higher CES (M = 23.2, SD = 17.2) and ABS (M = 21.7, SD = 15.0) scores than women (Ms = 9.0 and 12.6, SDs = 8.8 and 12.1, respectively), *t*'s>6.1, *p*'s<.001. Conversely, women had higher RUS scores (M = 27.8, SD = 9.1) and religiousness (M = 2.4, SD = 1.3) than men (Ms = 24.4 and 1.7, SDs = 6.3 and 1.3, respectively), *t*'s>3.7, *p*'s<.001. Across timepoints, women had higher meaning in life (M_{T1}, M_{T2}, M_{T3}, M_{T4}, M_{T5} = 27.5, 27.0, 27.8, 27.5, 27.9, respectively; SD_{T1}, SD_{T2}, SD_{T3}, SD_{T4}, SD_{T5} = 7.0, 6.9, 6.0, 6.6, 6.3, respectively) compared to men (M_{T1}, M_{T2}, M_{T3}, M_{T4}, M_{T5} = 25.6, 25.7, 25.9, 25.8, 26.3, respectively; SD_{T1}, SD_{T2}, SD_{T3}, SD_{T4}, SD_{T5} = 6.6, 6.9, 6.5, 6.4, 6.5, respectively), *t*s>2.3, *P*s<.03. There was in exception to the 3-month timepoint, where meaning in life did not differ by gender, *p* = .10. No other study variables differed by gender, *P*s>.53.

Veterans of racial minority status had had lower levels of instrumental social support (M = 15.2, SD = 4.6) compared to White veterans (M = 16.6, SD = 3.5), t = 2.4, *p* = .02. Additionally, veterans of minority racial status had higher RUS scores (M = 27.9, SD = 7.8) and religiousness (M = 2.5, SD = 1.3) than White veterans (Ms = 25.3 and 1.9, SDs = 7.5 and 1.3, respectively), *t*'s>2.4, *p* < .02. No other study variables differed by race, *p*'s>.22, and no study variable differed by ethnicity, *P*s>.10.

Time between military discharge and baseline interview positively associated with CES and ABS scores and negatively associated with post-deployment emotional and instrumental social support at baseline. Age negatively associated with CES scores and positively associated with military meaning and post-deployment religiousness at baseline.

CES and ABS scores strongly correlated. Both CES and ABS scores positively associated with military meaningful engagement and negatively associated with post-deployment emotional and instrumental social support and religiousness at baseline, as well as life meaning across timepoints. RUS scores negatively associated with military meaning, post-deployment emotional and instrumental social support at baseline, and life meaning across timepoints. Military meaning positively associated with life meaning only at 6 and 12 months. Post-deployment emotional and instrumental social support strongly correlated at baseline, and only emotional social support positively associated with religiousness at baseline. Both emotional and instrumental social support at baseline was positively associated with life meaning across timepoints. Post-deployment religiousness at baseline was positively associated with life meaning across timepoints. Life meaning was strongly correlated across timepoints. See Table 1.

Latent class mixture models

While information criteria did not unanimously determine a best-fit model for meaning in life, when considering fit indices overall, a best-fit model was identified, which was a mixed linear model with exponential terms and three latent classes (Table 2). Class one, *moderate meaning – no change*, consisted of most veterans, where meaning in life was moderate and did not change over one year (84.3%; *n* = 456). Class two, *low meaning – increasing*, consisted of a small-to-moderate proportion of veterans, where meaning in life was low and became higher over one year (14.4%; *n* = 78). Class three, *low meaning – decreasing*, consisted of a small proportion of veterans, where meaning in life was low and decreased over one year (1.3%; *n* = 7).

When adding demographic, deployment, and post-deployment variables into the best-fit unconditional model as predictors of class membership and trajectory, the model remained like the unconditional model in general. However, the fit was better across criterion (AIC: 13040.2, BIC: 13193.3, SABIC: 13079.0, log-likelihood: −6484.1, entropy: 85.6%), and the percentage of veterans in classes slightly shifted; notably, the *low meaning – decreasing* class was more than twice as large as in the unconditional model. Specifically, the *moderate meaning – no change* class decreased in size to 79.6% (*n* = 414). The *low meaning – increasing* class slightly increased in size to 15.8% (*n* = 82). The *low meaning – decreasing* class increased in size to 4.6% (*n* = 24). Class posterior probabilities were also better for the three classes (95.8%, 84.3%, and 88.8%, respectively). See Figure 1.

All demographic, deployment, and post-deployment variables predicted class membership to some degree, except for age, ethnicity, and military meaning. First, for every point decrease in problematic deployment relationships, point increase in emotional and instrumental social support, and point increase in religiousness, veterans were more likely to be in the *moderate meaning – no change* class than either *low meaning* class. Men were more likely than women to be in the *low meaning – decreasing* class than either other class, and for every point increase in combat exposure and in aftermath, veterans were more likely to be in the *low meaning – decreasing* class than other classes.

White veterans were more likely to be in the *low meaning – increasing* class, as compared to the *moderate meaning – no change* class, and for every month fewer between military discharge and baseline interview, veterans were more likely to be *low meaning – increasing* class compared to the *moderate meaning – no change* class. Lastly, for every point increase in problematic

Table 1. Correlations between continuous demographic and study variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Discharge time (months)													
2. Age (years)	**0.17****												
3. Combat exposure	**0.15****	**−0.12***											
4. Aftermath exposure	**0.15****	0.00	**0.79****										
5. Deployment relationships	0.05	−0.07	−0.05	−0.07									
6. Military meaning	0.06	**0.17****	**0.13***	**0.14***	**−0.13***								
7. Emotional social support (T1)	**−0.12***	−0.09	**−0.20****	**−0.24****	**−0.23****	−0.02							
8. Instrumental social support (T1)	**−0.14***	−0.09	**−0.16****	**−0.14***	**−0.24****	0.05	**0.60****						
9. Religiousness (T1)	0.02	**0.26****	**−0.17****	**−0.12***	−0.06	0.08	**0.17****	0.07					
10. Life meaning (T1)	−0.05	0.06	**−0.14***	**−0.13***	**−0.29****	0.10	**0.43****	**0.42****	**0.25****				
11. Life meaning (T2)	−0.03	0.04	**−0.14***	**−0.12***	**−0.32****	0.08	**0.46****	**0.39****	**0.26****	**0.80****			
11. Life meaning (T3)	−0.09	0.03	**−0.16****	**−0.13***	**−0.28****	**0.11***	**0.44****	**0.38****	**0.23****	**0.72****	**0.76****		
11. Life meaning (T4)	−0.07	0.06	**−0.15****	**−0.13***	**−0.34****	0.07	**0.42****	**0.36****	**0.28****	**0.78****	**0.80****	**0.81****	
11. Life meaning (T5)	−0.06	0.05	**−0.17****	**−0.16****	**−0.29****	**0.12***	**0.46****	**0.38****	**0.26****	**0.74****	**0.78****	**0.79****	**0.87****

*p < .05. **p < .01. ***p < .001. Bolded values indicate p < .05. Results were bootstrapped (n = 1000).

Table 2. Information criteria for unconditional meaning in life latent class mixture models.

Meaning in Life (Mixed linear model with exponential terms)

Index	1	2	3	4	5
			Classes		
AIC	13904.6	13910.6	**13818.4**	**13818.8**	13824.8
BIC	13938.9	13957.8	**13878.5**	13891.8	13910.7
SABIC	13913.5	13922.9	**13834.0**	13837.9	13847.2
Log Likelihood	−6944.3	−6944.3	−6895.2	**−6892.4**	**−6892.4**
Entropy	-	< .01	**.84**	**.85**	.65
Probabilities % (% of sample, n)					
Class 1	-	50.9% (49.7%; n = 269)	73.8% (1.3%; n = 7)	62.2% (2.2%; n = 12)	59.0% (2.6%; n = 14)
Class 2	-	51.4 (50.3; 272)	95.4 (84.3; 456)	95.1 (83.4; 452)	80.4 (82.8; 448)
Class 3	-		86.7 (14.4; 78)	97.7 (0.2, 1)	NA (0.0; 0)
Class 4	-			83.7 (14.1; 76)	97.7 (0.2; 1)
Class 5	-				82.7 (14.4; 78)

Bolded values indicate best-fit information criteria statistics within 1 unit.

deployment relationships, veterans were more likely to be in the *low meaning – decreasing* class than the *low meaning – increasing* class. See Table 3 for full details.

Discussion

Given the importance of meaning in life to mental and physical health and well-being (Fischer et al., 2020), particularly for post-deployment military veterans (Owens et al., 2009), understanding of its course across time is essential. The results of this study substantially advance our knowledge of meaning in life in important ways and provide directions for future research and prevention/intervention efforts for vulnerable veterans.

First, we found that meaning in life is relatively high and stable for most veterans, which is consistent with research on many populations; Heintzelman and King (2014) characterized general findings in a highly-cited *American Psychologist* review article entitled, 'Life is pretty meaningful'. It is perhaps reassuring that most of our sample were finding their post-deployment lives as fairly high in meaning across time; the means reported in the largest class (Moderate-Stable) are comparable to those found in many different populations (e.g., Steger et al., 2006). These veterans report feeling that their worlds make sense and that they consistently have a sense of purpose that directs them (George & Park, 2016). High levels of meaning in life may reduce the intensity of negative emotions (King & Hicks, 2009) and facilitate adaptive coping (e.g., social support), perhaps by lowering physiological arousal and preserving cognitive flexibility, which enables perspective taking and problem-solving (Miao et al., 2017) and indeed, a high level of meaning in life is a robust protective factor against a variety of mental and physical health problems (Czekierda et al., 2017; Steger, 2017).

However, our finding also indicated that a substantial minority of veterans experience low levels of meaning in life. These men and women reported lacking purpose and direction and a sense of their lives as worthwhile. Low meaningfulness can be a confusing and painful experience; given that we see veterans reporting low levels consistently over time is worrisome, and perhaps more so is that a small percentage trended lower in their sense of meaning in life across the observed year. Low levels of meaning in life are a risk factor for a range of mental and physical health problems, especially among veterans, including depression, PTSD, addiction, and suicidal ideation and behavior (Steger, 2017).

Second, our study identified determinants of class membership in the three observed trajectories of meaning. The meaning classes were distinguished in part by
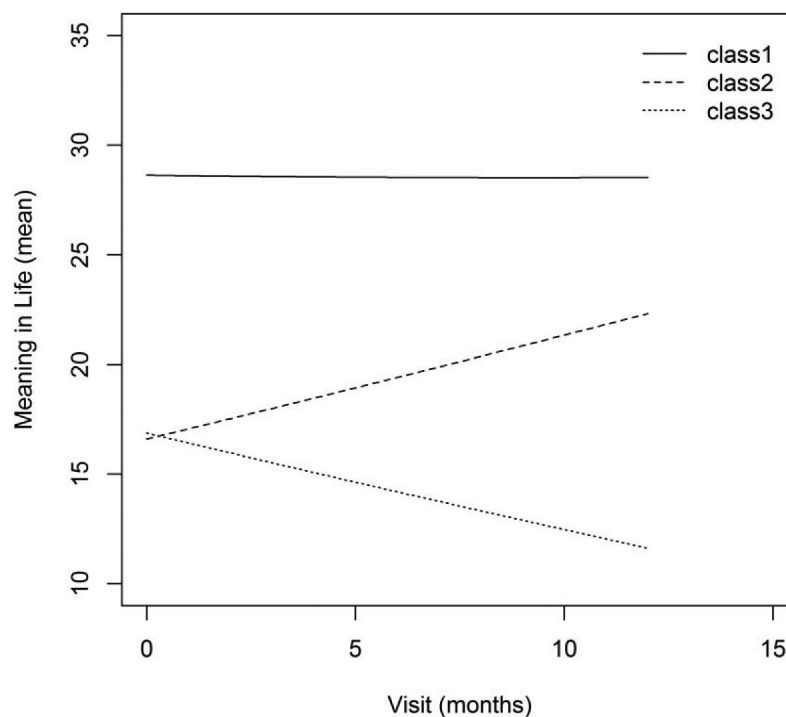
Figure 1. Conditional model of meaning in life (non-linear terms, linear mixed model, 3 classes).

Table 3. Demographic information, deployment experiences, post-deployment resources as predictors of latent class membership.

	Medium – Resilient		Low – Increasing
	Low – Increasing	Low – Decreasing	Low – Decreasing
	OR (SE)	OR (SE)	OR (SE)
Gender (% Male)	1.62 (0.42)	**27.51 (1.87) **	**16.94 (1.89) **
Race (% White)	2.76 (0.48)	**7.64 (3.11)***	2.76 (3.15)
Ethnicity (% Hispanic)	1.20 (0.46)	0.20 (6.04)	0.17 (6.03)
Discharge time (months)	**0.99 (0.01)***	0.99 (0.02)	1.00 (0.02)
Age (years)	1.00 (0.02)	0.97 (0.09)	0.97 (0.08)
Military meaning	0.94 (0.07)	0.84 (0.18)	0.89 (0.19)
Problematic deployment relationships	**1.07 (0.02) **	**1.22 (0.09) **	**1.14 (0.09) **
Combat exposure	1.00 (0.02)	**1.10 (0.06) **	**1.11 (0.06) **
Aftermath exposure	1.01 (0.02)	**0.83 (0.09) **	**0.82 (0.10) **
Social support (emotional)	**0.84 (0.04) **	**0.76 (0.15) **	0.92 (0.15)
Social support (instrumental)	**0.89 (0.05) **	**0.74 (0.16) **	0.84 (0.15)
Religion helps with stress	**0.63 (0.13) **	**0.46 (0.42) **	0.73 (0.41)

*p < .05. **p < .01. ***p < .001. Bolded values indicate p < .05. p adjusted by bootstrapping. Iterations = 1,000.

demographic factors, with the lower meaning groups comprising a higher percentage of men (and particularly White men in the low and decreasing meaning group) as well as having greater exposure to combat and its aftermath, lower levels of meaningful military engagement, and lower levels of current religiousness. This set of predictors is mostly consistent with previous research in both military/veteran and more general population samples, although the relationship of identification as White with lower levels of depression has not been reported previously. In fact, we were able to find only a few studies that reported relationships with race, and these generally reported that minority status was related to lower meaning. Women generally score higher in meaning in life than do men (e.g., Xi et al., 2018).

Previous studies of veterans have generally documented associations between greater military trauma exposure, such as that reflected here in both combat and aftermath exposure and lower levels of meaning in life (see Fischer et al., 2020); here, we see this association repeatedly in trajectories across a year. That these factors pose risk of having low meaning in life over time are particularly striking given that (a) both combat and aftermath exposure remained significant predictors of class even though they are strongly related, and (b) the average length of time since military service ended in this sample was over three years prior. Appraisals that one was highly engaged in meaningful service in the military served as a protective factor in terms of subsequent meaning in life. Although we are not aware of any studies that have examined the role of meaningful engagement of one's military service as predictive of

meaning in life specifically, it has been associated with the related construct of personality hardiness (Britt et al., 2001).

Relative to those low in meaning, those in the moderately high meaning class reported having lower levels of unit social difficulties while in the military and had higher current levels of both instrumental and emotional social support. Higher current social support leading to sustained moderately high levels of meaning in life is consistent with the large body of literature linking social support with meaning in life (e.g., Steger, 2017) and suggests the critical importance of social connection in the lives of these veterans. Further, the lack of recollected social difficulties within their military unit during service is consistent with the adaptive value of good social relationships to subsequent meaning in life. Finally, religiousness–the extent to which veterans relied on their faith to understand the world and cope with stressors–was predictive of the meaning class in which veterans resided. Higher levels of religiousness were strongly protective of higher levels of meaning, consistent with previous research in the general population (Steger & Frazier, 2005), although this link has not previously been empirically established in veterans, including recent era OEF/OIF/OND veterans.

While these results are intriguing, limitations of the current study must be noted. Our sample is a convenience sample and therefore not necessarily representative of the population of OEF/OIF/OND veterans. Furthermore, we lost many veterans in our longitudinal analysis and our results may be vulnerable to attrition bias. We attempted to examine a broad range of determinants of meaning class, but likely omitted important components that were not adequately assessed in our study (e.g., depressive symptoms). Interview administration of questionnaires might also have introduced bias in responses. Although our validated scales had different response formats and were administered at different time points, results may be biased by shared method variance (Brannick et al., 2010). On average, veterans in our study were already well into their transition out of the military by study entry, so the time period we tracked is a somewhat-arbitrary point relatively early in long-term adjustment.

Despite these limitations, these results offer important insights into the course of meaning in life of our sample of OEF/OIF/OND veterans. Although most maintain moderately high levels of meaning, comparable with many other populations (e.g., Heintzelman & King, 2014), a substantial minority experience low levels of meaning that only slight remit or even worsen over the course of a full year. These low levels of meaning are concerning, suggesting that these veterans are at higher risk for a host of adverse mental health and physical

conditions (Sinclair et al., 2016). Results also highlight the roles that demographics and sources of meaning may play in veterans' meaning in life, including stressful or traumatic experiences that occurred during their active duty as well as contemporaneous resources. That both instrumental and emotional social support, along with religiousness, may promote experiencing sustained and healthy levels of meaning in life provide valuable insights into preventive and interventional actions for OEF/OIF/OND veterans

Further research is needed to help to develop preventive efforts to promote meaning that might help veterans separating from the military to bolster their social and spiritual resources, which in turn serve as protective factors for suicidal ideation in veterans coping with mental health issues (e.g., depression, PTSD) (Braden et al., 2015; Sinclair et al., 2016). Moreover, given the current results, we recommend that OEF/OIF/OND veterans seeking treatment for mental health concerns also be assessed for meaning of life, since individuals with low meaning in life may profit from therapeutic efforts to alleviate the impact of traumatic exposures that occurred during their military service (e.g., Southwick et al., 2006). Lastly, future research is needed to examine how veterans in these different classes fare in terms of mental and physical health indices, particularly with regards to PTSD, depression, and persistent suicidal ideation. Because meaning in life is well-documented to be associated with poorer mental and physical health, examining associations of trajectories and health and well-being over time is likely to reveal important patterns of associations and lead to more holistic and therapeutic interventions for veterans with low meaning of life and mental health challenges.

Disclosure statement

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