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Differences in resilience profiles between military veterans and the general population: An exploratory latent profile analysis using the HUNT-4 survey

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Abstract

Using latent profile analyses, the current work investigated levels of adverse childhood experiences, symptoms of anxiety and depression and 3 dimensions of relational promotive factors) to identify resilience profiles in a large general population sample ($N = 161{,}622$, mean age = 53.02; SD = 17.80; 56.1% females). We then used the same method to identify the resilience profiles of military veterans ($N = 386$, mean age = 43.47; SD = 10.08; 9.8% females), all of whom had served in Afghanistan. A four-profile-solution was the best fitting for the general population (High resilient 30%, Moderate resilient 13%, Low resilient 53%, Work/social-based resilience 4%), while a three-profile-solution had the best fit in the veteran cohort (Family-based resilience 28%, Work/social-based resilience 62%, Hardy loners 10%). To ground the identified profiles in occupational function, we also checked how they predicted reports of sleep difficulties, job demand and job control. Despite both samples inhabiting a geographic region known for high socioeconomic similarity among residents, we found marked differences in profile-solutions between the military veterans and the general population. Our findings suggests that resilience profiles are highly influenced by cohort characteristics and the specific resources needed to manage a given stressor load. Accordingly, the generalisability of specific protective factors may be low across distinct cohorts, and reliable findings need to be obtained in specific populations as defined by stressor context, sample characteristics, and relevant outcomes.

KEYWORDS
high-risk jobs/populations, job stress, mental health, resilience, theoretical models of stress and coping, work family balance/conflict

1 | INTRODUCTION

The recent decades of military operations in Afghanistan and the Middle East precipitated several developments in the field of military psychology. Whereas the research on veterans previously focused mainly on the treatment of mental health problems after military trauma, there has been increasing interest in identifying factors contributing to psychological resilience that may reduce long term negative consequences of such exposure (Doody et al., 2021; Hourani et al., 2011). Moreover, health status is of great importance for soldiers' operational functioning, so developing resilience may potentially increase work performance that can contribute to mission readiness (Nindl et al., 2018). However, despite the growing enthusiasm around increasing psychological resilience among military personnel, the field is still nascent. Recent calls have been made for research that further explore the nuances of factors contributing to resilience, and how such factors may inform interventions that promote resilience in military populations (Fogle et al., 2020; Vella & Pai, 2019).

1.1 | Resilience promotive factors

The term resilience is often used to describe one's ability to accommodate a stressor load in a way that does not impede function (Nindl et al., 2018). The term is quite encompassing and is commonly used as a conceptual framework to describe, analyse, maintain, or even improve the functioning of everything from ecosystems and communities to organizations and individuals. Central to modern conceptualizations of resilience is the idea that the capacity to weather adversity and trauma arises as an interaction between several factors (Vella & Pai, 2019). These factors can be labelled as "promotive factors" and "risk factors", and resilience can thus be conceptualised as the sum of available promotive and risk factors relevant to managing one or more specific stressors at any given time (e.g., Park et al., 2021). This multisystemic framing of resilience is in contrast to more traditional mono-causal approaches to the concept (e.g., Bartone, 1999; Chopik et al., 2021), and emphasises the importance of accounting for the connectivity of the many elements that influence an individual's ability to withstand major adversity (Quinlan et al., 2016).

Resilience researchers Bonanno and Diminich (2013) emphasised that "the construct of psychological resilience can mean many things" (p. 21) suggesting that there are countless risk and promotive factors relevant to overcoming exposure to adversity. However, in the current study we selected five risk and promotive factors from which to infer resilience: adverse childhood experiences [ACEs], *mental health problems*, *social competence*, *family cohesion* and *social support at work*. The factor selection was made based on previous research findings. First, the factors in the current study have previously been identified as elements of resilience (ACEs: e.g., Sciaraffa et al., 2018; absence of mental health problems: e.g., Kansky & Diener, 2017; social competence: e.g., Xi et al., 2011; family cohesion, e.g., Daniels &

Bryan, 2021; and social support at work: e.g., Öksüz et al., 2019). Second, the factors we included are fairly common in resilience research both in the military and the civilian setting. For example, studies indicates that at least half of all military members (Aronson et al., 2020) and civilians (CDC, 2021) were exposed to at least one ACE, and about 20%–25% of both military members (Finnegan & Randles, 2022) and civilians (US National Institute of Mental Health) struggle with mental health conditions. Third, we selected both factors that can be characterised as malleable, such as social and family relationships, as well as factors that can be regarded as static, such as early life experiences (Arango et al., 2021, Cicchetti & Garmezy, 1993).

Of note, recent studies separate intrapsychic or personal promotive factors from relational promotive factors (e.g., Aune et al., 2021). In a military context, personal promotive factors such as hardiness (Bartone, 1999), character strengths (Peterson & Seligman, 2004), and locus of control (Rotter, 1966) have historically been associated with resilience. However, resilience research in other populations, such as among at-risk youths, emphasise that several key promotive factors are relational in nature (Masten, 2014). Within this field of research, relational factors such as the quality and capacities of family relations, community relations and relations at school or workplace are regarded as foundational to resilience in the face of traumatic stressors (Masten, 2021; Wille et al., 2008).

1.2 | Differences in resilience between civilian and military samples

Surprisingly, there have been limited studies that have examined whether there are differences in resilience between military and civilian individuals. The few studies that have compared the two groups have found inconsistent results (e.g., support: Sanborn et al., 2021—US psychological operations Army brigade to community college students; no support: Sohail & Ahmad, 2021—convenient samples of military personnel and civilians in Pakistan). There are some compelling reasons why military personnel might be more resilient such as personnel selection, military culture, unit cohesion, sense of control and agency during high stress events, and access to resilience training in the military (Jex et al., 2013). Yet it should also be noted that the strategies that protect the mental health of soldiers in war, may have different effects when individual return home and attempts to reintegrate to civilian life. Adler and Sowden (2018) have previously highlighted the shadow-side of military strategies to resilience, specifically the sometimes-disruptive effects on civilian functioning from ingrained military values meant to promote resilience in a war setting. Military organizations typically foster a culture that promote relational promotive factors (Adler et al., 2009). Hardship and challenges are shared and tackled by a cohesive peer group, and members of such groups usually report a strong sense of community and support from the peer group. This is a battle-proven tactic for generating resilience among troops enduring the hardship of serving in warzones (Castro et al., 2012). However, the tactics that

worked to protect troops in the trenches may not be the same that protect veterans from mental health problems when returning home to a peaceful western society. Despite its ability to mitigate the adverse effects of trauma exposure in a warzone, it is possible that overtly relying on emotional support in the occupational setting can end up being a dual edged sword, that "steals" attention and maintenance of family relations (Huffman et al., 2018; Paley et al., 2013).

Given the extreme nature of many warzone experiences, veterans often report reticence towards disclosing such experiences to people outside the military, even to close family and friends (Currier et al., 2013; Nordstrand et al., 2020). Moreover, veterans commonly report feeling alienated from civilian society because of both actual and expected negative reactions to their warzone experiences (Bolton et al., 2002; Phillips & Albanesi, 2022). Such findings may explain why colleagues could end up constituting the preferred source of relational support, however, this approach may not offer the most effective protection from mental health complaints after deployment (Geuzinge et al., 2020; Oshri et al., 2015).

Based on these larger issues associated with resilience within the military culture, it might be useful to ask two different (yet related) questions. First, does resilience look the same for military and civilian populations? Specifically, for the current study, do ACEs, mental health problems, social competence, family cohesion and social support at work, represent similar resilience profiles for civilians and military members? And second, does resilience differentially affect key outcomes for the two populations?

1.3 | Current study

In summarising the state of military resilience research and application, Sinclair and Britt (2013) describe the concept of equifinality which "highlights the idea that systems can reach the same particular end-state (e.g., high resilience) through a variety of pathways" (p. 242), and further suggest the need for research using person-centred methodologies in which we can distinguish people into distinct profiles. Our approach in this study was to use a categorical latent variable modelling (i.e., latent profile analysis (LPA) by taking advantage of multisystemic person-centred resilience-based research (Masten, 2011) to identify emergent subpopulations or distinct profiles underlying a population. Relatively homogenous subgroups of people may have different quantitative and qualitative configural profiles based on a set of attributes or variables. Within resilience research, these variables are usually risk factors (e.g., ACEs, and mental health problems) and promotive factors (e.g., social competence, family cohesion, and social support at work), by which resilience is inferred. These factors are theoretically related, yet also distinct enough to combine to form a mixture of distributions based on which different types of configural profiles emerge in analysis. Moreover, the selection of several of the promotive variables in the current study (i.e., relational factors), are highly malleable (Bjørly-khaug et al., 2022), thus appropriate for informing interventions. In organizational settings, while static promotive factors may inform the

selection of personnel for roles that are expected to entail particularly high job demands, the malleable factors can be shaped and influenced by ongoing work at individual and organizational levels.

We examined these factors in relation to three key military outcomes. We were guided by the Adler's (2013) note that "it is important to ensure that the outcomes selected make sense for the participating organizations" (p. 232), and similarly by the Adler and Castro's (2013) Occupational Mental Health Model since it provides "a framework for understanding the relationship between occupationally relevant demands and subsequent mental health adjustment, taking into account individual and organizational factors that can mitigate the impact of those demands" (p. 42). Based on this model we identified three commonly used outcomes that are germane to work function. The first two outcomes are related to one's perceptions of the workplace (perceptions of job demands, Brooks & Greenberg, 2018; perceptions of decision latitude, US Army, 1997) and the final is related to common reactions to work-stress (i.e., sleep difficulty; Wesensten & Balkin, 2013). All the occupational outcomes in the study are strongly associated with work-related functioning in high-risk occupations (Elgmark Andersson et al., 2017).

Recently, scholars have raised concerns that some elements that contribute to resilience may have "doubled edge sword" characteristics (Adler & Sowden, 2018). The implications of these concerns are that promotive factors which may bolster resilience in a given setting such as a warzone (e.g., the military values of "duty" and "selfless service"), do not have universal beneficial effects, and can even be detrimental outside of the military context. Accordingly, the current study aimed to identify and compare the resilience profiles of a large civilian cohort residing in Trøndelag, with those found in a cohort of military veterans who had served in Afghanistan inhabiting the same geographical region. This region of Norway is known for its high degree of socioeconomic homogeneity (Hjorthen et al., 2022; Krokstad et al., 2013). The assumption in this regard is that the military veterans likely have had to cultivate resilience relevant for managing warzone stressors (Jex et al., 2013). Accordingly, we expected the military resilience profiles to differ from those identified in the civilian cohort. In order to understand how resilience and constellations of specific risk and promotive factors might differ in a civilian and veteran sample, the goal of the current study was to answer the following research questions:

1. What are the profiles of resilience in a general population vs. a sample of veterans?
2. How do relevant outcome variables differ across profiles in the general population versus the veteran samples?

2 | METHOD

2.1 | Participants and procedure

Data for this study was based on the fourth wave of The Trøndelag Health Study (HUNT) (Åsvold et al., 2023), a Norwegian adult

population-based health survey including inhabitants from what was then Nord-Trøndelag (inhabitants ≥20 years, between August 2017–February 2019) and Sør-Trøndelag (inhabitants ≥18 years, October 2019). In the Sør-Trøndelag municipality, 247,823 inhabitants were invited and 105,967 (43%) responded whereas in the Nord-Trøndelag municipality, 103,798 were invited and 56,041 (54%) responded. Two thousand and eighty-eight participants had no data. The final total sample size in this study was therefore 162,008 (46% of invited population). The criteria used to be defined as "veteran" in the current study was being listed in the military health registry as having served at least one military deployment to Afghanistan during Norway's engagement in there (lasting from 2001 to 2020). To select the veteran subsample ($n = 386$; *Mean age* = 43.47; *SD* = 10.08; 9.8% females), we linked records from Norwegian military health registry and the HUNT data. Five participants had no data.

The remaining non-veteran respondents in the HUNT sample made up the general population ($n = 161,622$; *Mean age* = 53.02; *SD* = 17.80; 56.1% females) sample in the study. In the general population, four participants did not report their marital status while 82,010 (50.8%) were either unmarried, single, separated or divorced, and 79,487 (49.2%) were married. In the veteran sample, 196 (50.9%) were either unmarried, single, separated or divorced, and 189 (49.1%) were married. In terms of level of education, 81,919 (53.1%) in the general population had either elementary level, high school or vocational training while 33,819 (21.9%) had a bachelor's degree and 38,398 (24.9%) had postgraduate qualifications. In the veteran sample, 126 (34.1%) had either elementary level, high school or vocational training, 134 (36.2%) had a bachelor's degree, and 110 (29.7%) had postgraduate qualifications.

The HUNT Study is a collaboration between HUNT Research Centre, Trøndelag County Council, Central Norway Regional Health Authority, and the Norwegian Institute of Public Health. All respondents in the current study, gave their informed consent to utilise their data extracted from both the HUNT-4 database and Norwegian military health registry, as well as to link their data across health surveys/national health registers, such as in the current work.

2.2 | Measures

2.2.1 | Promotive factors

Social competence and family cohesion
Social competence and family cohesion were measured by three items each selected from the Resilience Scale for Adults (Friborg et al., 2003; Hjemdal et al., 2001). Social competence assesses ability to engage socially and create new friendships, feel at ease in social setting and being flexible in social interactions. Family cohesion assesses access to shared familial values, family loyalty, and mutual appreciation. With modifications, respondents rated each questionnaire item on a 5-point semantic differential scale format, ranging from "strongly agree" to "strongly disagree". Higher scores indicate higher levels of promotive factors of resilience. Social competence

and family cohesion have demonstrated acceptable psychometric properties (Cronbach's alpha, $\alpha = 0.83$ and 0.87, respectively) in previous studies (e.g., Friborg et al., 2003).

Social support at work
Social support at work was measured by three items selected from the Swedish Demand-Control-Support Questionnaire based on the Demand–Control Model (DCSQ; Johnson & Hall, 1988; Karasek, 1979; Sanne et al., 2005). The social support at work subscale (e.g., *"There is a good collegiality at work"*) evaluates the level of work-related social support and social relationship between an employee and other colleagues and is rated on a 4-point Likert scale, ranging from "strongly agree" to "strongly disagree." Higher scores indicate higher levels of social support at work. Cronbach's alpha in previous studies ranged from $\alpha = 0.81$ to 0.85 (Sanne et al., 2005).

2.2.2 | Risk factors

Adverse childhood experiences
The Difficult Childhood Questionnaire (DCQ; Vederhus et al., 2021) HUNT short version was used to measure questions related to ACEs. The DCQ comprises three non-intrusive items of subjective evaluations of childhood, and question about communication and conflict level in the family, as was a question about childhood trauma (e.g., *"Was there a lot of arguing, turmoil, conflicts, or poor communication in your childhood home?"*). The items were scored on a 5-point Likert scale, ranging from "not at all" to "very much," and higher scores represented greater perceived difficulties in childhood. One question, "When you think about your childhood, would you describe it as:" was scored on a 5-point Likert scale, ranging from "very good" to "very difficult". The DCQ scale has showed high internal consistency assessed by Cronbach's alpha ($\alpha = 0.86$) in previous study (Vederhus et al., 2021).

Mental health problems
Mental health problems were measure by the CONOR Mental Health Index (CONOR–MHI; Søgaard et al., 2003). The 7-item CONOR–MHI asks questions on various aspects of mental distress (e.g., *"In the last 2 weeks, have you felt: Nervous and restless?"*). Each question is rated on a 4-pont Likert scale, ranging from "no" to "very much." Higher scores indicate higher levels of distress related to mental health problems. Cronbach's alpha in previous study was $\alpha = 0.81$ (Søgaard et al., 2003).

2.2.3 | Outcome variables

Perceptions of job demands and decision latitude
The two factors—job demand and decision latitude—were measured by three items each selected from the Swedish Demand-Control-Support Questionnaire. The job demand subscale (e.g., *"Does your job require you to work very fast?"*) evaluates work stress-related

psychological pressure to achieve a task (e.g., time, effort, and speed required). The decision latitude subscale (e.g., "Do you have the possibility to decide for yourself how to carry out your work?") assesses the extent to which employees have control and the degree of the autonomy in making decisions about task execution. Both subscales are rated on a 4-point Likert scale, ranging from "often" to "never/ almost never." Higher scores indicate higher levels of control or decision latitude. Perceptions of job demands (Cronbach's alpha, $\alpha = 0.70$–0.75) and decision latitude (Cronbach's alpha, $\alpha = 0.71$–0.80) have demonstrated acceptable psychometric properties (Sanne et al., 2005).

Sleep difficulty

Sleep problems were measured by the three items in the Sleeping HUNT Questionnaire (Engstrøm et al., 2011), rated on a 3-point Likert scale, ranging from "never" to "at least three times a week" to questions such as "Had difficulty falling asleep at night". Higher scores indicate higher problems in sleeping. Reliability estimates in a previous study using kappa coefficient were acceptable ($\kappa \leq 0.51$) (Engstrøm et al., 2011).

2.3 | Statistical analyses

Data analyses were conducted in Mplus 8.7 (Muthén & Muthén, 1998-2021). To make use of all available data, full-information maximum likelihood was used with robust estimation (Maximum Likelihood with Robust Standard Errors) due to non-normality. Based on existing literature and theory, progressively larger numbers of latent profiles (one-to five-profile) solutions were explored to determine the optimal solution. To avoid convergence on local maxima solutions, the models were estimated using 5000

random sets of start values with 100 iterations and the 200 best solutions retained for final stage optimization. A variety of model fit statistics, substantive meaningfulness of the profiles, and their theoretical interpretability were analysed to determine the optimal solution. We examined fit statistics with classification accuracy so that average probability of belonging to the most likely profile should be high, and the average probability of belonging to the other profiles should be low. Model fit statistics included the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), sample-size adjusted BIC (ABIC), Vuong-Lo-Mendell-Rubin Likelihood Ration test (LMR-LRT), Lo-Mendell-Rubin Adjusted Likelihood Ratio test (ALMR-LRT) and the Bootstrapped Likelihood Ratio test (BLRT). The AIC, BIC and ABIC provide relative improvement in fit information when comparing models. The LMR-LRT, ALMR-LRT and BLRT compare different likelihood ratio tests that quantify the comparisons between the current model solution to a model solution with one fewer class. We sought a model with lower values for all criterion indices, but higher entropy values. Entropy values (0 = low, 1 = high) evaluate the accuracy of classification across the profiles. Model fit indices in combination with substantive meaningfulness of profiles, and theoretical interpretability guided the final model selection. Finally, relevant outcome variables were regressed on the latent profiles to determine how outcome variables differ across profiles in the general population, veterans, and matched samples. Mplus codes for analyses are publicly available at https://osf.io/24bkz/.

3 | RESULTS

Table 1 presents the means, standard deviations, reliability estimates and correlations for all variables in the study.

TABLE 1 Table of means, standard deviations, reliability estimates and correlations for all measures.

	General population			Veteran sample			1	2	3	4	5	6	7	8
	Mean	SD	α	Mean	SD	α								
1 Adverse childhood experiences	3.43	1.65	0.82	3.47	1.52	0.83	-	0.25**	0.26**	0.18	−0.03	0.18	0.07	−0.13
2 Mental health problems	18.76	7.46	0.96	20.15	7.54	0.97	0.29**	-	−0.10*	0.31*	0.07	0.06	−0.28*	−0.39**
3 Sleep difficulty	5.19	1.67	0.67	4.50	1.61	0.71	0.16**	−0.02**	-	0.12	−0.07	−0.01	−0.12	−0.06
4 Perceptions of job demand	8.58	1.96	0.73	8.61	1.88	0.72	0.05**	0.05**	0.07**	-	0.09	0.09	−0.00	0.09
5 Social support at work	9.95	1.71	0.85	10.30	1.27	0.77	−0.17**	−0.23**	−0.12**	−0.06**	-	−0.05	0.27*	0.02
6 Perceptions of decision latitude	9.40	1.92	0.70	9.92	1.83	0.76	−0.02**	−0.09**	−0.09**	0.05**	0.14**	-	−0.03	−0.03
7 Social competence	11.01	2.67	0.74	11.78	2.71	0.74	−0.13**	−0.28**	−0.13**	0.03**	0.21**	0.12**	-	0.22
8 Family cohesion	12.02	2.49	0.72	11.71	2.76	0.59	−0.32**	−0.29**	−0.13**	−0.01	0.23**	0.07**	0.29**	-

Note: Correlations for general population shown in the lower diagonal and veteran sample in the upper diagonal.

Abbreviations: SD, Standard deviation; α, Cronbach's alpha.

*$p < 0.05$; **$p < 0.001$

3.1 | Preliminary results

The general population were significantly older than the veteran sample with a mean age difference of 9.55 years, 95% confidence interval (CI) [8.54, 10.57], $t(390.75) = 18.55$, $p < 0.001$; Cohen's $d = 1.88$, 95% CI [1.64, 2.11]). Preliminary chi-square test of independence found significant associations between group (i.e., general population and veterans) with gender $\chi^2 (1) = 333.69$, $p < 0.001$, as well as with level of education $\chi^2 (2) = 63.01$, $p < 0.001$, but not marital status $\chi^2 (2) = 0.01$, $p = 0.990$. Figure 1 displays additional results from the chi-square test of independence.

3.2 | Identification of latent profiles

Across both groups (i.e., general population and veteran sample) the model with the 1-profile solution showed the largest AIC, BIC and ABIC values, indicating its fit was worst. For the veteran sample, the LMR LR test, ALMR LR test and BLRT in the 2-profile solution all had p-values <0.05, suggesting rejecting a single-profile solution in favour of at least two profiles. The LMR LR, ALMR LR tests and BLRT all supported a 3-profile solution, although the first two indices were only marginally significant. The four- and five-profile solutions in the veteran samples contained relatively fewer proportion of samples and were thus not favoured. For the general population, the LMR LR test, ALMR LR test and BLRT in the 2-profile solution all had p-values >0.05, suggesting rejecting the two-profile solution in favour of the one-profile solution. However, the three-, four- and five-profile solutions all had p-values <0.05. The five-profile solution contained relatively fewer proportion for two groups, making it unfavourable compared to the four-profile solution.

Thus, guided by theoretical interpretability, the class profile plot based on the estimated posterior probabilities and the best

performing BIC, we favoured a 3-profile solution whose BIC was lower than a 2-profile solution for the veteran sample, although the entropy value for the 2-profile solution was higher. Compared with the 4-profile solution, the 3-profile solution also showed easy-to-interpret profile plots (i.e., meaningful profiles) than a 4-profile solution, although the entropy values were comparable. The 3-profile solution, however, showed higher entropy value than the 5-profile solution. Similarly, we favoured a 4-profile solution whose AIC, BIC and ABIC were all lower than the 3-profile solution for the general population, although the entropy value for the 3-profile solution was higher. Thus, the three-profile solution in the veteran sample and the four-profile solution in the general population showed reasonable representations of the data and more parsimonious models were selected for the veteran sample and general population, respectively. Table 2 contains all model fit results.

3.3 | Interpretation of latent profiles

3.3.1 | General population

Profile one in the general population (30%) reported relatively greater levels of promotive factors (i.e., social competence, family cohesion and social support at work) and lower levels of risk factors (i.e., ACEs and mental health problems) and was thus labelled as *High resilience*. Profile two (4%) reported greater social support at work and social competence and was thus labelled *Work/social-based resilience*. Profile three (53%) was a mirror reflection of Profile one (i.e., *High resilience*), reporting greater risk factors and lower promotive factors. Therefore, this profile was labelled *Low resilience*. Profile four (13%) was somewhat dominated by lower ACEs, slightly high mental health problems and moderate levels of promotive factors and was thus designated as the *Moderate resilience* profile.
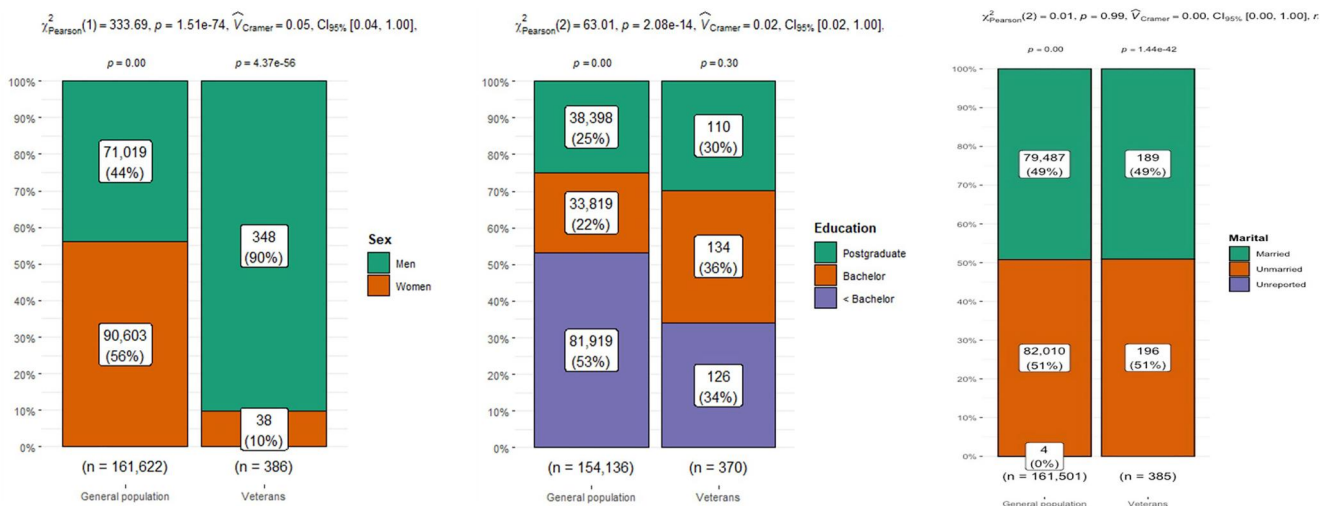

FIGURE 1 Results from chi-square test of independence.

TABLE 2 Model fit indices for latent profile analysis (LPA).

	AIC	BIC	ABIC	Entropy	LMR LR test p-values	ALMR LR test p-value	Sample proportion per class	Classification accuracy	BLRT p-value
1-Profile	1,798,305.489	1,798,405.289	1,798,373.509				159,534		
	3938.178	3977.606	3945.878				381		
2-Profiles	1,703,978.410	1,704,138.090	1,704,087.241	0.94	0.333	0.333	(99,685; 62%), (59,849; 38%)	0.98–0.98	0.000
	3626.192	3689.277	3638.512	0.97	0.000	0.000	(255; 67%), (126; 33%)	0.98–0.99	0.000
3-Profiles	1,685,434.655	1,685,654.216	1,685,584.299	0.90	0.000	0.000	(50,631; 32%), (96,662; 60%), (12,241; 8%)	0.79–0.97	0.000
	3558.758	3645.499	3575.697	0.94	0.051	0.055	(38; 10%), (105; 28%), (238; 62%)	0.88–0.99	0.000
4-Profiles	1,673,348.974	1,673,628.415	1,673,539.429	0.87	0.000	0.000	(47,888; 30%), (7061; 4%), (84,734; 53%), (19,851; 13%)	0.76–0.94	0.000
	3519.766	3630.165	3541.326	0.94	0.006	0.006	(95; 25%), (238; 62%), (36; 10%), (12; 3%)	0.87–0.99	0.000
5-Profiles	1,667,468.635	1,667,807.955	1,667,699.902	0.83	0.000	0.000	(41,965; 26%), (6487; 4%), (20,016; 13%), (11,633; 7%), (79,433; 50%)	0.69–0.95	0.000
	3502.549	3636.604	3528.728	0.91	0.044	0.046	(25; 6%), (92; 24%), (14; 4%), (37; 10%), (213; 56%)	0.87–0.99	0.000

Note: Results are presented first for the general population group (top), followed by the veteran sample (middle), and the matched sample (bottom) in rows.

Abbreviations: ABIC, Sample-size adjusted BIC; AIC, Akaike information criterion; ALMR LR, Lo-Mendell-Rubin Adjusted LRT Test; BIC, Bayesian information criterion; BLRT, Bootstrap likelihood ratio test; LMR LR, Vuong-Lo-Mendell-Rubin Likelihood Ratio Test;

3.3.2 | Veteran population

Profile one (10%) in the veteran sample reported relatively greater ACEs, close to average levels of mental health problems and very low levels of social competence, family cohesion and social support at work. This profile was labelled as *Hardy loners*, using this term broadly to index low scores on reported relational promotive factors, irrespective of personal motivations or aetiology, which are likely complex, heterogeneous, and in many cases related to deployment. Profile two (28%) in the veteran sample was dominated by family cohesion with relatively lower risk factors and was therefore labelled *Family-based resilience* profile. Profile three (62%) on the other hand, was dominated by social competence and social support at work. Therefore, this profile was labelled *Work/social-based resilience*. The *Family-based resilience* profile reported very low levels of social support at work whereas the *Work/social-based resilience* profile reported very low family cohesion. See Figure 2 for standardised plots of profiles in the general population and veteran sample.

3.4 | Differences in relevant outcome variables

The results from mean difference tests using the Bolck–Croon–Hagenaars (BCH) -method in Mplus are displayed in Table 3. This procedure conducts Wald tests to compare the mean levels of outcome variables across profiles and has been found to be robust even for non-normally distributed variables.

In the general population, although significant differences were found for the comparisons on levels of job demand such that, the *High resilience* profile reported lower job demand, followed by *Moderate resilience*, *Work/social-based resilience* and the *Low resilience* profile, which reported the highest level of job demand, there was no discernible effect ($\eta^2 = 0.00$). For decision latitude, there was a small effect ($\eta^2 = 0.01$) between factors, and the *High resilience* profile reported significantly higher levels than the *Work/social-based resilience* profile, who also reported significantly higher levels than the *Moderate resilience* profile, with the *Low resilience* profile reporting the lowest level of decision latitude. Finally, significant differences (with a small to medium effect, $\eta^2 = 0.03$), were found for all the comparisons on levels of sleep difficulty. The *High resilience* profile reported the lowest level of sleep difficulty, followed by *Low resilience*, *Work/social-based resilience* and then the *Moderate resilience* profile, which reported the highest level of sleep difficulty.

In the veteran sample, the *Hardy loners* reported significantly higher levels of sleep difficulty than both the *Family-based resilience* and *Work/social-based resilience* profiles (large effect, $\eta^2 = 0.11$). The *Work/social-based resilience* profile reported significantly higher job demand (medium effect, $\eta^2 = 0.06$) and decision latitude (small effect, $\eta^2 = 0.01$) than the *Family-based resilience* profile.
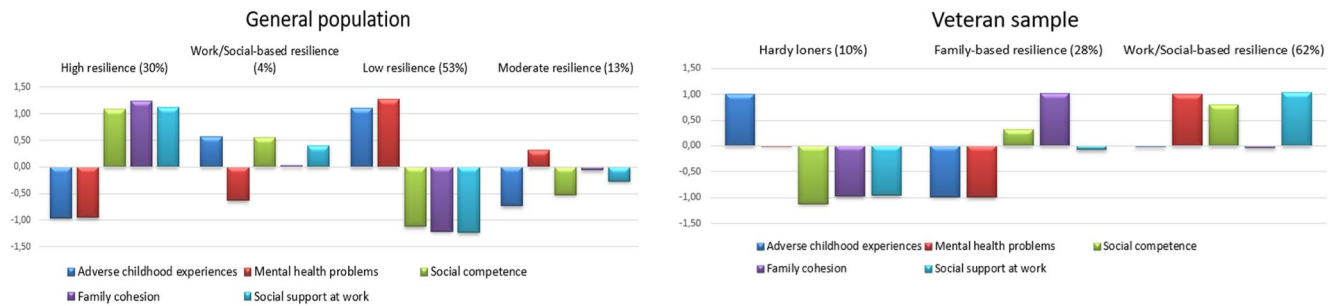
FIGURE 2 Characteristics of the general population and veteran sample latent profiles. The results were standardized to help in the interpretation of the histogram.

TABLE 3 Mean comparisons for outcomes across profiles for general population ($n = 159, 534$) and veteran sample ($n = 381$).

Outcomes	General population				Overall chi-square test	η^2 (CI)
	High resilience (30%) Mean (S.E)	Work/Social-based resilience (4%) Mean (S.E)	Low resilience (53%) Mean (S.E)	Moderate resilience (13%) Mean (S.E)		
Perceptions of job demand	2.85 (0.01)	2.93 (0.01)	3.07 (0.09)	2.93 (0.03)	57.28***[a,b,c]	0.00 [0.00, 0.00]
Perceptions of decision latitude	3.17 (0.01)	3.12 (0.01)	2.86 (0.09)	2.88 (0.03)	183.96***[a,b,c,d,e]	0.01 [0.01, 0.02]
Sleep difficulty	1.69 (0.03)	1.87 (0.01)	1.70 (0.00)	2.11 (0.01)	4947.42***[a,b,c,d,e,f]	0.03 [0.03, 0.03]
Veteran sample						
	Hardy loners (10%) Mean (S.E)	Family-based resilience (28%) Mean (S.E)	Work/Social-based resilience (62%) Mean (S.E)			
Perceptions of job demand	3.24 (0.18)	2.84 (0.08)	3.93 (0.0.09)		14.38**[i]	0.06 [0.00, 0.19]
Perceptions of decision latitude	3.69 (0.38)	3.29 (0.08)	3.67 (0.14)		22.03***[i]	0.01 [0.00, 0.09]
Sleep difficulty	2.13 (0.13)	1.45 (0.05)	1.43 (0.03)		24.29***[g,h]	0.11 [0.06, 0.17]

Note: Differences in outcomes for general population. Differences in outcomes for veteran sample.

Abbreviations: CI, confidence interval; η^2, Eta-squared.

[a]High resilience versus Work/Social-based resilience, $p < .001$.

[b]High resilience versus Low resilience, $p < .01$.

[c]High resilience versus Moderate resilience, $p < .001$.

[d]Work/Social-based resilience versus Low resilience, $p < .001$.

[e]Work/Social-based resilience versus Moderate resilience, $p < .001$.

[f]Low resilience versus Moderate resilience, $p < .001$.

[g]Hardy loners versus Family-based resilience, $p < .001$.

[h]Hardy loners versus Work/Social-based resilience, $p < .001$.

[i]Family-based resilience versus Work/Social-based resilience, $p < .05$.

4 | DISCUSSION

The current study applied a multisystemic person-centred approach to resilience and explored the resilience profiles of a large general sample in a socioeconomic homogeneous region of Norway. We also identified the resilience profiles of military veterans from the same region, all of whom had served in the Norwegian NATO-missions to Afghanistan. Resilience profiles were identified by using a LPA approach to analyse levels of childhood adversity, levels of anxiety and depression, as well as the promotive factors social competence, social support at work, and family cohesion. Three major findings were gleaned from our study: resilience profiles differed across samples, the samples display different constellations of the investigated risk and promotive factors, and resilience profiles are related to different outcomes depending on the sample.

4.1 | Distinct resilience profiles

First, despite some similarities, there were significant differences in the constellations of risk and promotive factors constituting the resilience profiles of the general population and of the veteran cohort. Analysis of the civilian sample revealed four distinct resilience profiles. Three of the profiles identified in the general population dovetail with classic resilience profiles identified by several previous studies (e.g., Wille et al., 2008; Janousch et al., 2022), as we found a *High resilience* profile (i.e., low risk and high promotive factors), a *Moderate resilience* (i.e., mixed factors: high risk [adverse childhood]/high promotive [social competence]), and a *Low resilience* profile (i.e., high risk and low promotive factors). In addition, we identified a fourth profile among the civilians characterised by low levels of ACEs and a pattern of social competence and social support from colleagues at work, but low levels of family cohesion. We labelled this profile *Work/social-based resilience.*

In contrast to the four-factor model in the civilian sample, the results supported a three-profile solution in the veteran sample. Only one of these profiles, the *Work/social-based resilience* profile had an equivalent in the general population. Unlike in the general population, however, the *Work/social-based resilience* profile in the veteran sample was associated with high levels of psychological distress. In contrast, a profile characterised by high levels of family cohesion and relatively low levels of social competence and social support at work seemed to offer the most protection in terms of mental health symptoms. This profile was labelled *Family-based resilience.* Finally, 10% of the veteran sample displayed a pattern of low levels on all the relational promotive factors, while still reporting only moderate levels of psychological distress. We labelled this resilience profile *Hardy loners.*

The differences (and similarities) in the types of resilience we see in each sample supports the notion that the warzone deployment in particular, and perhaps the military experience in general, likely prompted the development of distinct resilience patterns in the veterans. Mainly having supportive relations at work did not seem to constitute an adequate buffer in terms of reducing symptoms of depression and anxiety. Our findings suggest that family cohesion was the major promotive factor for resilient veterans, above and beyond social competence and co-worker support. This finding is congruent with the family resilience theoretical framework (Walsh, 2003), in that high family cohesion has been found to provide a positive context that is particularly effective at buffering the negative mental health outcomes associated with trauma. However, given that unit cohesion has been repeatedly shown to increase resilience among soldiers (e.g., Castro et al., 2012) it is still surprising that collegial emotional support did offer more protection against mental health complaints. Adler and Sowden (2018) contend that military values might promote a "war footing" type of resilience that may or may not be conducive to adjustment and health in a civilian setting. Following this line of thought, the results might thus reflect the context dependence of the protective effects provided by specific relational promotive factors. In short, unit cohesion might be

effective at reducing psychological distress during deployment, but when attempting to reintegrate into society after deployment it may not have the same efficacy in terms of promoting mental health.

Of note, a minority of the veteran sample constitute a resilience profile characterised by low levels of relational promotive factors. The family resilience framework (Walsh, 2003) may offer some insight on this group, identified in the *Hardy loners* resilience profile. Individuals constituting this profile report elevated levels of ACEs that may have led to negative experiences with seeking interpersonal support, and it is in line with previous research that such individuals report lower levels of relational promotive factors as adults (Patterson, 2002). Somewhat confounding, the *Hardy loners* concurrently report close to average levels of mental health complaints. This may, however, reflect the multisystemic nature of resilience. The current study only measured relational factors, but personal promotive factors such as hardiness and emotion regulation capacity are also major contributors to resilience. A military selection processes typically advantage individuals with high levels of personal promotive factors (Bartone et al., 2008), a finding also replicated previously in Norway (Hystad et al., 2011). Given this, it seems likely that a segment of our veteran sample may have particularly high levels of for example, hardiness (Bartone, 1999) or emotion regulation capacity (Troy & Mauss, 2011). Accordingly, the *Hardy loners* resilience profile may represent a group with sufficient levels of such personal promotive factors to enable a resilient response to military deployment, despite low levels of relational support. However, it should be noted that the current study only represents a cross sectional "snapshot" of the health status in the various groups identified by the analysis. It may be that over time the lack of relational resources will put the Hardy loners at risk of not being able to respond resiliently to future adversity, despite robust personal promotive factors.

4.2 | Occupational outcomes

Adler and Castro's (2013) Occupational Mental Health Model has been proposed as a framework for understanding the interplay between mental health, protective factors and work-related outcomes, particularly among personnel in high-risk occupations (e.g., Gottschall & Guérin, 2021; Elgmark Andersson et al., 2017). Modern military organizations, and in particular small and technologically advanced militaries such as the Norwegian Armed Forces, rely on highly qualified personnel not easily replaced (Asoni et al., 2022; Lindgren & Ofstad Presterud, 2021). Soldiers and officers are usually deployed to war zones several times throughout their career and may spend their entire working life accruing competence and thus value for the military organization. Sustaining good health and retaining the employed personnel is therefore of critical importance for today's military organizations. The current findings show, as expected, favourable job work related outcomes associated with the *High resilience* profile and the inverse associated with the *Low resilience* profile in the general population. In the veteran sample, however, the findings are more mixed. The *Hardy loners* profile was particularly

associated with sleep difficulties, the *Work/social-based resilience* with high perceived job demand and high decision latitude, while the *Family-based resilience* was associated low perceived job demand and low decision latitude. In other words, the profile with the least amount of mental health complaints report that their job has low demand, but they also perceive themselves as having less control over their work. In contrast the profile reporting the most mental health complaints perceive their job as highly demanding, but also as offering a high degree of autonomy and control. These findings could indicate that the people constituting the work/social-based resilience profile might to some degree be using work as an avoidance strategy, rather than as a health promotive way of reintegrating into civil society. Though the concept of workaholism is somewhat contested, there is solid evidence for people using work as a maladaptive coping strategy (Andreassen, 2014; Andreassen et al., 2012), often to the detriment of family cohesion and quality of life (Sirgy & Lee, 2018). Accordingly, this perspective might offer a partial accounting of the links found between the identified resilience profiles and the occupational outcomes in the study.

4.3 | Conclusions for theory and practise

The current results should engender caution in extrapolating resilience research findings from one specific population to another. Both the impact and constellation of different promotive factors, and probably risk factors, will likely be sensitive to cultural and contextual factors as well as the personal characteristics of any given cohort. Military cohorts are distinct from civilian cohort and will likely have cultivated strategies specific to the adversity of operating in a war zone. When developing interventions and prevention aimed at increasing the resilience of military personnel, our findings stress the importance of identifying patterns of resilience that accounts for the idiosyncrasies specific to this population, and the situation they are faced with. Congruent with previous findings, we show that family cohesion constitutes a potent relational promotive factor, also among military veterans. Importantly though, the family is not readily available as a support resource while deployed to a war zone, and in this setting, fellow soldiers will likely represent the most important relational promotive factor while deployed. After deployment, however, relying primarily on colleagues for emotional support might end up representing avoidance rather than a substantial resilience mainstay. This could disrupt relations to the people most readily available as a support resource, which highlights the importance of developing the capacity to flexibly shift between different sources of support and choose the most applicable given the current circumstances.

4.4 | Limitations and suggestions for future research

One of the strengths of the current study was the use of LPA, as it allowed us to identify latent subpopulations with different configural profiles within a general population and a veteran sample. Characterising emergent resilience subpopulations can contribute to the development and expansion of theoretical thinking regarding qualitative and quantitative variations in overcoming risk and adversity, that may generate fruitful hypotheses for future empirical work.

Yet even with this strength, several limitations to the current study should be noted. First, the cross-sectional design did not allow us to observe changes in the classes and explore the causal relationships between the identified resilience-profiles and mental health symptoms. Future longitudinal studies are required to further confirm whether the resilience-profiles we found in the current study can serve as predictors of mental health. Given the marked temporal variation in relational promotive factors (Taylor & Stanton, 2007), future longitudinal research should consider the ways that variations in psychosocial resources shape resilience over time. Resilience processes are heterogeneous and operate differently across time throughout the lifespan (Masten, 2014), as such, future studies should consider whether and how members of different resilience profiles transition or change over time and what factors may explain the transition of profile memberships among military populations. Resilience is conceptualised as both a process and an outcome of successful adaptation when facing significant adversity. Thus, future studies should aim to account for this by utilising analytic strategies that disaggregate between-person variation from within-person changes, so as to capture latent profile membership transitions over time as well as the within-person resilience change processes.

Second, the study was conducted in a large-scale survey data set, and not on anamnestic reports or diagnostic interviews. The presented results are based on short-form self-report measures. Findings are subject to the limitations of the participants' ability to self-evaluate retroactively. This is an inherent limitation to all survey-based studies, but it should be considered when interpreting the results.

Third, while this study examined multiple psychosocial resources deemed important in prior research, there are several other dimensions that were not included in this analysis. For example, we did not have information on the levels of personal promotive factors in our samples (e.g., hardiness or personality), and as discussed above, such factors could explain some of the findings the current study and deepen our understanding of the complex relationship between variables of interest (e.g., possible transactions between individual and environmental factors when accounting for the aetiology of social isolation). It would be useful to identify resilience profiles based on both relational and personal promotive factors, however, data on this was not available in the current project. The current study also does not control for the effect of employment status when identifying the profiles, which may have potentially contributed to the emergence of a Work/social-based resilience profile in the general population. Moreover, future studies should consider an expansive approach to outcomes indicating successful adaptations to adversity, as health not only represents the absence of disease, but also thriving.

Fourth, the current study does not include deployment experience variables. Future studies should examine deployment factors

such as number of times deployed, as well as deployment stressors and war zone trauma exposure. It would be interesting to compare differences on deployment versus in garrison samples. It could be that in-garrison samples benefit from certain resilience factors that may be absent for deployed samples who are often exposed to higher risk factors and thereby explain variations in resilience profiles. Given that one of the main differences between civilian and veteran cohorts is increased trauma exposure due to war zone stressor exposure (Brunet et al., 2015), service-related trauma exposure might be an important confounding variable not accounted for in the current study. However, the recently published Afghanistan survey 2020 (Departementene, 2020) found that during deployment, 92.5% of all Norwegian Afghanistan veterans were exposed to one or more incident that could constitute a criterion A event for post traumatic stress disorder. Accordingly, we can assume that most of the current veteran sample had been exposed to traumatic stress exposure while in Afghanistan, so that the sample is largely homogenous in terms of exposure—non-exposure to military trauma.

Fifth, the gender distribution was rather skewed in the veteran sample, as it included only 9.8% females. Veteran samples are typically heavily male biased, but the findings may not be fully generalisable to civilian populations or more gender-balanced populations. Of note though, recent studies argue that in some distinct cohorts, such as military populations, the impact of gender on resilience is modest (Hirani et al., 2016; Kelber et al., 2021).

Finally, the conceptualisation and measurement of resilience overall is quite diverse. In the current study we identified several different profiles emphasising relational promotive factors, moreover we did not include a general measure (e.g., I adapt well to major changes). Because of the wide range of theoretical perspectives on the phenomenon, we did not try do an exhaustive inclusion of the various components that make up the various conceptualizations of resilience. Thus, there may be important promotive factors not captured by our study.

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CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

DATA AVAILABILITY STATEMENT

Per current HUNT Research Center policy and ethical guidelines, data is not freely accessible to the public. Information on the application and conditions for data access is available at [www.ntnu.edu/hunt/data], or by contacting the authors directly.

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