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# Psychometric Properties of the Estonian Version of the Six-item Military Morale Instrument

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**Abstract:** Performance in a military setting is influenced more by the quality of human resources than by the amount of weapons or technology, usually described as military morale. This article aims to analyse the psychometric properties of the Estonian version of the six-item instrument referring to respondents' motivation and enthusiasm for accomplishing mission objectives. Confirmatory Factor Analysis, examining data from the Estonian Defence Forces (EDF), indicated that the six-item instrument functioned well at the individual level and was therefore recommended as a research and screening tool for the EDF.

**Keywords:** Military morale, burnout, work engagement, validation, Estonia

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## Introduction

According to various military publications, combat capability depends on three mutually related conceptual, moral, and physical components (UK Defence Doctrine, 2014, p. 25; Canadian Military Doctrine, 2009, p. 2-4; Eimers-van Nes, 2006). The first of these includes the principles of war fighting, doctrines, and conceptual thinking, and the third component incorporates all aspects of physical resources. The second aspect, the most interesting for social scientists, engages with the human factor: motivation of personnel, leadership, and management. Traditionally this factor has been characterized as morale, *esprit de corps,*[1] or *élan*[2], yet almost all authors consider it to be the soldier's motivation as a member of the group (Henderson, 1985).

Morale is a widely known construct in industrial, military, medical, and educational contexts, describing personal and group motivation or readiness to achieve some type of tasks or mission-related objectives (Britt & Dickinson, 2006; Fennell, 2014b; Manning, 1994; Motowidlo & Borman, 1977, 1978; Peterson *et al.*, 2008). Usually, morale includes elements of a positive psychological state of mind such as optimism, enthusiasm, satisfaction, or well-being (e.g. Gal, 1986; Kümmel, 1999; Manning, 1991; Peterson *et al.*, 2008, etc.) but also interrelated elements of a sense of common purpose, unit cohesion, or collective efficacy (Dyches *et al.*, 2017; Hardy, 2009; Peterson *et al.*, 2008). Morale is used to describe individuals and groups – more precisely, individuals aggregated in groups (Hardy, 2009; Kümmel, 1999; Peterson *et al.*, 2008). As Sirota *et al.* (2008) stated, morale (in a military context and elsewhere) has been considered an essential contributor to performance, characterising well-performing groups with motivated and self-efficient members.

Even though 'morale' as a term is widely used in different fields of academic literature, and the concept itself is important, especially for performance success (Manning, 1991; Sirota *et al.*, 2008), there is a shortage of empirical research on the

[1] Term to describe the soldier's feeling of being part of a unit (togetherness).
[2] French expression to describe a soldier's enthusiasm and inspiration to fight (will to fight).

construct (Britt & Dickinson, 2006, p. 158). One reason for a lack of literature might be that the construct itself has not always been well-defined (Fennell, 2014a) and has multiple meanings in the military context as well as elsewhere (Hardy, 2009, pp. 17-20). For instance, military morale is something like a personal mood or readiness and enthusiasm to sacrifice for some researchers, while for others it is something like well-being (Bowles *et al.*, 2017; van Boxmeer *et al.*, 2007). Moreover, conceptualisations of morale by military leaders have often been found unusable in academic research, as they are not supported by empirical data and are not connected with constructs established in academic literature (Britt *et al.*, 2007).

As any organisation, including a military force, aims at success and better and more effective performance, any factor contributing to this success should be considered important for study and improvement. Retention of personnel and their ability to act well under stressful conditions as in military service, not only in a combat situation, but also in the routine of 'acting in a manner required by an authority or institution' (Fennell, 2014b, p. 801), is considered essential in any contemporary institution. Although military personnel (for example, conscripts) may not necessarily face combat situations during their service, the need to ensure the personnel's well-being, assure a team's good performance, and avoid burnout are still essential for both operational and non-operational contexts (Ivey *et al.*, 2015; Peterson *et al.*, 2008; van t'Wout & Van Dyk, 2015).

Military morale has not yet been systematically researched in the EDF, although there have been some successful attempts to study it. For instance, Kasemaa (2008) used the self-constructed instrument, which did not demonstrate good psychometric properties; Parmak (2010) and Sõmer (2015) used the tool proposed by Boxmeer and colleagues (2007), which measures military morale through the work engagement and burnout; and Kasemaa & Säälik (2021) directly asked the individual level of morale. As a conclusion, this situation means EDF does not have an easily administrable tool to measure morale, monitor the well-being and motivation of service personnel, and provide the necessary feedback and guidance to military commanders in this matter. There are two principal options to solve this problem. The first option would be the creation of a new instrument. Such an

instrument should be based on scientific knowledge relevant to the topic and taking into account the Estonian military context. Another option would be to translate and adapt already existing instrument into Estonian language and cultural environment. Such an adaption would require the existence of such an instrument that is properly validated and psychometrically reliable. This article has taken the second option, as military morale itself is not viewed to be conceptually different across the cultures (Fennell, 2014b; Britt & Dickinson, 2006), which allows the use of already developed instruments. In addition, adapting an already existing measurement tool provides an opportunity to compare different samples, including cross-cultural ones. However, even the careful translation of instrument´s items into a different language does not guarantee proper psychometric stability across diverse socio-demographic groups (Furr, 2011, p. 5). Thus, a proper adaption process following the necessary steps (Furr, 2011) has to be followed in order to claim that the instrument works or does not work in one or another linguistic or cultural context. The letter would include, among other things, various socio-demographic groups in the EDF – most importantly those related with the conscription service.

Therefore, taking into account the reasoning above, a properly validated and easily administrable measurement tool of military morale, suitable for different EDF personnel categories, socio-demographic groups, and different contextual settings (for instance, the training environment) is vital for current research. Hence, the aim of our research is to adopt an existing instrument measuring military morale into the Estonian context, which will help the EDF to measure morale more adequately.

## A Theoretical Background of Military Morale

The concept of 'morale' goes back to the 18th century, referring to good conduct and confidence in a military context, while the term 'demoralization' was used for an activity that lowers the confidence of an opposing army (Peterson *et al.,* 2008). There have been several approaches and conceptual overviews published related to morale in military context (e.g., Britt & Dickinson, 2006; Britt *et al.*, 2007; Gal, 1986; Kümmel, 1999; Manning, 1991, 1994; Moskos, 1970; Motowidlo & Borman, 1977, 1978; Peterson *et al.*, 2008). Morale as a psychological state has been described in terms of energy and enthusiasm (e.g., Britt & Dickinson, 2006; Britt *et al.*, 2007,

2013; Cotton & Hart, 2003; Dyches *et al.*, 2017; Meyer *et al.*, 2009; Peterson *et al.*, 2008), either as an ascendant of morale or one characteristic of a group's morale but also as a consequence of a well-performing group's actions. Therefore, it could be concluded that energy and enthusiasm create the basis for group morale, which must be maintained and directed to achievement of a group's goals, and when goals are achieved well, this in turn nourishes the group's morale. Another frequent characteristic of morale proposed by several authors is psychological well-being (e.g. Gal, 1986; Manning, 1991, 1994; Kümmel, 1999; van Boxmeer *et al.*, 2007), but this aspect has also been criticized; as pointed out by Britt *et al.* (2007), it must be distinguished from an affect-based construct of emotional well-being and related to a more motivational and functional aspect (see also Fennell, 2014b).

There are also several personal factors either contributing to, characterising, or resulting from morale, such as self-efficacy, confidence, self-esteem, feeling of group cohesion, relatedness, *esprit de corps*, solidarity, shared beliefs, and convictions (Bijlevelt, 2005; Britt *et al.*, 2007; Cotton & Hart, 2003; Dyches *et al.*, 2017; Gal, 1986; Hardy, 2009; Kümmel, 1999; Maugen & Litz, 2006; Moskos, 1970; Peterson *et al.*, 2008; van't Wout & Van Dyk, 2015; Weakliem & Frenkel, 2006). These elements are obviously intertwined with the previously mentioned enthusiasm, well-being and satisfaction, but also with often emphasised persistence (Manning, 1991; van Boxmeer *et al.*, 2007), willingness (Fennell, 2014b; Maltby, 2012; van't Wout & Van Dyk, 2015) or motivation (Britt & Dickinson, 2006; Britt *et al.*, 2007; Fennell, 2014b; Kümmel, 1999; Motowidlo & Borman, 1977; Peterson *et al.*, 2008; van't Wout & Van Dyk, 2015).

Based on the discussion above, the current paper considers morale as a psychological construct, a variable that gives the service member energy directing the person towards more qualitative performance in stressful conditions, emphasising enthusiasm and persistence with which a member of a group engages in the prescribed activities of that group.

The question of whether morale is a concept related to an individual or a group could be disputed, but the current paper considers morale as a psychological state

of an individual that could be aggregated in a group and supported or reduced due to the group's psychological state, as proposed by Kümmel (1999). Therefore, it could be stated that morale can be measured on an individual level, but the combination and interaction of group members' characteristics, as well as the psychological situation created within and for the group, is what creates, and maintains or interrupts, group morale.

## Measurement of Morale

The most popular method for morale measurement in the military environment (as also elsewhere) has been the use of questionnaires. Morale is either measured directly by asking a simple question of 'what is your level of morale?', using the item 'my level of morale is good' (as in Bliese & Britt, 2001; Hart *et al.*, 2000; Maugen & Litz, 2006; Dyches *et. al.*, 2017), or on a group level by asking, 'what level is the morale in your platoon/company?' (Gal, 1986; Milgram *et al.*, 1989; Shumm *et al.*, 2003; Maugen & Litz, 2006). The positive side of asking such questions is that they are direct tools to measure the phenomena. However, there is also a negative side: the answers depend quite contingently on how individuals understand the concept of morale. Understandings can be different, so a single-item instrument measures an individual's real conceptualisation about the construct instead. Therefore, the question remains of how adequate the single-item instrument is (van Boxmeer *et al.*, 2008): construct validity might be high, but there are also constraints to using these instruments in statistical analysis, for instance in Confirmative Factor Analysis (CFA) (Diamantopoulos *et al.*, 2012), as well as the interpretation of results (Bliese & Britt, 2001). However, some authors (e.g., van Boxmeer et al., 2007; Whitesell & Owens, 2012) have used direct one-item measures for the validation of morale scales, while others have operated with multi-item questionnaires (Gresov *et al.*, 1989; Gal, 1986). One reason for this has been the wide use of factor analysis and structural equation modelling in analogous research, giving the possibility of statistical manipulation to interpret the results (for instance Britt *et al.*, 2007).

There are some attempts to measure military morale through multidimensional constructs (for example, Gal, 1986; van Boxmeer *et al.*, 2007), however, one short and easily administrable instrument was proposed by Britt & Dickinson (2006, p.

162). This instrument is based on a definition of military morale: 'a service member´s level of motivation and enthusiasm for achieving mission success'. According to this, military morale is a type of motivation, which is based on enthusiastic orientation toward an activity or entity which is related to the sense of purpose, meaning, and optimism. Therefore, this approach is separating morale from an emotional state of subjective well-being, positive affect, lack of depression, or job satisfaction (Britt *et al.*, 2007). Instead, this approach views morale as an energising construct, which supports a soldier´s efforts to adapt better to stressful conditions (Britt & Dickinson, 2006). However, morale should always be evaluated in a context, such as within a military operation, conscription, or professional service. Since its proposal, this six-item instrument has been used in several subsequent studies (Britt *et al.*, 2007; Britt *et al.*, 2013; Ivey *et al.*, 2015), demonstrating sufficient validity and reliability to be adapted into different cultural and linguistic context.

Based on the discussion above, we proposed the following hypotheses: 1) the short six-item measure of military morale (SMQ) is invariant across age, language, wave, profession, place of living, student status, and educational groups; 2) the SMQ measures individual level of military morale.

## Method

### Sample and Procedure

The data was collected from EDF service members, who participated in various studies concerning military morale (altogether, 7 studies). All these studies had the their own aims, however one common purpose of data collection was to compile a database that represents the different socio-demographic groups of the EDF and therefore allow to conduct an analysis of the psychometric properties of the 6-items morale instrument. This approach was used to avoid overburdening EDF personnel samples with separate survey participations.

Therefore, we merged data from seven independent studies, with a total sample of 987 Estonian service members, with mean age 22.98 (SD = 3.76), minimum 18

years old and maximum 45 years old. Among them, 955 participants were male and 10 were female (22 did not report their gender), 846 reported having Estonian as a mother tongue, 109 other languages, mostly Russian (we did not have this parameter for 32 participants). In terms of education, 132 participants had passed basic school, 713 had obtained secondary and 101 higher education, while 41 did not report their education, however among all of them, 92 participants had the status of student. 244 had lived most of their lives in the countryside, 161 in towns, and 249 in cities, yet we did not have this parameter for 333 respondents. By profession, 509 were conscript soldiers, 168 conscript leaders, and 310 professional soldiers, Non-Commissioned Officers (NCO), or officers. Additionally, the sample was divided between the phases of military training (wave): 91 participants were interviewed during their basic, 279 during their specialised, and 307 in their collective training; however for 310 professionals, the wave was not specified.

All questionnaires were administered in classrooms using a paper-pencil approach. After providing informed consent, participants filled out the questionnaires. Participation was voluntary, and all participants had the possibility to cease filling out the questionnaires at any point.

**Measures**

Military morale was measured using the six-item instrument proposed by Britt & Dickinson (2006) and used in several studies afterwards (Ivey *et al.*, 2015; Britt *et al.*, 2007 and 2013). Respondents were asked to assess their level of motivation, morale, energy, drive, enthusiasm, and eagerness using a five-point Likert-scale (from very low to very high). Originally this instrument was proposed for an operational context (Britt & Dickinson, 2006), however, we followed the recommendations by Britt et al. (2007 & 2013) and introduced it using the statement '... please think about your work objectives ...', so making it more suitable for a non-operational context as well. The items were translated into Estonian and back into English for the purpose of this study by a professional translator. Previous studies have found Cronbach's alphas between .89 and .93 (Britt *et al.*, 2007 & 2013; Ivey *et al.*, 2015).

For validation purposes, individual morale was assessed by one item ('my personal morale is ...'), collective morale by three items ('the morale of my fellow

soldiers/platoon/company is ...'), and summarised morale by four items (individual and collective) (taking example from Gal, 1986; van Boxmeer *et al.*, 2007). It was predicted that correlations between those items and morale instruments would assess the construct validity of the morale questionnaires. A similar single-item approach was used in several previous studies (for instance Whitesell & Owens, 2012; Gal, 1986; Dyches *et al.*, 2017). CFA for direct morale items ($DMQ_{sum}$) demonstrated acceptable fit of the data: $\chi^2(2) = 5.05$, $p = .080$, root mean square error of approximation (RMSEA) = .043, comparative fit index (CFI) = .998, standardized root mean residual (SRMR) = .028, and items $r^2$ was between .73 and .47.

**Strategy of Analyses**

The first round of analyses was focused on the issue of construct validity of the military morale instrument (van Boxmeer *et al.*, 2007). A series of CFAs were performed with the JASP 0.18.3, using a diagonally weighted least squares estimator, as ordinal variables included into the analyses were not normally distributed (Shapiro-Wilks test of normality, $p < .01$). These analyses were intended to answer the question of whether the internal structure of the analysed instrument is empirically stable and independent from directly measured military morale. Knowing this, we could state that the internal stability of the instrument is good.

We analysed a one factor model of SMQ (Short Morale Questionnaire by Britt & Dickinson, 2006) as the first model (M1), the second model (M2) included all SMQ and DMQ items (all together 10) as one factor, and the third model (M3) separated SMQ and DLQ items into different factors. The goodness of fit of the CFA models was judged via following fit indexes: the comparative fit index (CFI), Tucker Lewis index (TLI), root mean square error of approximation (RMSEA), and standardised root mean residual (SRMR). Additionally, chi square was reported. For TLI and CFI values $\geq .93$ were considered as acceptable fit (Hu & Bentler, 1999) and values $\leq .08$ were considered as acceptable for RMSEA and SRMR (Bentler & Bonett, 1980; Marsh *et al.*, 2004).

To claim that the instrument is empirically stable and having the comparable measurement properties across to the different socio-demographic groups, we used the concept of measurement invariance. In other words, the purpose of these analyses was to find out how well this instrument is used to measure military morale in different socio-demographic groups within the EDF. For this, we performed series of multi-group CFAs (diagonally weighted least squares estimator). We tested the configural, metric, and scalar factor variances of the model across the age, gender, mother tongue, place of living, student status, service wave, and position groups. The groups were selected having meaningful differences in military morale (Kasemaa & Säälik, 2021). Configural measurement invariance demonstrates whether the scale factor structure (for instance, the number of factors) is the same across groups. Metric measurement invariance demonstrates whether factor loadings are similar across the groups. Scalar measurement invariance shows whether the residuals are equivalent across compared groups. In order to make comparison between the fit of the models $\Delta\chi^2$ (Satorra & Bentler, 2001), ΔCFI, ΔRMSEA, ΔSRMR, and ECVI (expected cross validation index) were used. The change of -.01 in CFI (Cheung & Rensvold, 2002), -.015 in RMSEA, and -.030 in SRMR were used as cut-off criteria (Chen, 2007). For ECVI, a smaller value indicates a better model (Browne & Cudeck, 1993). Additionally, the pattern of factor loadings was evaluated, loadings ≥ .40 being considered as still meaningful (Stevens, 1992).

In order to propose meaningful arithmetic means and standard deviations for socio-demographic groups, we examined differences of military morale measured by SMQ and DMQ using the Kruskal-Wallis test. Additionally, we analysed the relations between SMQ and directly measured morale variables using Spearman correlations ($\varrho$).

## Results

### Descriptives and Correlations

Descriptive statistics of the SMQ items are presented in Table 1. The average values of the items were between 3.280 (SMQ-1) and 3.643 (SMQ-2). For the majority of items, there is a negative skewness (highest for item SMQ-2; -.692) and negative

kurtosis (highest for item SMQ-1; -.558), reflecting the tendency having average values in the direction of right (negative skewness) and low scores (negative kurtosis). As a general guideline, skewness and kurtosis values between -1 and +1 are assessed as excellent by Hair *et al.* (2022, p. 66).

**Table 1**: Descriptive statistics of the items of the Estonian versions of the SQM

| Item* | *M* | *SE* of *M* | *SD* | Median | Min | Max | Skew | *SE* of Skew | Kurtosis | *SE* of Kurtosis |
|---|---|---|---|---|---|---|---|---|---|---|
| SMQ-1 | 3.280 | .037 | 1.164 | 3 | 1 | 5 | -.477 | .078 | -.558 | .156 |
| SMQ-2 | 3.643 | .033 | 1.038 | 4 | 1 | 5 | -.692 | .078 | .100 | .156 |
| SMQ-3 | 3.492 | .033 | 1.050 | 4 | 1 | 5 | -.446 | .078 | -.299 | .156 |
| SMQ-4 | 3.537 | .032 | 1.006 | 4 | 1 | 5 | -.507 | .078 | -.069 | .156 |
| SMQ-5 | 3.353 | .034 | 1.082 | 3 | 1 | 5 | -.431 | .078 | -.381 | .156 |
| SMQ-6 | 3.459 | .034 | 1.067 | 4 | 1 | 5 | -.503 | .078 | -.237 | .156 |

*Notes.* n=981; SMQ – Short Morale Questionnaire; *M* – arithmetic mean; SE – standard error; * - the order of the items in the table follows the sequence of items in the questionnaire.

**Factorial Structure of the Estonian Version of the SMQ**

To assess internal validity of the SMQ, a one-factor CFA model was analysed (see Table 2). It demonstrated good fit of the data: $\chi^2(98) = 14.54$; RMSEA .025; CFI .999; TLI .99, and SRMR .033, factor loadings ($r^2$) were between .55 (item SMQ-2) and .78 (item SMQ-6). All loadings were statistically significant ($p < .001$). M2 (SMQ and DMQ items were designated into one single factor) did not meet the threshold criteria for RMSEA and SRMS, so this model was rejected. The next model (M3) specified SMQ and DMQ items into separate factors, however, taking into account proposed modifications, the model 4 (M4) specified $DMQ_{ind}$ into the SMQ. Nevertheless, both two factor models demonstrated satisfactory fit to the data, however they did not differ significantly from each other ($\Delta CFI < .01$; $\Delta RSMEA < .015$; $\Delta SRMR < .030$), factor loadings were ($r^2$) from .44 to .85 for M3, and from .54 to .75 for M4. Thus, we could conclude that individual morale (measured directly) loads equally into the SMQ and $DMQ_{sum}$.

**Table 2**: CFA for short morale (SMQ) and direct morale (DMQ) items.

| Model | $\chi^2$ ($p$) | $df$ | RMSEA [90% CI] | CFI | TLI | SRMR | ECVI |
|---|---|---|---|---|---|---|---|
| M1: One F model (SMQ) | 14.54 (.105) | 9 | .025[.000-.048] | .999 | .99 | .033 | .039 |
| M2: One F model (SMQ & DMQ) | 335.14 (<.001) | 35 | 103.[.093-.113] | .963 | .95 | .090 | .486 |
| M3: Two F model (SMQ & DMQ)[1] | 117.06 (<.001) | 34 | .055[.044-.066] | .990 | .99 | .053 | .220 |
| M4: Two F Model (SMQ & DMQ)[2] | 99.01 (<.001) | 34 | .048[.038-.060] | .992 | .99 | .050 | .198 |

*Notes.* n=981; RMSEA - root mean square error of approximation; CFI - comparative fit index; TLI - Tucker Lewis fit index; GFI – goodness of fit index; SRMR - standardized root mean square residual; ECVI - expected cross validation index. Method: Diagonally Weighted Least Squares; [1] - SMQ items and DMQ items were specified into separate factors; [2] – $DMQ_{md}$ was specified into SMQ.

Table 3 shows descriptive statistics, correlations ($\varrho$), and reliability of the morale instruments and their subscales. McDonald's $\omega$ was .92 for SMQ and .83 $DMQ_{col}$, being over the threshold >.70 (Furr & Bacharach, 2014, p. 111). SMQ was correlated with $DMQ_{ind}$ ($r$=.65) and $DMQ_{col}$ ($r$=.46), adding additional argument that SMQ measures rather individual level of morale.

**Table 3:** Descriptive statistics and correlations (Spearman´s *rho*) of morale instruments

| Variable | *m* | *SD* | *min* | *max* | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|
| 1. SMQ (6 items) | 3.46 | .90 | 1.00 | 5.00 | (.92) | | | |
| 2. $DMQ_{sum}$ (4 items) | 3.31 | .87 | 1.00 | 5.00 | .57* | (.84) | | |
| 3. $DMQ_{ind}$ (1 item) | 3.42 | 1.08 | 1.00 | 5.00 | .65* | .77* | (n/a) | |
| 4. $DMQ_{col}$ (3 items) | 3.28 | .93 | 1.00 | 5.00 | .46* | .95* | .58* | (.83) |

*Notes.* * - $p < .001$; n=981; $DMQ_{sum}$ - three collective morale items and one individual level item; $DMQ_{ind}$ - this variable consists of one item; $DMQ_{col}$ - this variable includes all three direct collective morale items; McDonald´s ω are in brackets.

In order to assess measurement invariance of the Estonian version of SMQ, a series of multi-group CFAs was conducted: across age groups (2), mother tongue (2), place of living (2), student status (2), education (3), profession (2), and wave (4). Results are presented in Table 4. Generally, models of configural, metric, and scalar invariance demonstrated good fit of the data and did not statistically differ from their predecessor models. All ΔCFI, ΔRSMEA, and ΔSRMR values were below the threshold (ΔCFI < .01; ΔRSMEA < .015; ΔSRMR < .030). Additionally, the $\Delta\chi^2$ test was not significant for all models. This means that the one-factor SMQ model is invariant across the age, language, wave, profession, place of living, student status, and educational groups and allows the comparison of military morale.

**Table 4:** The fit of the multi-group models of the one-factor model of the SMQ

| Sample | Model | $\chi^2(df)$ | $p$ | RMSEA [90% CI] | CFI | NNFI | SRMR | ECVI | $\Delta\chi^2$ (df) | ΔCFI | ΔRSMEA | ΔSRMR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | Configural | 15.73(18) | .612 | .000 [.000-.035] | 1.00 | 1.00 | .034 | .065 | - | - | - | - |
| | Metric | 19.15(23) | .693 | .000 [.000-.030] | 1.00 | 1.00 | .037 | .058 | 3.42(5) | .000 | .000 | .003 |
| | Scalar | 22.28(28) | .752 | .000 [.000-.025] | 1.00 | 1.00 | .035 | .076 | 3.13(5) | .000 | .000 | -.002 |
| Mother tongue | Configural | 15.54(18) | .625 | .000 [.000-.035] | 1.00 | 1.00 | .034 | .067 | - | - | - | - |
| | Metric | 19.62(23) | .665 | .000 [.000-.031] | 1.00 | 1.00 | .038 | .061 | 4.08(5) | .000 | .000 | .004 |
| | Scalar | 23.07(28) | .729 | .000 [.000-.027] | 1.00 | 1.00 | .035 | .076 | 3.45(5) | .000 | .000 | -.003 |
| Wave | Configural | 22.39(36) | .963 | .000 [.000-.000] | 1.00 | 1.00 | .039 | .121 | - | - | - | - |
| | Metric | 26.97(51) | .992 | .000 [.000-.000] | 1.00 | 1.00 | .045 | .098 | 4.58(15) | .000 | .000 | .006 |
| | Scalar | 45.47(66) | .975 | .000 [.000-.000] | 1.00 | 1.00 | .047 | .133 | 18.05(15) | .000 | .000 | .002 |
| Profession | Configural | 18.05(18) | .452 | .002 [.000-.040] | 1.00 | 1.00 | .035 | .068 | - | - | - | - |
| | Metric | 20.47(23) | .613 | .000 [.000-.032] | 1.00 | 1.00 | .038 | .060 | 2.42(5) | .000 | -.002 | .003 |
| | Scalar | 25.17(28) | .619 | .000 [.000-.030] | 1.00 | 1.00 | .036 | .079 | 4.70(5) | .000 | .000 | .002 |
| Place of living | Configural | 15.05(27) | .969 | .000 [.000-.000] | 1.00 | 1.00 | .041 | .135 | - | - | - | - |
| | Metric | 23.56(37) | .958 | .000 [.000-.000] | 1.00 | 1.00 | .052 | .118 | 8.51(10) | .000 | .000 | .011 |
| | Scalar | 26.87(47) | .992 | .000 [.000-.000] | 1.00 | 1.00 | .048 | .148 | 3.31(10) | .000 | .000 | -.004 |
| Student status | Configural | 9.01(18) | .958 | .000 [.000-.000] | 1.00 | 1.01 | .044 | .198 | - | - | - | - |
| | Metric | 11.76(23) | .974 | .000 [.000-.000] | 1.00 | 1.01 | .049 | .173 | 2.75(5) | .000 | .000 | .005 |
| | Scalar | 12.35(28) | .995 | .000 [.000-.000] | 1.00 | 1.01 | .044 | .223 | .59(5) | .000 | .000 | -.005 |
| Education | Configural | 14.61(27) | .975 | .000 [.000-.000] | 1.00 | 1.00 | .033 | .093 | - | - | - | - |
| | Metric | 20.94(37) | .984 | .000 [.000-.000] | 1.00 | 1.00 | .039 | .078 | 6.33(10) | .000 | .000 | .006 |
| | Scalar | 23.08(47) | .999 | .000 [.000-.000] | 1.00 | 1.00 | .036 | .097 | 2.14(10) | .000 | .000 | -.003 |

## Characteristics of the Estonian Versions of SMQ

Additional analysis was carried out on different socio-demographic groups (see Table 5). Series of Kruskal-Wallis nonparametric dispersion analyses were conducted, in which previously analysed SMQ and DMQ subscales were the dependent variables. The results demonstrated statistically significant differences ($p < .05$) between some socio-demographic groups. As general tendency, there was not remarkable differences between the SMQ and DMQ components. To summarise: 1) age differentiated SMQ and DMQ; 2) time of training (wave) made a difference across all analysed military morale subscales; 3) profession differentiated SMQ and DMQ. However, only profession ($\omega^2$ between .084 and .054) and time of training (wave) ($\omega^2$ between .131 and .074) demonstrated medium effect sizes (Tabachnick & Fidell, 2007, p. 55).

**Table 5:** Differences of military morale across various socio-demographic groups

| Group | *m*(*SD*) | | | |
|---|---|---|---|---|
| | SMQ | $DMQ_{ind}$ | $DMQ_{col}$ | $DMQ_{sum}$ |
| Age | $p<.05$; $\omega^{2=}.016$* | $p<.05$; $\omega^{2=}.013$* | $p<.05$; $\omega^{2=}.006$* | $p<.05$; $\omega^{2=}.013$* |
| Younger** (n=552) | 3.35(.94) | 3.31(1.14) | 3.21(.96) | 3.22(87) |
| Older (n=435) | 3.59(.84) | 3.56(.98) | 3.36(.88) | 3.42(.85) |
| Mother tongue | $p>.05$ | $p>.05$ | $p>.05$ | $p>.05$ |
| Estonian (n=843) | 3.47(.89) | 3.43(1.06) | 3.26(.92) | 3.30(.86) |
| Other (n=109) | 3.29(1.01) | 3.27(1.22) | 3.34(.97) | 3.30(.91) |
| Wave | $p<.05$; $\omega^2=.131$ | $p<.05$; $\omega^2=.090$ | $p<.05$; $\omega^2=.074$ | $p<.05$; $\omega^2=.100$ |
| Basic training (n=91) | 3.40(.76) | 3.54(.84) | 3.25(.90) | 3.40(.71) |

| | | | | |
|---|---|---|---|---|
| Spec. training (n=276) | 2.99(.97) | 2.96(1.21) | 2.98(.95) | 2.94(.88) |
| Collect. training (n=307) | 3.51(.88) | 3.43(1.01) | 3.20(.92) | 3.26(.87) |
| Other (n=310) | 3.85(.69) | 3.79(.91) | 3.63(.81) | 3.66(.76) |
| Profession | $p<.05$; $\omega^2=.084$ | $p<.05$; $\omega^2=.054$ | $p<.05$; $\omega^2=.065$ | $p<.05$; $\omega^2=.074$ |
| Conscripts (n=677) | 3.28(.94) | 3.25(1.10) | 3.11(.93) | 3.15(.87) |
| Professionals (n=310) | 3.85(.69) | 3.79(.91) | 3.63(.81) | 3.66(.76) |
| Place of living | $p>.05$ | $p>.05$ | $p>.05$ | $p>.05$ |
| Countryside (n=224) | 3.60(.82) | 3.55(.99) | 3.31(.90) | 3.80(.84) |
| Towns (n=161) | 3.56(.88) | 3.51(1.03) | 3.35(.89) | 3.41(.85) |
| Cities (n=249) | 3.53(.85) | 3.49(.99) | 3.31(.92) | 3.63(.87) |
| Student status | $p>.05$ | $p>.05$ | $p>.05$ | $p>.05$ |
| Student (n=92) | 3.45(.95) | 3.47(1.04) | 3.31(.90) | 3.36(.86) |
| Non-student (n=202) | 3.47(.84) | 3.43(.99) | 3.21(.91) | 3.28(.84) |
| Education | $p>.05$ | $p>.05$ | $p>.05$ | $p>.05$ |
| Basic (n=132) | 3.47(.93) | 3.35(1.09) | 3.29(.90) | 3.29(.84) |
| Secondary (n=713) | 3.47(.90) | 3.42(1.08) | 3.29(.93) | 3.32(.88) |
| Higher (n=101) | 3.38(.90) | 3.44(1.06) | 3.19(.92) | 3.28(.86) |
| Gender | p>.05 | p>.05 | p>.05 | p>.05 |
| Male (n=925) | 3.46(.90) | 3.42(1.07) | 3.29(.92) | 3.32(.87) |
| Female (n=10) | 3.75(.94) | 3.30(1.50) | 2.70(1.15) | 2.85(1.13) |

Notes. * - non significance ($p > .05$) or significance ($p <. 05$) of the dispersion analysis (Kruskal-Wallis), accompanied by effect size ($\omega^2$) if $p < .05$; ** - cut-off point was age of 21.43.

## Discussion

The aim of this study was to analyse the psychometric properties of the short six-item military morale questionnaire, which measures morale through motivation and enthusiasm, in order to offer a valid and reliable instrument in the Estonian language. For this purpose, we used a series of statistical analyses, which were meant to answer the questions how internally stabile and independent the six-item measurement tool is from directly measured military morale. Additionally, we used the concept of measurement invariance to assess the suitability of this instrument to measure morale across various socio-demographic groups relevant for the EDF. As a result, we calculated arithmetic means and standard deviations as a reference point for the subsequent studies using the same instrument.

The first hypothesis assumed the invariance of short six-item measure of military morale (SMQ) across socio-demographic groups. The socio-demographic indicators were selected in line with the results by Kasemaa & Säälik (2021), as they found those variables make meaningful differences to military morale. Different CFA models were analysed, and as a conclusion, this hypothesis was supported by the results: SMQ demonstrated invariance across age, language, wave, profession, place of living, student status, and educational groups. Therefore, this instrument could be used in Estonian language to measure military morale across various socio-demographic groups.

The second hypothesis proposed that SMQ measures the individual level of military morale. To get empirical support for this, we firstly used CFA procedure, which indicated that SMQ and DMQ items loaded into different factors. However, individual morale item from DMQ (*'what is your personal level of morale'*) loaded into both factors. Therefore, these results indicated that SMQ measures individual level of military morale instead. Additionally, the Spearman correlations were used, which

also gave support to the CFA results, because correlations between SMQ and individual level morale was remarkable higher compared to the collective level (section, platoon, or company) of morale. As a conclusion, this might be an indicator that SMQ is not suitable to assess collective energy and enthusiasm, which are needed to achieve mission objectives.

Despite some previous results (for instance Kasemaa & Säälik, 2021), the military morale, measured in both ways, via SMQ and DMQ, statistical difference was demonstrated only by age, profession, and time of the training groups. Nevertheless, we had only 10 females in our sample, therefore this particular calculation should be rechecked by more gender balanced research. In short, language, place of living, student status, and education did not make differences in military morale, measured by SMQ and DMQ. To compare this with results presented by Kasemaa & Säälik (2021), there are some differences. So, previous research used a sample that was based on conscripts from the EDF, and they also used logistic regression as an analysis method and found small, but still statistically significant effects of socio-demographic characteristics on individual and collective level of military morale. Therefore, leaving aside the difference in methods, we could argue that for professionals, education, mother tongue, student status, and place of living is not making difference in military morale. However, for the sample of conscripts, slightly different characteristics are playing the role and differences are in place. At the same time, our analysis supported the previous knowledge of the U-shape of the military morale (Bartone, 1989; Maugen & Litz, 2006).

## Conclusion, Limitation, and Further Directions

Performance success is not the only concern in the current military context, with much more attention now paid to the personnel's well-being to avoid burnout and dropout (Ivey *et al.*, 2015; Peterson *et al.*, 2008; van t'Wout & Van Dyk, 2015). Therefore, the better we can identify and screen the development of military morale over time and the factors that may predict, refer to, or reveal a person's expected characteristics that are presumed to support performance success, the less we need to handle or manage the related issues of personnel mental health problems or low

success rates due to low confidence, optimism, and enthusiasm, all of which impact on military morale.

As a result of our research, we can propose the instruments of morale for the EDF as a screening and also as a research tool. We are confident that the short six-item measure of morale (SMQ) is suitable for this purpose, especially if the military morale as positive and motivational construct is on focus.

However, we identified some limitations, which need to be considered when interpreting the results of this research. Firstly, as the current military morale instruments were tested in the Estonian military context, their use in other possible contexts needs prior research and validation. Additionally, because this article calculated group differences only to help to assess the suitability of the instruments for Estonian conditions, the exact cut-off points for all socio-demographic groups would be necessary to compute. This would allow an easier comparison of morale at the individual level and would facilitate the use of those instruments for monitoring purposes.

Finally, we suggest a fully longitudinal research design in order to find out how morale (measured using different instruments) might change during the service period. This question was previously discussed for instance by Bartone (1989) and Ivey, *et al.* (2015), although there might be differences between professional, voluntary, and conscripted soldiers. The general assumption could be that military morale will increase as the time people are together grows longer. There may also be dissimilarities in how morale is enhanced in different organisations.

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