Engagement DEOCS 4.1
Construct Validity Summary

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DEOMI PRESS

Technical Report #13-18

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Background

In 2014, DEOMI released DEOCS 4.0 for Department of Defense military and civilian members. DEOMI initiated development of DEOCS 4.1 in May 2016. This effort includes various updates to improve climate factors and individual items on the DEOCS. The following details the work done to add an engagement factor to DEOCS 4.1 to enhance the breadth of the survey. Included is a review of the literature and the proposed items for addition to the DEOCS.

Creating the engagement factor involved (1) reviewing the civilian and military engagement literature; (2) adapting the construct definition proposed by Schaufeli, Salanova, Gonzalez-Roma, and Bakker (2002) to be applicable to both the military and civilian population within the DoD; (3) writing new items and adapting items from established scales to fit the DoD population; (4) piloting items on the DEOCS; (5) examining the descriptive statistics and bivariate correlations among items, (6) selecting items that demonstrate strong scale properties; (7) piloting the three selected items on a second sample, and (8) reporting the descriptive statistics, exploratory factor analysis, and aggregation statistics of the proposed three item scale.

Literature Review

In the past several years, engagement has become an increasingly popular construct in industry and research. Indeed, management literature suggests employee engagement is the key to an organization's success (Saks & Gruman, 2014). Specifically, engagement is suggested to be positively related to important job attitudes such as job satisfaction, organizational commitment, and job involvement, as well as increased employee performance (Christian, Garza, & Slaughter, 2011). Thus, engagement is considered an important construct to examine for the assessment of command climates.

Although there have been various definitions of engagement (Saks & Gruman, 2014; Kahn, 1990; Maslach, Schaufeli, & Leiter, 2001), Schaufeli et al.'s (2002) widely accepted research defines it as a "positive, fulfilling, work related state of mind that is characterized by vigor, dedication, and absorption" (p. 74). Within that body of work, vigor is described as "high levels of energy and mental resilience while working", dedication refers to "a sense of significance, enthusiasm, inspiration, pride, and challenge" in the work role, and absorption refers to "being fully concentrated and deeply engrossed in one's work" (p. 74). Shaufeli and colleague's definition was drawn upon to inform the creation of a definition and measure of engagement that was then adapted using subject matter expert (SME)[1] input to create a final definition that is compatible with the DoD population.

While engagement is often operationalized using items that assess subcomponents of the construct (e.g., vigor, dedication, and absorption,) the subcomponents have been found to be closely related (Schaufeli et al., 2002; Schaufeli, Bakker, & Salanova, 2006); thus, a unidimensional measure of engagement may be acceptable (Schaufeli et al., 2006). In support of a unidimensional measure, Sonnentag (2003) failed to find evidence for the three factor structure

[1] SMEs included four retired military members representing different services and a variety of ranks.

and suggests a unidimensional model for measuring engagement. Additionally, one aim of DEOCS 4.1 is to reduce survey burden and a unidimensional measure of engagement is expected to require fewer items than creating a three-dimensional measure, such as Schaufeli and colleagues' (2002) Utrecht Work Engagement Scale. Finally, the intent of DEOCS 4.1 is to provide a heuristic or snapshot of important factors; thus, although a three-dimensional measure may be more comprehensive, a unidimensional measure is expected to be sufficient to gain a preliminary understanding of unit engagement.[2] Therefore, conceptualizing and measuring engagement as a unidimensional construct was expected to be consistent with previous research and meet the practical needs for the current effort.

Ultimately, the DEOCS 4.1 engagement measure is intended to be a unidimensional measure that assesses an individual's current level of engagement[3] for both the military and civilian populations. Research suggests the Schaufeli and colleagues' (2002) conceptualization of engagement is indeed appropriate military (Breevaart, Bakker, Hetland, Demerouti, Olsen & Espevik, 2014) and civilian populations. The factor definition of engagement from the literature and has been adapted through SME input to fit the needs of the DoD population. Thus, the following definition, which served as the basis for the DEOCS 4.1 engagement measure, was established: *Engagement refers to a persistent, positive, and fulfilling state of mind characterized by mental resilience, dedication, and immersion in the work role.*

Overview of studies

Two studies were conducted to develop and test engagement items within the DoD population. Study 1 provided the researchers with an understanding of engagement in the military context and involved item development, item analysis, and item reduction. The data was broken out into military and civilian populations and initially analyzed separately. The results were similar and thus the entire sample was analyzed as one and those analyses are reported. The purpose of Study 2 was to assess the statistical properties of the final scale in a second sample after the items were reduced and refined.

Study 1 – Item Development

Established items from Schaufeli and colleagues' (2002) engagement scale were selected and modified by research analysts to fit within the military context. The Schaufeli and colleagues' items were chosen as they tap into employees' level of engagement (Shaufeli et al., 2002), rather than the environment that promotes engagement thus addressing the proper referent. The items chosen were favored based on how well they adhered to and fully covered the DEOCS 4.1 definition of engagement, as judged by research analysts. Subject matter experts reviewed and agreed upon the relevancy of the items prior to collecting data. This yielded a total of 15 items (See Table 1).

[2] A more comprehensive measure of engagement can be achieved via additional items in the form of locally developed questions. These locally developed questions provide a section in which the commander can choose specific questions to tap into areas of particular interest.

[3] While there are existing measures of engagement that target the federal civilian population, they contain questions that measure an environment that promotes engagement.

Table 1.
Study 1 Engagement Items

Item
1. When I get up in the morning, I feel like going to work.
2. At my job I always persevere, even when things do not go well.
3. I can continue working for very long periods at a time.
4. At my job, I am very mentally resilient.
5. My work is challenging to me.
6. My work inspires me.
7. I am enthusiastic about my work.
8. I am proud of the work that I do.
9. I find the work that I do full of meaning and purpose.
10. When I am working, I forget everything else around me.
11. Time flies when I am working.
12. I get carried away when I am working.
13. It is difficult to detach myself from my work.
14. I am immersed in my work.
15. I feel happy when I am working intensely.

Data Analysis

Data Analysis Strategy

In an effort to reduce survey fatigue, the goal of data analysis was to reduce the scale while still covering the definition and ensuring the scale displayed strong scale properties. This process involved eight steps across the two studies. Those steps are outlined below:

A. Study 1

1. Reduce the number of items by taking into account the items consistency with the factor definition
2. Conduct a reliability analysis to assess scale properties
3. Determine the factor structure of the reduced scale via exploratory factor analysis
4. Reduce the number of items based on inter-item correlations
5. Obtain SME input on the appropriateness of the selected items

B. Study 2

1. Conduct a reliability analysis to assess scale properties of the final scale
2. Determine the factor structure of the final scale
3. Determine if it is appropriate to aggregate the engagement factor to the unit-level

Study 1

Study 1 Demographics

This section contains the demographic characteristics of the initial sample, which tested 15 items (n = 4,952) and was collected from 17 August 2016 through 22 August 2016. The results displayed are based on individual respondents' selections (i.e., self-report), with the exception of branch of service, which is reported by the survey administrator. The personnel classifications of this sample are as follows: 36% Army (n = 1,793), 31% Navy (n = 1,556), 14% Marine Corps (n = 707), 7% Air Force (n = 344), <1.0% Coast Guard (n = 47), and 8% National Guard (n = 415).

The majority of respondents within this sample are male (*n* = 3,906; 79%). For further information regarding the composition of the sample, refer to Table 2.

Table 2.
Study 1 Sample Demographics of Engagement Items Piloted on DEOCS

	n	%
Branch of Service		
Army	1,793	36.2%
Navy	1,556	31.4%
Marine Corps	707	14.3%
Air Force	344	6.9%
Coast Guard	47	<1.0%
National Guard	415	8.4%
Component		
Active Duty	2,754	83.1%
Reserve	561	16.9%
Employment Type		
Military	3,736	75.4%
Civilian	1,120	22.6%
Gender		
Male	3,906	78.9%
Female	1,046	21.1%
Seniority		
Junior Enlisted (E1 – E3)	823	22.0%
Non-Commissioned Officer (E4 – E6)	1,956	52.4%
Senior Non-Commissioned Officer (E7 – E9)	385	10.3%
Junior Officer (O1 – O3)	361	9.7%
Senior Officer (O4 and above)	211	5.6%

Study 1 Item Level Descriptive Statistics

This section displays the descriptive statistics for the initial 15 engagement piloted items. All items were measured on a seven-point scale from *strongly disagree* to *strongly agree*. All items had a range of 1 to 7. For item descriptive statistics refer to Table 3.

Table 3.
Study 1 Sample Descriptive Statistics of Engagement Items Piloted on DEOCS

Item	Mean	SD	Skewness	Kurtosis
1. When I get up in the morning, I feel like going to work.	4.55	2.04	-0.53	-1.12
2. At my job I always persevere, even when things do not go well.	5.70	1.38	-1.56	2.49
3. I can continue working for very long periods at a time.	5.56	1.49	-1.36	1.38
4. At my job, I am very mentally resilient.	5.60	1.38	-1.37	1.69
5. My work is challenging to me.	4.84	1.72	-0.74	-0.37
6. My work inspires me.	4.77	1.88	-0.68	-0.68

7. I am enthusiastic about my work.	4.99	1.83	-0.86	-0.35
8. I am proud of the work that I do.	5.60	1.60	-1.41	1.32
9. I find the work that I do full of meaning and purpose.	5.16	1.78	-0.99	-0.02
10. When I am working, I forget everything else around me.	4.05	1.72	-0.07	-0.91
11. Time flies when I am working.	4.98	1.75	-0.84	-0.23
12. I get carried away when I am working.	4.28	1.62	-0.26	-0.65
13. It is difficult to detach myself from my work.	3.73	1.83	0.14	-1.08
14. I am immersed in my work.	4.48	1.67	-0.41	-0.64
15. I feel happy when I am working intensely.	4.79	1.67	-0.69	-0.25

Note: n = 4,952. The Std. Error for Skewness is .04 and Kurtosis is .07 for the scale.

Study 1 Item Reduction

After examining the descriptive statistics and reevaluating each item's content, items 1, 3, and 5 were eliminated from the scale as they did not adhere as closely to the factor definition as the remaining items. Items 2 and 15 were eliminated due to their conceptual overlap with items 4 and 11. After items 1, 2, 3, 5, and 15 were eliminated, a reliability analysis and exploratory factor analysis were conducted to further reduce the items. Item 13 was removed as it weakened the reliability of the scale (See Table 4). After reliability analysis was performed, an exploratory factor analysis was utilized.

Exploratory factor analysis (EFA) is a tool for consolidating the number of measured variables into a fewer number of factors (Tabachnick & Fidell, 1996). Prior to analyses, the data was tested for normality using the Kolmogotov-Smirnov statistic; the test was significant, indicating non-normality.

Fabrigar, Wegener, MacCallum, and Strahan (1999) suggest utilizing principal factor methods if data violates the assumption of normality. Costello and Osborne (2005) recommend utilizing oblique rotation (which assumes correlations among factors) over orthogonal rotation (which does not recognize the correlation between factors) because it more accurately depicts the relationship between variables. Based on these recommendations, EFA was conducted using principal axis factoring with an oblique rotation, specifically direct oblim rotation.

The Bartlett Test of Sphericity (BTS) and the Kaiser Meyer-Olkin (KMO) measures were examined to assess the fit between the data and the factor. The BTS hypothesizes that the correlation matrix is an identity matrix. The BTS was significant (χ^2 (36) = 27,008.33; p <.01), therefore allowing us to reject the null hypothesis that the correlation matrix is an identity and to conclude that the factor analysis is an appropriate method to utilize for this data (George & Mallery, 2006). The KMO measure of sampling adequacy was also employed to compare the sum of the squared correlation coefficients and the squared partial correlation coefficients. The obtained statistic was .90. This indicates an adequate fit and suggests that a factor analysis is an appropriate statistical method to utilize for analyzing this data.

Bennet and Robinson (2000) suggest factor loading must reach or exceed .4 for retention, and the factor loadings should have a difference greater than .1. Following Bennet and Robinson's (2000) criteria, a factor loading of .4 was set as the minimum cutoff for items to be retained. All items met this initial criteria; however items 10 and 12 cross loaded, with a factor loading difference less than .1 and were eliminated.

In order to fully and succinctly measure engagement, bivariate correlations were assessed to identify excessive overlap. Items 6, 7, 8, and 9 all displayed strong correlations suggesting overlap (See Table 5). Items 6, 8, and 9 were eliminated and item 7 was retained based on its adherence to the factor definition. This left items 4, 7, 11, and 14. A group of SMEs were given the items for a final review. The SMEs were asked to review (a) the applicability of the selected items to the military, (b) whether the items reflected the definition of engagement, and (c) applicability of the items to varying levels and ranks. There was unanimous agreement that items 4, 7 and 11 were interpretable and applicable to both the military and civilian populations with minor rewording. Subject matter experts agreed that Item 11 should be removed because the reading level might not be appropriate for some levels of the military and civilian population. The final items retained were 4, 7, and 11 based on their adherence to the theoretical definition, subject matter expert recommendations, and their statistical properties.

Table 4.
Study 1 Reliability Analysis of Engagement Items Piloted on DEOCS

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1. When I get up in the morning, I feel like going to work.	246.98	.69	.60	.91
2. At my job I always persevere, even when things do not go well.	268.05	.57	.50	.91
3. I can continue working for very long periods at a time.	266.49	.55	.47	.91
4. At my job, I am very mentally resilient.	267.72	.57	.52	.91
5. My work is challenging to me.	265.33	.49	.28	.91
6. My work inspires me.	245.05	.80	.80	.90
7. I am enthusiastic about my work.	245.19	.81	.81	.90
8. I am proud of the work that I do.	254.64	.75	.67	.90
9. I find the work that I do full of meaning and purpose.	249.13	.77	.73	.90
10. When I am working, I forget everything else around me.	265.65	.48	.34	.91
11. Time flies when I am working.	253.99	.69	.52	.91
12. I get carried away when I am working.	264.40	.54	.42	.91
13. It is difficult to detach myself from my work.	272.49	.32	.38	.92
14. I am immersed in my work.	261.08	.58	.50	.91
15. I feel happy when I am working intensely.	257.96	.65	.45	.91

Note: scale level α = .91.

Table 5.
Study 1 Inter-item Correlations of Engagement Items Piloted on DEOCS

	1	2	3	4	5	6	7	8.	9	10	11	12	13	14
1. When I get up in the morning, I feel like going to work.														
2. At my job I always persevere, even when things do not go well.	.464**													
3. I can continue working for very long periods at a time.	.409**	.574**												
4. At my job, I am very mentally resilient.	.478**	.615**	.613**											
5. My work is challenging to me.	.354**	.294**	.242**	.290**										
6. My work inspires me.	.715**	.429**	.400**	.458**	.475**									
7. I am enthusiastic about my work.	.734**	.473**	.442**	.503**	.444**	.864**								
8. I am proud of the work that I do.	.592**	.533**	.461**	.504**	.400**	.712**	.747**							
9. I find the work that I do full of meaning and purpose.	.655**	.455**	.404**	.458**	.428**	.798**	.791**	.762**						
10. When I am working, I forget everything else around me.	.275**	.210**	.222**	.210**	.268**	.348**	.345**	.305**	.340**					
11. Time flies when I am working.	.535**	.395**	.393**	.399**	.326**	.589**	.581**	.542**	.570**	.458**				
12. I get carried away when I am working.	.309**	.225**	.268**	.234**	.301**	.390**	.390**	.345**	.367**	.507**	.505**			
13. It is difficult to detach myself from my work.	.117**	.090**	.152**	.057**	.211**	.197**	.191**	.163**	.181**	.351**	.231**	.410**		
14. I am immersed in my work.	.325**	.290**	.326**	.270**	.349**	.420**	.429**	.399**	.393**	.397**	.434**	.470**	.571**	
15. I feel happy when I am working intensely.	.512**	.412**	.434**	.419**	.255**	.545**	.564**	.513**	.507**	.352**	.511**	.385**	.234**	.450**

Study 2

Study 2 Demographics

Following Study 1, descriptive statistics, reliability analysis, factor analysis, and aggregation statistics were examined on the reduced scale (See Table 6) in Study 2 using a second sample. Study 2 was required as item 4 (now item 1) was reworded to adhere to suggestions made by subject matter experts. "Job" was replaced with "workplace" and the word "very" was removed resulting in the following item: At my workplace, I am mentally resilient.

This section contains the demographic characteristics of the Study 2 (n = 6,163), collected from 1 September 2016 through 9 September 2016 that tested the reduced scale (See Table 6). The variables are displayed according to the individual respondents' selections (except for branch of service, which is reported by the survey administrator). The personnel classifications of this sample are as follows: 32% Army (n = 2,327), 37% Navy (n = 2,255), 8% Marine Corps (n = 503), 8% Air Force (n = 482), <1.0% Coast Guard (n = 12), and 3% National Guard (n = 191). The majority of respondents within this sample are male (n = 4,790; 78%). For further information regarding the composition of the sample, refer to Table 7.

Table 6.
Final Engagement Items Piloted on DEOCS

Item
1. At my workplace, I am mentally resilient.
2. I am enthusiastic about my work.
3. Time flies when I am working.

Table 7.
Study 2 Demographics of Engagement Items Piloted on DEOCS

	n	%
Branch of Service		
Army	2,327	37.8%
Navy	2,255	36.6%
Marine Corps	503	8.2%
Air Force	482	7.8%
Coast Guard	12	<1.0%
National Guard	191	3.1%
Component		
Active Duty	3,913	92.5%
Reserve	317	7.5%
Employment Type		
Military	4,547	76.2%
Civilian	1,421	23.8%
Gender		
Male	4,790	77.7%

	n	%
Female	1,373	22.3%
Seniority		
Junior Enlisted (E1 – E3)	837	18.4%
Non-Commissioned Officer (E4 – E6)	2,398	52.7%
Senior Non-Commissioned Officer (E7 – E9)	538	11.8%
Junior Officer (O1 – O3)	450	9.9%
Senior Officer (O4 and above)	324	7.1%

Study 2 Item Level Descriptive Statistics and Reliability

This section displays descriptive statistics for the three engagement items tested. All items were measured on a seven-point scale from *strongly disagree* to *strongly agree***.** All reliability analyses were conducted using Cronbach's Alpha. The reliability coefficient was adequate α = .82 (Nunnally, 1978). For more information on the items descriptive statistics or the reliability refer to Table 8 and Table 9.

Table 8.
Study 2 Descriptive Statistics of Prospective Engagement Items Piloted on DEOCS

Item	Mean	SD	Skewness	Kurtosis
At my workplace, I am mentally resilient.	5.42	1.61	-1.22	.83
I am enthusiastic about my work.	5.02	1.88	-.86	-.43
Time flies when I am working.	5.08	1.84	-.87	-.32

Note: n = 6,163. The Std. Error for Skewness is .03 and Kurtosis is .06 for the scale.

Table 9.
Study 2 Reliability Analysis of Prospective Engagement Items Piloted on DEOCS

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
At my workplace, I am mentally resilient.	10.10	11.75	.61	.82
I am enthusiastic about my work.	10.50	8.98	.76	.67
Time flies when I am working.	10.45	9.81	.68	.75

Note: scale level α = .82.

Study 2 Exploratory Factor Analysis

Prior to analyses, the data was tested for normality using the Kolmogotov-Smirnov statistic; the test was significant, indicating non-normality. The procedure follows that outlined in ***Study 1 Item Reduction*** section, with a principal axis factoring strategy and a direct oblim rotation implemented.

The Bartlett Test of Sphericity (BTS) and the Kaiser Meyer-Olkin (KMO) measures were examined to assess the fit between the data and the factor. The BTS hypothesizes that the correlation matrix is an identity matrix. The BTS was significant ($\chi^2(3) = 7{,}126.76$; $p < .01$), therefore allowing us to reject the null hypothesis that the correlation matrix is an identity and to conclude that the factor analysis is an appropriate method to utilize for this data (George & Mallery, 2006). The KMO measure of sampling adequacy was also employed to compare the sum of the squared correlation coefficients and the squared partial correlation coefficients.

Kaiser (1974) suggests KMO values greater than .5 should be deemed acceptable. The obtained statistic was .68. This indicates an acceptable fit and suggests that a factor analysis is an appropriate statistical method to utilize for analyzing this data.

In support of the unidimensional conceptualization of engagement put forth by Sonnentag (2006), the EFA yielded a one factor solution accounting for 62% of the variance. Each item exhibited strong primary loadings on the factor (see Costello & Osborne, 2005, for recommended factor loading strengths).[4] Refer to Table 10 for more information.

Table 10.
Factor Matrix of Engagement Items

Items	Factor 1
At my workplace, I am mentally resilient.	.66
I am enthusiastic about my work.	.92
Time flies when I am working.	.76

Note. All items loaded on to one factor.

Study 2 Aggregation Statistics

Surveys, including climate surveys, often measure a construct by obtaining multiple ratings from individuals and aggregating that data to the group-level. The construct of interest is then able to be interpreted at the group-level; this allows for interpretation of the results to shift from saying that Person A and Person B differ on a specific construct to being able to say that Organization A and Organization B differ on a specific construct. Often the interpretation of the same construct differs between individual-level and group-level. Some researchers believe the assessment of agreement is a prerequisite for arguing that a higher-level construct can be operationalized from individual-level data; other researchers believe that the variance of within-group agreement is of theoretical importance and should be studied (see Burke, Borucki & Kaufman, 2002). For exploratory purposes, the aggregation statistics for the Engagement Climate scale was examined.

The DEOCS typically remains open for 21 to 30 days - the data analyzed here is representative of individuals who completed the research blocks of the DEOCS between 1 September 2016 and 9 September 2016; therefore, caution should be taken when interpreting the aggregation statistics because the sample reflects partial units/organizations. Additionally, respondents are aggregated to the unit-level through a grouping variable that can identify who belongs to which unit. These units vary in size. For example, Commanders in the Air Force requesting the DEOCS may oversee a single Squadron, Group, or Wing. Therefore, a unit may comprise multiple commands. Because of this, the fidelity of the aggregation statistics presented in the current paper may lose value. Additional unit-level analyses will be conducted after the survey is released, therefore allowing aggregation of complete units/organizations. Additionally, once we have a more robust dataset, different levels of analyses (e.g., based on sub-UICs or

[4] Due to the single factor solution, the solution could not be rotated.

'breakouts'/departments) will be explored. The remainder of this section will discuss the aggregation statistics for the Engagement scale.

Sample Description

This section contains the demographic characteristics of Study 2. These individuals come from 75 units containing 16 or more individuals (n = 2,178). The variables are displayed according to the survey administrator's selections. The personnel classifications of this sample are as follows: 29% Army (n = 624), 53% Navy (n = 1,158), 12% Marine Corps (n = 263), and 3% Air Force (n = 62). The majority of respondents within this sample are male (n = 1,695; 78%).

Within-Group Agreement

The within-group agreement for the Engagement scale was explored. Within-group agreement indices help determine if the construct that is supposed to be shared at the group-level actually demonstrate agreement among respondents within the same group. Several within-group agreement indices were explored, including: r_{wg}, AD_M, *ICC(1)*, *ICC*(*2*).

r_{wg} *Statistic*

The r_{wg} compares the observed within-group variances to an expected variance from random responding. This is a consensus measure or index of agreement within-group(s). LeBrenton and Senter (2008) suggest interpreting r_{wg} on a continuum of agreement, with values between .00 and .30 indicating a *lack of agreement*, .31 to .50 as *weak agreement*, .51 to .70 as *moderate agreement*, .71 to .90 as *strong agreement*, and .91 to 1.00 as *very strong agreement*. The averaged $r_{wg(j)}$ results for *Engagement* was .37 suggesting weak agreement.

Mean Average Deviation (AD_M)

The mean average deviation (AD_M) can be interpreted such that 0 indicates complete agreement. Using the seven point response scale, an upper limit cut-off of 1.2 was utilized to determine within-group agreement (Burke & Dunlap, 2002), thus scores that fall under an AD_M value 1.2 represent satisfactory group agreement. The AD_M indices for the *Engagement* scale suggest weak within-group agreement, falling slightly above the 1.2 cut-off ($AD_{M\,(J)=}$ 1.35).

Intraclass Correlations

Intraclass correlations were conducted to determine the amount of variance that can be explained by the unit (LeBreton & Senter, 2008). The *ICC(1)* explains the total variance that can be explained by group membership. Specifically, an *ICC(1)* of .10 can be interpreted as 10% of the variability in individual's responses is explained by group membership (Bliese, 2000). Additionally, *ICC(1)* can be interpreted similarly to effect size, with a value of .01 considered a "small" effect, a value of .10 considered a "medium" effect and a value of .25 considered a "large" effect (LeBreton & Senter, 2008). A medium effect was found for the *Engagement* scale, suggesting that 8% of an individual's responses can be attributed to unit membership.

ICC(2) is an estimate of the reliability of the group means. Thus, an *ICC(2)* indicates whether groups can be reliably differentiated based on the group mean. Although there are no

strict standards of acceptability for *ICC(2)* values, Glick (1985) recommended an *ICC(2)* cutoff of .60. The *ICC(2)* score fell just above the cut-off (*ICC(2)* = .73).

Between-Group Differentiation

The between-group differentiation for the Engagement Climate scale was explored. Between-group analyses help determine if the groups that are expected to differ actually differ. A one-way analysis of variance (ANOVA) was performed to determine if minimal evidence exists for difference across groups.

One-Way Analysis of Variance (ANOVA)

The discriminant power was assessed for the *Engagement* scale to determine if differences across groups exist. The discriminant power was assessed with the one-way Analysis of Variance (ANOVA) procedure. Hays (1981) suggests that an F ratio > 1.00 provides the minimal evidence for differences across groups. Within the current sample, the F ratio for Engagement across units was greater than one, F (74, 2103) = 3.64, $p < .01$, suggesting differences across groups.

Taken together, the aggregation statistics and the one-way ANOVA provide initial support for aggregating this data to the unit level. Aggregation statistics will be further explored once we have data for complete units.

Conclusion

The *Engagement* scale that will be added to DEOCS 4.1 contains three items. The focus of the current paper is the steps to create a succinct measure of engagement that is compatible with both military and civilian populations. Upon the development of the three-item scale, theoretical and statistical evidence were used to help reduce the number of items on the survey and make a brief, parsimonious scale. Results of factor and reliability analyses support a single factor of engagement using a three-item scale. While there was some initial support that the engagement scale can be aggregated to reflect a meaningful unit-level variable, additional unit-level analyses will be conducted when we have data on complete units/organizations. Future analysis will be conducted to establish correlations with theoretically related items and to establish convergent and discriminant validity.

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