

Validation of DEOCS 4.1: A Confirmatory Factor Analysis



DEFENSE EQUAL OPPORTUNITY MANAGEMENT INSTITUTE
DIRECTORATE OF RESEARCH DEVELOPMENT AND STRATEGIC INITIATIVES

Dr. Richard Oliver Hope Human Relations Research Center
Directed by Dr. Daniel P. McDonald, Executive Director
366 Tuskegee Airmen Drive Patrick AFB, FL 32925
321-494-2747

Prepared by
Hope Research Center
DEOMI R&D
for Dr. Daniel P. McDonald, Director of Research and Development



Tech Report No. 19-06

Abstract

DEOCS 4.1 has demonstrated to provide reliable measurement of the associated factors. In addition, it has also proven to be a valuable asset to Commanders in providing them a snapshot of their unit's climate. However, several limitations of these analyses should be noted. The first limitation involves the fit value of some of the indices. One possible reason for these fit values could be that the DEOCS measures both climate and non-climate constructs within each section of the DEOCS. This variation would lead to a reduction of fit since each section of the DEOCS would not be measuring a single latent construct as hypothesized. Secondly, these analyses were conducted at the individual level and not aggregated. Since the DEOCS is designed to measure unit climate, future research should examine if the fit indices would improve aggregating the data to the unit and then conducting the analyses.

Future efforts should continue to focus on finding a balance between stakeholders and theory to continue to ensure that the DEOCS is a valid and usable climate assessment. The next revision to the DEOCS should consider increasing the theoretical background of which constructs make up *organizational climate* while still eliciting feedback from Commanders, Service EO program managers, and DoD entities. Also, consideration should be made to structure the survey into 'climate' or 'non-climate' sections. Another future direction for the DEOCS would be to consider a molar approach to measuring climate. This would allow Commanders and stakeholders to obtain a general idea of member well-being within the unit. It is also important to note that process improvements to the DEOCS continue to include: (1) determining and evaluating existing constructs that remain of interest to the DoD; (2) examining, evaluating, and defining constructs related to newer initiatives within the DoD; and (3) determining a priori needs for aggregation of these constructs.

1. Introduction

1.1 Purpose

In May 2016, Defense Equal Opportunity Management Institute (DEOMI) began developing the latest version of the DEOMI Organizational Climate Survey (DEOCS), version 4.1. This effort included redesigning the previous version of the survey (DEOCS 4.0), as well as redesigning the corresponding DEOCS Commander Report. The goal of this revision was to realign the survey with Department of Defense (DoD) initiatives while considering the needs of the commander. In order to better understand command climate, DEOMI explored the measurement properties of this new survey. This paper presents the findings of a series of factor analyses using the DEOCS 4.1 items and factors.

This paper is divided into six sections. This section specifies the purpose of the paper and provides an overview of the structure of the document. The second section contains relevant background information, including a brief history of the DEOCS, policy regarding DEOCS administration, and a discussion of the primary purpose of the DEOCS. The third section introduces the concept of command climate, and describes DEOMI's approach to measuring command climate. The remaining sections detail a series of factor analyses used to examine the measurement properties of the DEOCS, as well as identify future directions. Section four highlights the results of Phase I, which used an exploratory approach to better understand the shared variance among items within each factor. Section five details the results of Phase II, which used a confirmatory approach to examine the latent structure of the factors. Lastly, section six highlights the limitations of this approach, and provides recommended next steps.

2. Background Information on the DEOCS

2.1 History

Approximately 30 years ago, DoD Directive 1350.2, “The Department of Defense Military Equal Opportunity Program,” established the requirement for commanders/directors to monitor their organizations’ climates, and take steps to remedy identified issues and concerns. The DEOCS is a command-requested organizational development survey used to assess members’ shared perceptions of various human relations conditions, including organizational effectiveness (OE), equal opportunity (EO), and sexual assault prevention and response (SAPR). The DEOCS, previously referred to as the Military Equal Opportunity Climate Survey (MEOCS), was first released in 1990. In 2005, the MEOCS was revised and renamed the DEOCS and, for the first time, was available as an online survey. Over the years, DEOCS usage grew substantially, from 154,381 surveys administered in Fiscal Year 2005 (FY05) to 3,104,702 surveys administered in Fiscal Year 2018 (FY18).

2.2 Policy

The DEOCS is unique, in that the survey is continuously administered to DoD organizations as directed by the National Defense Authorization Act for Fiscal Year 2013 (NDAA13). To wit: NDAA13 requires leaders of DoD organizations to conduct a climate assessment—that includes administering the DEOCS as a component of that assessment—within 120 days of taking command and at least annually thereafter while in command.

2.3 Primary Purpose

Command climate is an important driver of members’ attitudes, behaviors, and, ultimately, mission effectiveness. In order to leverage and maximize the positive influence of command climate, leadership must set and maintain the *right* climate. The DEOCS is a commander's management tool that allows leaders to proactively assess critical organizational climate

dimensions that can have an impact on their organization's effectiveness. The DEOCS provides a diagnosis of potential organizational issues through a comprehensive report. Commanders use information provided in the report to assess negative and positive indicators of their commands.

The DEOCS is one component of a larger organizational assessment. DEOMI recommends commanders use the DEOCS results to identify potential areas of concern and organizational strengths. Furthermore, these findings should help to drive follow-on assessments, namely focus groups and/or individual interviews, systematic observations, and/or review of records and reports. This holistic examination of conditions will help commands obtain a more accurate picture of their command climate and use this information to modify policies, programs, and resource allocation.

3. Conceptualizing Command Climate

Climate has been conceptualized in multiple ways. Academically, organizational climate is defined as “the shared meaning organizational members attach to events, policies, practices, and procedures they experience and the behaviors they see being rewarded, supported, and expected” (Ehrhart, Schneider, & Macey, 2013, p. 69). In other words, command climate is established by leadership, and is learned through social interaction and observation. Members learn which behaviors and practices the organization reinforces or encourages, simply tolerates, or actively discourages or prohibits. This knowledge helps members interpret events, and ultimately drives their behavior.

Climate can be labeled as being generic or strategic. A climate categorized as generic is known as a molar climate, where patterns exist across many aspects of climate (Ostroff, Kinicki, & Muhammad, 2013). For instance, in the workplace, obtaining a general idea of the well-being of employees would be considered a molar climate approach (Ehrhart, Schneider, & Macey 2013). A climate categorized as strategic is known as a focused climate. Here, there is a specific area of interest (e.g., a specific process within the organization) that is examined in relation to a specific outcome. For example, an organization might examine service climate if they are specifically interested in how employees interact with customers (as opposed to a general positive climate of well-being) (Schneider, Ehrhart, & Macey, 2013). Schneider and colleagues noted that, because focused climates allow more targeted examination of specific outcomes, they have led to improved validity studies (i.e., less variability in results) and a greater understanding of the characteristics that can influence specific climates.

Examining the validity of climate research also requires clarifying the frame of reference of the survey items. The frame of reference helps infer which climate constructs can be

aggregated as well as the level of analysis. As climate is defined as having a set of shared perceptions, climate research will typically occur at the team or organizational level (Chan, 1998). For instance, in one scenario, team level could be considered an individual's immediate work group, whereas organizational level could be considered an individual's entire company. Because it is important to examine climate at these levels, it follows that survey items be written in a manner that will allow data collected at lower levels to establish higher level constructs (Chan, 1998). Chan (1998) identified a number of composition models that he used "to provide a framework for organizing, evaluating, and developing constructs and theories in multilevel research" (p. 234). The two most commonly used climate research models are the direct consensus and referent-shift consensus models (Wallace et al., 2016). These models were utilized throughout the DEOCS item and factor improvement process. Survey items that ask about the individual's perceptions (e.g., "I feel...") use a direct consensus model (Wallace et al., 2016). Wallace and colleagues noted that these survey items can be aggregated to reflect shared perceptions, as long as two criteria are met: (1) the construct of interest is defined at all levels of analysis (i.e., individual level/psychological climate and group or team level/organizational climate) and (2) the reasons for aggregating items are determined *a priori*. Survey items that ask about the respondent's perception of a higher level concept (e.g., "My team" or "My organization") are using a referent-shift consensus model; that is, the frame of reference is "shifted" so that the individual is now considering a particular collective (Wallace et al., 2013). These survey items have the same two criteria for aggregation as the direct consensus model items. DEOMI took this information into consideration in its approach to developing DEOCS 4.1.

4. Approach to developing DEOCS 4.1

To accomplish the goal of re-developing a *valid* and *usable* climate assessment for commanders and stakeholders, DEOMI took a balanced approach that considered both scientific rigor and practical utility. Scientific rigor was accomplished by consulting literature and research from an academic perspective of modeling climate as well as establishing both content and construct validity. Practical utility was accomplished by soliciting feedback from the field and meeting needs directed by policy.

For the purpose of the DoD's strategic goals in using climate for targeted outcomes, the DEOCS 4.1 was designed to take a focused climate approach to climate assessment (Schneider et al., 2013). DEOMI's goal was to identify those focused climates most critical to mission effectiveness while balancing commander, policy, and stakeholders' interest. Additionally, because the climates of interest include OE and EO topics, one generic (i.e. molar) climate measurement would not effectively serve the field. In order to examine multiple focused, climates, DEOMI examined the literature to identify relevant organizational climate factors and surveyed the field for an understanding of climates that could enhance mission effectiveness.

Feedback from the field was solicited regarding which factors from DEOCS 4.0 were considered valuable and should still be included and which should be removed. Commanders and Service Equal Opportunity (EO) program managers were also consulted, along with DoD entities operating under the Under Secretary of Defense for Personnel and Readiness Office of Force Resiliency (e.g., Sexual Assault Prevention and Response Office [SAPRO], Defense Suicide Prevention Office [DSPO], Office of Diversity Management and Equal Opportunity [ODMEO]) about what areas of climate they considered critical. Factors from DEOCS 4.0 that

were considered valuable were retained, while emerging factors (e.g., inclusion, engagement) were further examined by reviewing the literature.

Selected climates were then further examined to establish content and construct validity. To establish construct validity, analysts reviewed current literature to garner usable definitions and any available relevant scales. Questions were developed—or revised when established scales were used—to reflect construct definitions. To ensure content validity, subject matter experts (SMEs) reviewed the items to confirm that they were relevant to the work domain or unit and that the items had adequate coverage of the domain.

Construct validity was then further assessed by pilot testing survey questions using the research blocks of the DEOCS. The research blocks pose additional items at the end of the DEOCS to those respondents who indicate they would participate in completing the research items. A complete discussion on the DEOCS methodology can be found in DEOMI climate technical reports provided to the services (e.g., DEOMI, 2018). The psychometric properties (e.g., descriptive statistics, factor structure, reliability) of items and scales were examined. Survey questions that demonstrated the strongest psychometric properties were selected for inclusion on the DEOCS, thus shortening the survey to reduce survey burden. Finally, the nomological network of the factors was also examined to ensure that climate constructs (1) related to other theoretically-related constructs and (2) did not relate to theoretically-unrelated constructs. DEOMI released DEOCS 4.1 in August 2017.

This paper examines additional measurement properties of the DEOCS following a two-phase approach. Phase I, completed during DEOCS 4.1 development, used pilot data collected using the DEOCS research blocks to conduct a Principal Components Analysis (PCA) and

provided results for each factor at the item level. The purpose of this phase was to provide the researchers with an understanding of the shared variance among items within each factor.

Phase II—conducted after all Phase I analyses were complete and all statistical requirements were met—used DEOCS 4.1 data obtained after the survey was released for DoD-wide use. The purpose of Phase II was to complete a confirmatory factor analysis (CFA) on the items within each individual factor as well as the factors within each of the three sections of the DEOCS (i.e., OE, EO, and SAPR).

5. Phase I: PCA

DEOMI initiated development of the DEOCS 4.1 in May 2016. The efforts associated with this task included various updates to improve the DEOCS' ability to gauge command climate, all of which was accomplished in conjunction with this project. Phase I was conducted with the primary goal of examining the proposed DEOCS 4.1 items within a smaller set of components (Park, Dailey, & Lemus, 2002). Prior to completing the PCA, we examined each construct independently, and conducted an extensive literature review of the construct areas to ensure proper coverage of the content domain. Additionally, we completed multiple steps prior to obtaining the final set of proposed items. These steps included item development for each of the proposed factors, then conducting descriptive statistics, reliabilities, and correlations for each factor until we reached consensus and met statistical requirements.

After developing the final set of proposed items, the first step was to look at the demographic composition of the sample to ensure that there was sufficient representation for each demographic group, as well as Service branch representation. Additionally, a reliability analysis helped determine which items would be examined in the PCA. A PCA is a dimension-reduction tool that is used to minimize the number of variables while still maintaining the most

information. It provides a linear combination of variables so that the maximum variance is extracted from the variables. It continues to do this iteratively with the remaining variance until all of the variance is accounted for. Prior to analysis, we assessed the factorability of the items by assessing the Bartlett Test of Sphericity (BTS; Snedecor & Cochran, 1983) and the Kaiser Myer-Olkin (KMO) measure of sampling adequacy (Kaiser & Rice, 1974). The BTS was significant and KMO values ranged from 0.75 to 0.97, suggesting adequate factorability (see Table 1).

Table 1 displays the results of the PCA for each of the principal components. The samples utilized for the following PCAs were collected using the DEOCS research blocks from June to September 2016. The sample sizes for the PCAs ranged from 1,428 to 5,251 participants, and each had sufficient Service representation.

Table 1: Results of PCA

Component/ Factor*	Sample Size	Number of Final Items	BTS	KMO	Variance Explained
Command Leadership	3,227	4	11,096.98; <i>p</i> <.01	.85	84%
Connectedness	4,644	4	5,106.76; <i>p</i> <.01	.68	79%
Engagement	4,230	3	7,126.76; <i>p</i> <.01	.68	92%
Group Cohesion	5,111	3	11,687.79; <i>p</i> <.01	.76	94%
Inclusion	4,532	6	20,346.39; <i>p</i> <.01	.88	56%
Job Satisfaction	3,893	3	22,122.49; <i>p</i> <.01	.79	93%
Organizational Commitment	3,227	3	9,695.14; <i>p</i> <.00	.75	97%
Sexual Assault Prevention ⁱ	1,428	6	41,071.25; <i>p</i> <.01	.97	67%
Sexual Assault Response ⁱ	1,428	5	41,071.25; <i>p</i> <.01	.97	78%
Sexual Assault Retaliation ⁱ	1,428	6	41,071.25; <i>p</i> <.01	.97	81%

Sexual Harassment Retaliation	4,234	6	29,187.51; <i>p</i> <.01	.95	85%
Trust in Leadership	5,251	4	18,287.06; <i>p</i> <.001	.85	93%
Unlawful Discrimination**	4,018	4	72,761.72; <i>p</i> <.01	.94	90%/97%
Unwanted Workplace Experience***	5,404	5	20,054.49; <i>p</i> <.00	.83	81%

* Factors with a “select all that apply” option were not included in these analyses.

** The results of the PCA showed that Unlawful Discrimination had two factors: Unlawful discrimination and a behavior sub-factor. The two factors by items can be seen in Appendix A.

*** This factor had four items with a yes/no response scale.

ⁱ Exploratory Factor Analysis (EFA) was conducted for Sexual Assault Prevention, Sexual Assault Response and Sexual Assault Retaliation

6. Phase II: Analysis of Factors and Sections within DEOCS 4.1

Phase II was conducted with the primary goal of performing a confirmatory factor analysis (CFA) on the items within each individual factor as well as looking at the factors within each of three sections of the DEOCS (i.e., OE, EO, and SAPR). While converting the DEOCS from version 4.0 to 4.1, one major consideration was reducing survey burden. We accomplished this by removing items and factors that were no longer seen as relevant by commanders and revising redundant factors to more precisely align with the current scientific literature. Ultimately, the DEOCS was shortened from 95 items (DEOCS 4.0) to 56 items (DEOCS 4.1). Another major consideration was to balance the needs of the commander with stakeholder interest. This resulted adding the content areas of engagement, connectedness, and retaliation to the survey.

6.1 What is a Confirmatory Factor Analysis?

A CFA is typically conducted to assess the psychometric properties of a scale while examining the relationship between the observed variables and the underlying latent constructs. Further, a second-order CFA is utilized when a survey is multidimensional and requires the researcher to look at underlying sub-dimensions or components.

6.2 Confirmatory Factor Analysis Conducted

A second-order CFA was conducted to test the factor structure of the DEOCS' OE, EO, and SAPR categories. In particular, each category contains a grouping of factors presented together in DEOCS reports and special analyses. This approach was conducted as a starting point to develop a theoretically- and statistically-supported model of organizational climate based on these factors measured by the DEOCS. Only factors with a Likert-type scale administered to all respondents were included, due to the nature of the current analysis (some discrimination items are only answered by civilians). Other types of scales (e.g., ones with dichotomous or "select all that apply" response options) can be examined; however, these require a different method and approach of confirmatory analysis, and may be explored in future research efforts. Other avenues of future research may reintroduce some of these differing scale-type factors as outcomes of a predictive model of organizational climate.

6.3 Factor Categories

For this analysis, the OE category included the following factors: Commitment, Senior Leadership, Organizational Performance, Cohesion, Trust in Leadership, Connectedness, Job Satisfaction, Organizational Processes, and Engagement. The EO category included Sexual Harassment, Sexual Harassment Retaliation Climate, Inclusion, and the three behaviorally indicated Discrimination items. Finally, the SAPR category included Sexual Assault Response Climate, Sexual Assault Retaliation Climate, and Sexual Assault Prevention Climate.

6.4 Cleaning Procedures

Before conducting the analysis, a series of steps were taken to identify and remove careless responders and missing data from the dataset. The initial sample size consisted of 73,676 DEOCS participants. Based on the sizable sample, conservative screening strategies

were enacted to ensure quality data. Respondents were removed on the basis of not meeting any one out of three criteria for flagging careless responders. The first two criteria included two attention check items: one placed among the OE items, and the other placed among the SAPR items. Respondents answering either attention check item incorrectly were removed from the sample. The third criterion involved calculating the standard deviation across the behaviorally-based discrimination items, inclusion items, and sexual harassment items within the EO category. Participants were removed for careless responding if the standard deviation across 13 items was zero (i.e., no variance in responding). Based on these three flagging criteria, 11,889 (16%) of the cases were removed, leaving 61,787 participants in the sample. Finally, any participants with missing data were also removed from the sample; that is, the analysis was conducted on only those participants who completed the entire survey. Based on these screening steps, the final sample size for the current analysis was 61,041 participants. Sample demographics can be seen below in Table 2. As noted above, the initial sample size was quite large for the analyses to be completed, thus the researchers felt comfortable removing 16% of respondents to ensure all anomalies were removed. Hatcher (1994) suggests that the number of participants for a CFA should be more than five times the number of variables being used per analysis. Considering that 66 variables were used across the three separate CFAs (i.e., for each section of the DEOCS), the current sample size was deemed to be adequate.

Table 2. Demographics of Respondents in Sample

	<i>Respondent n</i>	<i>Percentage</i>
Overall	61,041	100%
Gender		
Male	47,760	78%
Female	13,281	22%
Service		
Joint Command	521	1%

Navy	21,037	35%
Air Force	8,461	14%
Army	20,151	33%
Marine Corps	9,094	15%
Coast Guard	513	1%
National Guard	1,264	2%

6.5 Measurement Models

A measurement model with second-order factors was estimated using IBM SPSS Amos 16.0.1 software (Figure 1). Each second-order CFA was conducted using the maximum likelihood (ML) estimate method. According to Benson and Fleishman (1994), the ML method is robust, and shows little bias when estimating factor loadings under a wide range of sample conditions, including small sample sizes, the magnitude of correlations among observed indicators, the number of indicators in the model, the magnitude of skewness and kurtosis, and the proportion of indicators with non-normal distributions.

6.6 Organizational Effectiveness

A nine-factor measurement model was estimated, where OE is multidimensional and modeled as a second-order factor. The standardized loadings of items on factors ranged from 0.59 to 0.97 (see Table 3 and Table 4). The root mean square error of approximation (RMSEA) was used to determine how well our *a priori* model fit the data within the current sample (McDonald & Ho, 2002). The chi-square test which “assesses the magnitude of discrepancy between the sample and fitted covariances matrices” (Hu & Bentler, 1999, p. 2) was not utilized as it is known to be highly sensitive to large sample sizes and almost always rejects the model where large samples are used (Bentler & Bonnet, 1980; Jöreskog & Sörbom, 1993). As such, other fit indices should be taken into consideration when determining the overall fit of the data to the specified latent variable(s). The RMSEA statistic indicates how well a model fits the population covariance matrix even with unknown but optimally-selected parameter estimates

(Byrne, 1998). The RMSEA statistic has been regarded as, “one of the most informative fit indices” (Diamantopoulos & Siguaw, 2000, p. 85). A cut-off value of 0.06 or lower, with a more stringent upper limit of 0.07, has been suggested as a value indicative of good fit (Hu & Bentler, 1999; Steiger, 2007). The RMSEA value for the current analysis was 0.06, indicating a good fit for the nine-factor measurement model in the current sample.

Incremental fit indices are also known as comparative or relative fit indices; these compare the chi-square value to a baseline model (Miles & Shevlin, 2007; McDonald & Ho, 2002). The Comparative Fit Index (CFI) assumes uncorrelated latent variables (i.e., the null model), and compares the sample covariance matrix with the null model. It is a popular fit index due to being the least affected by sample size (Bentler, 1990; Fan, Thompson, & Wang, 2009). CFI values closer to 1 indicate a good fit, with a recommended cut-off criterion of $CFI \geq 0.95$ (Hu & Bentler, 1999). The Tucker-Lewis Index (TLI) is another incremental fit index, with a recommended cut-off of $TLI \geq 0.95$ to indicate good fit. The respective CFI and TLI values for the nine-factor measurement model were 0.95 and 0.94.

See Appendix A for the path diagram for the Organizational Effectiveness factors. The squared multiple correlations (Appendix B) represent the percent of variance in a given indicator (e.g., Commitment, Senior Leadership, etc.) explained by its latent variable (i.e., OE), and may be interpreted as the reliability of the indicator. These values ranged from .52 to .79 for OE. The standardized regression weights in Table 4 represent the correlation between the observed variable (e.g., Commitment, Senior Leadership, etc.) and the corresponding common factor (i.e., OE). These values ranged from 0.72 to 0.89 for OE.

When considering the above results for the second-order factor of OE, the nine-factor measurement model demonstrated unacceptable fit according to the Chi-Square Test, good fit

according to RMSEA and CFI, and approached good fit based on the TLI value. These results suggest that, while this model approaches acceptable levels of fit, there is still room for improving the theoretical basis and structure of these factors within the OE category.

6.7 Equal Opportunity

A four-factor measurement model was estimated, where EO is multidimensional and modeled as a second-order factor. See Appendix D for the path diagram for the Equal Opportunity factors. The standardized loadings of items on factors ranged from 0.12 to 0.97 (see Appendix F). The RMSEA was estimated and had a value of 0.10. Similar to OE, two incremental fit indices were also estimated to determine model fit, CFI and TLI. The CFI value was observed at 0.91, while the TLI was 0.89. The squared multiple correlations for each factor within EO ranged from 0.07 to 0.71, while the standardized regression weights ranged from 0.26 to 0.85.

The results for equal opportunity suggested that the factors within the EO category had unacceptable levels based on the recommended guidelines for acceptable levels of the various fit indices discussed. Based on these above results, the current categorization of EO factors may not be the best model representing an equal opportunity climate. As such, the factors within this second-order model may need to be restructured according to theory surrounding the most ideal grouping, or arrangement, of these factors.

6.8 Sexual Assault Prevention and Response

A three-factor measurement model was estimated, where SAPR is multidimensional and modeled as a second-order factor. See Appendix G for the path diagram for the Sexual Assault Prevention and Response factors. The standardized loadings of items on factors ranged from 0.70 to 0.89 (see Appendix H). The RMSEA was estimated and had a value of .06. Similar to

OE and EO, two incremental fit indices were also estimated to determine model fit, CFI and TLI. The CFI and TLI values were both .97. The squared multiple correlations for each factor within SAPR ranged from .57 to .75, while the standardized regression weights ranged from .75 to .86.

The results for the three-factor SAPR measurement model suggest the fit index values for RMSEA, CFI, and TLI were at “good” levels, according to the guidelines for each of these estimates. However, the chi-squared value was significant, suggesting that there is room for improvement in the construction of this second-order factor.

Table 3: Guidelines for Factor Analysis Fit Indices

Fit Index	Acceptable Values
Root Mean Square Error of Approximation (RMSEA)	<.05-.06 is “good”, .05-.08 is “acceptable”, .08-.10 is “mediocre”, and >.10 is “unacceptable”
Comparative Fit Index (CFI)	>.90 is acceptable and >.95 is good
Tucker Lew-Index (TLI)	>.95 is “good”

Table 4: Model Fit Indices of Each Factor Category

Fit Index	OE	EO	SAPR
Root Mean Square Error of Approximation (RMSEA)	.06	.10	.06
Comparative Fit Index (CFI)	.95	.91	.97
Tucker Lew-Index (TLI)	.94	.89	.97

The above analyses indicate EO demonstrated the lowest levels of goodness of fit indices while the other sections demonstrated good fit indices. Considering the theory behind the current DEOCS factors, as well as the present results of the CFA, exploration of a more acceptable theoretical model may prove beneficial. See Appendix J for the finalized items within each factor.

References

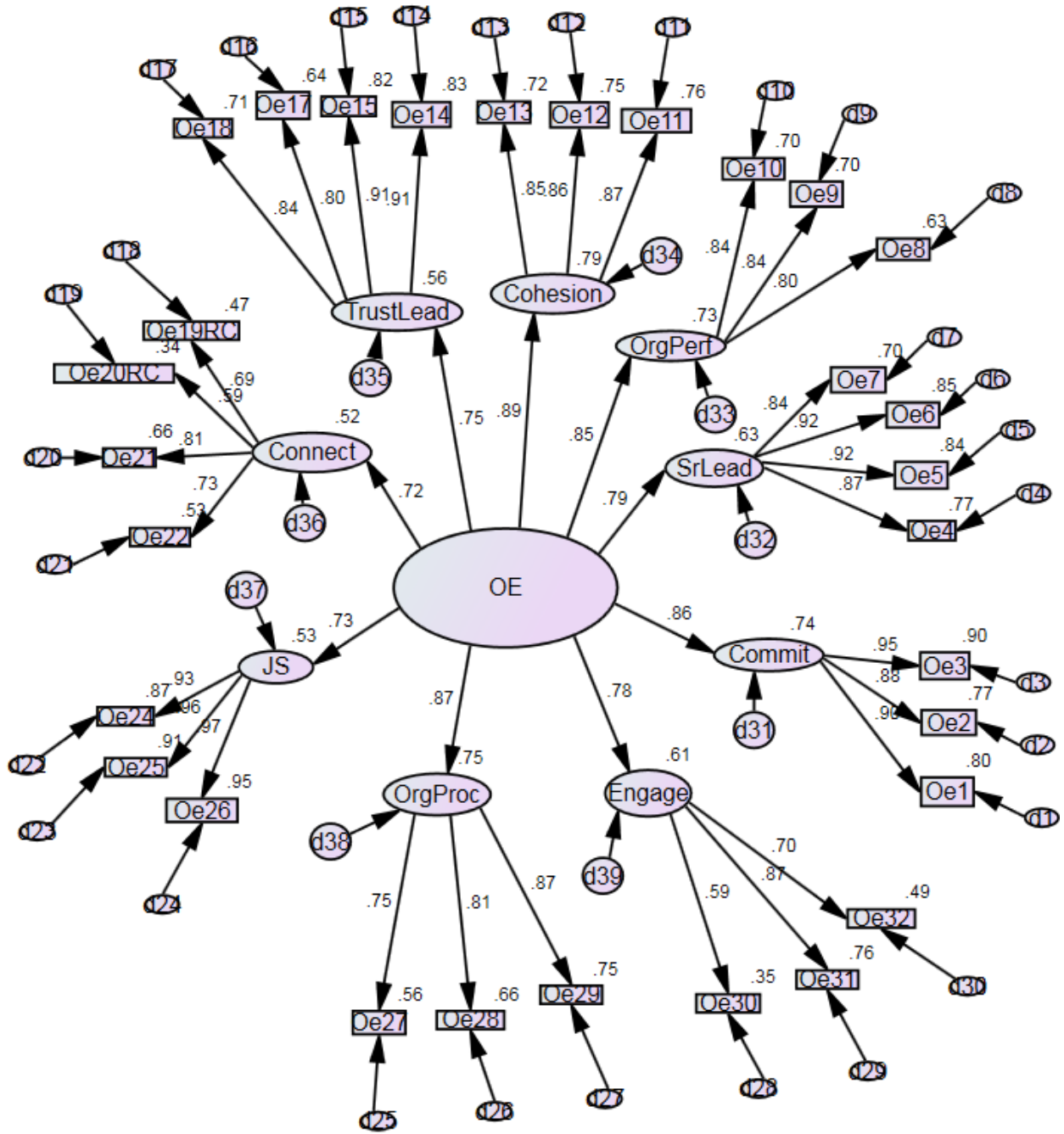
- Barrett, P. (2007). Structural equation modelling: Adjudging model fit. *Personality and Individual Differences, 42*, 815-824.
- Benson, J., & Fleishman, J. A. (1994). The robustness of maximum likelihood and distribution-free estimators to non-normality in confirmatory factor analysis. *Quality & Quantity, 28*, 117-136.
- Bentler, P. M. (1990). Comparative Fit Indices in Structural Models. *Psychological Bulletin, 107*(2), 238-246
- Bentler, P. M., & Bonnet, D. C. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*(3), 588-606.
- Byrne, D. (1998). *Complexity Theory and the Social Sciences. An Introduction*. London and New York: Routledge.
- Chan, D. (1998). Functional relations among constructs in the same content domain at different levels of analysis: A typology of composition models. *Journal of Applied Psychology, 83*(2), 234-246.
- Defense Equal Opportunity Management Institute. (2018). *Sexual assault prevention and response climate report: DoD Results FY18 Q1*.
- Diamantopoulos, A. & Siguaw, J.A. (2000). *Introducing LISREL*. London: Sage Publications.
- Ehrhart, M. G., Schneider, B., & Macey, W. H. (2013). *Organizational climate and culture: An introduction to theory, research, and practice*. New York: Routledge.
- Fan, X., Thompson, B., & Wang, L. (2009). Effects of sample size, estimation methods, and model specification on structural equation modeling fit indexes. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 56-83.

- Hatcher, L. (1994). *A step-by-step approach to using the SAS system for factor analysis and structural equation modeling*. Cary, NC: SAS Institute.
- Hu, L.-t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1-55.
- Jöreskog, K. G., & Sörbom, D. (1993). LISREL 8: Structural equation modeling with the SIMPLIS command language. Chicago, IL, US: Scientific Software International; Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc.
- Kaiser, H. F. & Rice, J. (1974). Little Jiffy, Mark IV. *Educational and Psychological Measurement*, 34, 111 -117.
- McDonald, R. P., & Ho, M.-H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, 7, 64-82.
- Miles, J., & Shevlin, M. (2007). A time and a place for incremental fit indices. *Personality and Individual Differences*, 42(5), 869-874.
- Ostroff, Kinicki, & Muhammad, 2013
- Park, H. S., Dailey, R., & Lemus, D. (2002). The use of exploratory factor analysis and principal components analysis in communication research. *Human Communication Research*, 28(4), 562-577.
- Schneider, B., Ehrhart, M. G., & Macey, W. M. (2013). Organizational climate and culture. *Annual Review of Psychology*, 64, 361-388.
- Snedecor, G. W. & Cochran, W. G. (1989). *Statistical Methods*. Eighth Edition, Iowa State University Press.
- Steiger, J. H. (2007). Understanding the limitations of global fit assessment in structural equation modeling. *Personality and Individual Differences*, 42(5), 893-898.

Tabachnick, B. G., & Fidell, L. S. (1996) *Using multivariate statistics (3rd ed.)*. New York: Harper Collins College Publishers.

Wallace, J. C., Edwards, B. D. Paul, J., Burke, M., Christian, M., & Eissa, G. (2013). Change the referent? A meta-analytic investigation of direct and referent-shift consensus models for organizational climate. *Journal of Management*, 42(4), 838-861.

Appendix A. Path Diagram of Organizational Effectiveness Factors



Appendix B: Organizational Effectiveness Factor and Item Squared Multiple Correlations and Standardized Regression Weights

Factors & Items	Squared Multiple Correlations	Standardized Regression Weights
Commitment	.74	.86
Oe1	.80	.90
Oe2	.77	.88
Oe3	.90	.95
Senior Leadership	.63	.79
Oe4	.77	.88
Oe5	.84	.92
Oe6	.85	.92
Oe7	.70	.84
Organizational Performance	.72	.85
Oe8	.63	.80
Oe9	.70	.84
Oe10	.70	.84
Cohesion	.79	.89
Oe11	.76	.87
Oe12	.75	.86
Oe13	.72	.85
Trust in Leadership	.55	.74
Oe14	.83	.91
Oe15	.82	.91
Oe17	.64	.80
Oe18	.71	.84
Connectedness	.52	.72
Oe19RC*	.47	.69
Oe20RC*	.34	.59
Oe21	.66	.81
Oe22	.53	.73
Job Satisfaction	.53	.73
Oe24	.87	.93
Oe25	.91	.96
Oe26	.95	.97
Organizational Processes	.75	.87
Oe27	.56	.75
Oe28	.66	.82
Oe29	.75	.87
Engagement	.61	.78
Oe30	.34	.59
Oe31	.76	.87
Oe32	.49	.70

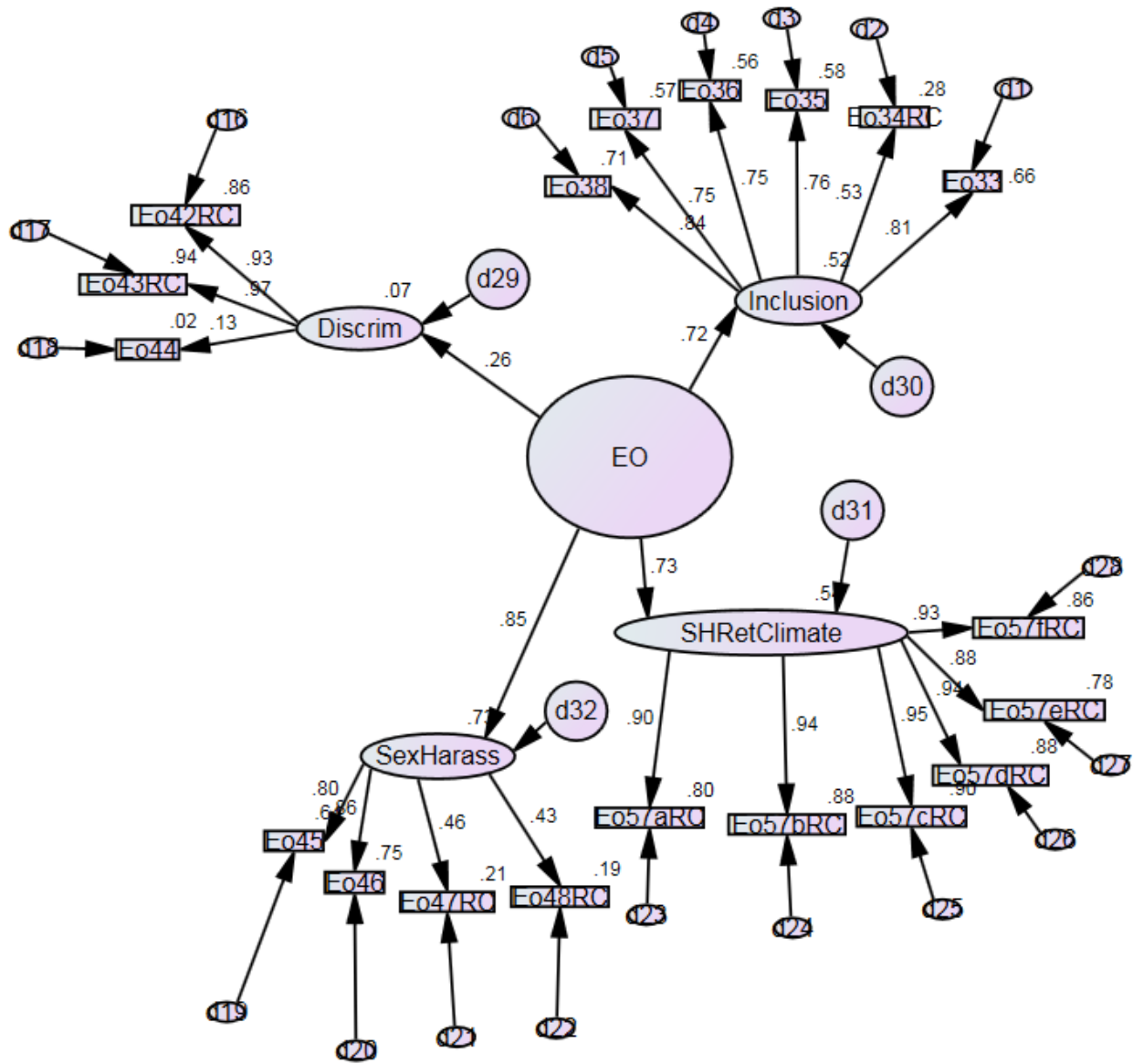
**Note.* RC indicates that the item was reverse coded before conducting the analysis.

Appendix C: Organizational Effectiveness Factors and Item Key

Key	Factors and Items
Commitment	
Oe1	I feel like “part of the family” in this workgroup.
Oe2	This workgroup has a great deal of personal meaning to me.
Oe3	I feel a strong sense of belonging to this workgroup.
Senior Leadership	
Oe4	My senior leader puts processes in place to facilitate the sharing of information throughout the organization.
Oe5	My senior leader clarifies our organization’s goals and priorities.
Oe6	My senior leader communicates a clear vision for the future.
Oe7	My senior leader listens to the concerns of the organization’s military members and employees.
Organizational Performance	
Oe8	When short suspense/tasks arise, people in my organization do an outstanding job in handling these situations.
Oe9	My organization's performance, compared to similar organizations, is high.
Oe10	My organization makes good use of available resources to accomplish its mission.
Cohesion	
Oe11	My workgroup is united in trying to reach its goals for performance.
Oe12	We all take responsibility for the performance of the workgroup.
Oe13	If members of our workgroup have problems in the workplace, everyone wants to help them so we can get back on task.
Trust in Leadership	
Oe14	I can rely on my immediate supervisor to act in my organization’s best interest.
Oe15	My immediate supervisor follows through with commitments he or she makes.
Oe17	I feel comfortable sharing my work difficulties with my immediate supervisor.
Oe18	My immediate supervisor treats me fairly.
Connectedness	
Oe19RC*	My future seems dark to me.
Oe20RC*	These days, I think I am a burden on people in my life.
Oe21	These days, I feel like I belong.
Oe22	These days, I feel that there are people I can turn to in times of need.
Job Satisfaction	
Oe24	I like my current job.
Oe25	I feel satisfied with my current job.
Oe26	I am happy with my current job.
Organizational Processes	
Oe27	Programs are in place to address military members’ and employees’ concerns.
Oe28	Discipline is administered fairly.
Oe29	Decisions are made after reviewing relevant information.
Engagement	
Oe30	At my workplace, I am mentally resilient.
Oe31	I am enthusiastic about my work.
Oe32	Time flies when I am working.

**Note. RC indicates that the item was reverse coded before conducting the analysis.*

Appendix D. Path Diagram of Equal Opportunity Factors



Appendix E: Equal Opportunity Factors

Factor	Squared Multiple Correlations	Standardized Regression Weights
Inclusion	.52	.72
Eo33	.66	.81
Eo34RC*	.29	.53
Eo35	.58	.76
Eo36	.55	.74
Eo37	.57	.75
Eo38	.71	.84
Discrimination	.07	.26
Eo42RC*	.86	.93
Eo43RC*	.95	.97
Eo44	.02	.12
Sexual Harassment	.71	.85
Eo45	.64	.80
Eo46	.75	.86
Eo47RC*	.20	.45
Eo48RC*	.18	.42
Sexual Harassment Retaliation Climate	.54	.73
Eo57aRC*	.80	.89
Eo57bRC*	.88	.94
Eo57cRC*	.90	.95
Eo57dRC*	.88	.94
Eo57eRC*	.78	.88
Eo57fRC*	.86	.93

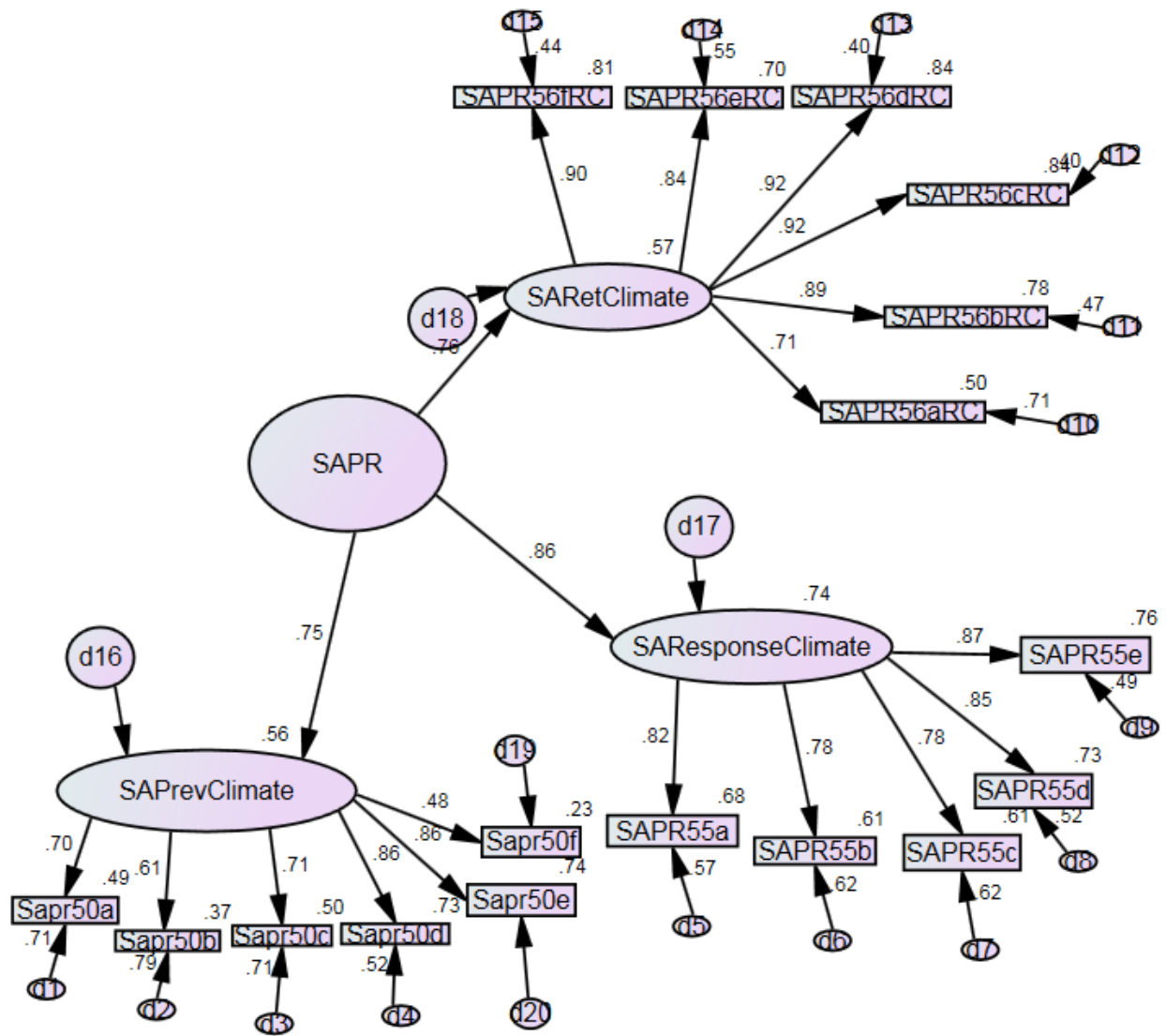
**Note.* RC indicates that the item was reverse coded before conducting the analysis.

Appendix F: Equal Opportunity Factors and Item Key

Key	Factors and Items
Inclusion	
Eo33	Coworkers are treated as valued members of the team without losing their unique identities.
Eo34RC*	I feel excluded by my workgroup because I am different.
Eo35	Within my workgroup, I am encouraged to offer ideas on how to improve operations.
Eo36	Military members/employees in my workgroup are empowered to make work-related decisions on their own.
Eo37	Outcomes (e.g., training opportunities, awards, and recognition) are fairly distributed among military members/employees of my workgroup.
Eo38	The decision-making processes that impact my workgroup are fair.
Discrimination	
Eo42RC*	Racial slurs, comments, and/or jokes are used in my workplace.
Eo43RC*	Sexist slurs, comments, and/or jokes are used in my workplace.
Eo44	I believe I can use my chain of command/supervision to address concerns about discrimination without fear of retaliation/reprisal.
Sexual Harassment	
Eo45	My chain of command/supervision adequately responds to allegations of sexual harassment.
Eo46	My chain of command/supervision plays an active role in the prevention of sexual harassment.
Eo47RC*	Individuals from my workplace use offensive gestures that are sexual in nature.
Eo48RC*	Individuals from my workplace have been offered rewards or special treatment in return for engaging in sexual behavior.
Sexual Harassment Retaliation Climate	
<i>Item stem:</i>	<i>In my workgroup, military members or employees who file a sexual harassment complaint would be:</i>
Eo57aRC*	Excluded from the social interactions or conversations.
Eo57bRC*	Subjected to insulting or disrespectful remarks or jokes.
Eo57cRC*	Blamed for causing problems.
Eo57dRC*	Denied career opportunities (e.g., denied training, awards, or promotions).
Eo57eRC*	Disciplined or given other corrective action.
Eo57fRC*	Discouraged from moving forward with the complaint.

**Note.* RC indicates that the item was reverse coded before conducting the analysis.

Appendix G. Path Diagram of Sexual Assault Prevention and Response Factors



Appendix H: Sexual Assault Prevention and Response Factors

Factor	Squared Multiple Correlations	Standardized Regression Weights
Sexual Assault Prevention Climate	.57	.75
Sapr50a	.68	.70
Sapr50b	.37	.61
Sapr50c	.50	.71
Sapr50d	.73	.86
Sapr50e	.74	.86
Sapr50f	.23	.48
Sexual Assault Response Climate	.75	.86
Sapr55a	.66	.82
Sapr55b	.61	.78
Sapr55c	.61	.78
Sapr55d	.73	.85
Sapr55e	.76	.87
Sexual Assault Retaliation Climate	.56	.76
Sapr56aRC*	.50	.71
Sapr56bRC*	.78	.89
Sapr56cRC*	.84	.92
Sapr56dRC*	.84	.92
Sapr56eRC*	.70	.84
Sapr56fRC*	.81	.90

*Note. RC indicates that the item was reverse coded before conducting the analysis.

Appendix I: Sexual Assault Prevention and Response Factors and Item Key

Key	Factors and Items
Sexual Assault Prevention Climate	
<i>Item stem:</i>	<i>My immediate supervisor:</i>
Sapr50a	Models respectful behavior.
Sapr50b	Promotes responsible alcohol use.
Sapr50c	Would correct individuals who refer to coworkers as “honey,” “babe,” “sweetie,” or use other unprofessional language at work.
Sapr50d	Would stop individuals who are talking about sexual topics at work.
Sapr50e	Would intervene if an individual was receiving sexual attention at work (e.g., staring at someone’s chest, standing too close, rubbing someone’s shoulders).
Sapr50f	Encourages individuals to help others in risky situations that could result in harmful outcomes.
Sexual Assault Response Climate	
<i>Item stem:</i>	<i>If a coworker were to report a sexual assault, my chain of command/supervision would:</i>
Sapr55a	Take the report seriously.
Sapr55b	Keep the knowledge of the report limited to those with a need to know.
Sapr55c	Discourage military members or employees from spreading rumors and speculation about the allegation.
Sapr55d	Promote healthcare, legal, or other support services to the reporter.
Sapr55e	Support the individual for speaking up.
Sexual Assault Retaliation Climate	
<i>Item stem:</i>	<i>In my workgroup, reporters of sexual assault would be:</i>
Sapr56aRC*	Excluded from social interactions or conversations.
Sapr56bRC*	Subjected to insulting or disrespectful remarks or jokes.
Sapr56cRC*	Blamed for causing problems.
Sapr56dRC*	Denied career opportunities (e.g., denied training, awards, or promotions).
Sapr56eRC*	Disciplined or given other corrective action.
Sapr56fRC*	Discouraged from moving forward with the report.

*Note. RC indicates that the item was reverse coded before conducting the analysis.

Appendix J: Items on Final DEOCS 4.1

Factor	Items
Command Leadership	<p>My senior leader puts processes in place to facilitate the sharing of information throughout the organization</p> <p>My senior leader communicates a clear vision for the future.</p> <p>My senior leader listens to the concerns of the organization’s members.</p> <p>My senior leader clarifies our organization’s goals and priorities.</p>
Connectedness	<p>These days I think I am a burden on people in my life.</p> <p>These days, I feel like I belong.</p> <p>These days, I feel that there are people I can turn to in times of need.</p> <p>My future seems dark to me.</p>
Engagement	<p>At my workplace, I am mentally resilient.</p> <p>I am enthusiastic about my work.</p> <p>Time flies when I am working.</p>
Group Cohesion	<p>The workplace is united in trying to reach its goals for performance.</p> <p>We all take responsibility for the performance of our workgroup.</p> <p>If members of our team have problems at work, everyone wants to help them so we can get back on task.</p>
Inclusion	<p>Coworkers are treated as valued members of the team without losing their unique identities.</p> <p>I feel excluded by my workgroup because I am different.</p> <p>Within this workgroup, I am encouraged to offer ideas on how to improve operations.</p> <p>Employees in this workgroup are empowered to make work-related decisions on their own.</p> <p>Outcomes (e.g., training opportunities, awards, and recognition) are fairly distributed among members of my workgroup.</p> <p>The decision-making processes that impact my workgroup are fair.</p>
Job Satisfaction	<p>I like my current job.</p> <p>I feel satisfied with my current job.</p> <p>I am happy with my current job.</p>
Commitment	<p>I feel like “part of the family” in this workgroup.</p> <p>This workgroup has a great deal of personal meaning to me.</p> <p>I feel a strong sense of belonging to this workgroup.</p>
Sexual Assault Prevention	<p>My immediate supervisor models respectful behavior.</p> <p>My immediate supervisor promotes responsible alcohol use.</p> <p>My immediate supervisor would correct individuals who refer to coworkers as “honey,” “babe,” “sweetie,” or use other unprofessional language at work.</p> <p>My immediate supervisor would stop individuals who are talking about sexual topics at work.</p> <p>My immediate supervisor would intervene if an individual was receiving sexual attention at work (e.g., staring at someone’s chest, standing too close, rubbing someone’s shoulders).</p> <p>My immediate supervisor encourages individuals to help others in risky situations that could result in harmful outcomes.</p>
Sexual Assault Response	<p>If a coworker were to report a sexual assault, my chain of command would take the report seriously.</p> <p>If a coworker were to report a sexual assault, my chain of command would keep the knowledge of the report limited to those with a need to know.</p> <p>If a coworker were to report a sexual assault, my chain of command would discourage members from spreading rumors speculating about the allegation.</p>

Factor	Items
	<p>If a coworker were to report a sexual assault, my chain of command would promote healthcare, legal, or other support services to the reporter.</p> <p>If a coworker were to report a sexual assault, my chain of command would support the reporter for speaking up.</p>
Sexual Assault Retaliation	<p>If a coworker reported a sexual assault, they would be excluded from the social interactions or conversations.</p> <p>If a coworker reported a sexual assault, they would be subjected to insulting or disrespectful remarks or jokes.</p> <p>If a coworker reported a sexual assault, they would be blamed for causing problems.</p> <p>If a coworker reported a sexual assault, they would be denied career opportunities (e.g., denied training, awards, or promotions).</p> <p>If a coworker reported a sexual assault, they would be disciplined or ordered other corrective action.</p> <p>If a coworker reported a sexual assault, they would be discouraged from moving forward with the report.</p>
Sexual Harassment Retaliation	<p>If a coworker filed a sexual harassment complaint, they would be excluded from the social interactions or conversations.</p> <p>If a coworker filed a sexual harassment complaint, they would be subjected to insulting or disrespectful remarks or jokes.</p> <p>If a coworker filed a sexual harassment complaint, they would be blamed for causing problems.</p> <p>If a coworker filed a sexual harassment complaint, they would be denied career opportunities (e.g., denied training, awards, or promotions).</p> <p>If a coworker filed a sexual harassment complaint, they would be disciplined or ordered other corrective action.</p> <p>If a coworker filed a sexual harassment complaint, they would be discouraged from moving forward with the report.</p>
Trust in Leadership	<p>I can rely on my immediate supervisor to act in my organization's best interest.</p> <p>My immediate supervisor follows through with the commitments he or she makes.</p> <p>I feel comfortable sharing my work difficulties with my immediate supervisor.</p> <p>My immediate supervisor treats me fairly.</p>
Discrimination	<p>Discrimination based on _____ does not occur in my workplace.</p> <p><input type="checkbox"/> Race/Color/National Origin</p> <p><input type="checkbox"/> Religion</p> <p><input type="checkbox"/> Sex</p> <p><input type="checkbox"/> Sexual Orientation</p> <p><input type="checkbox"/> Age</p> <p><input type="checkbox"/> Disability</p> <p><input type="checkbox"/> Equal Pay</p> <p><input type="checkbox"/> Genetic Information</p> <p><input type="checkbox"/> Pregnancy</p>
Discrimination Behavioral Sub-factor	<p>I believe I can use my chain of command to address concerns about discrimination without fear of negative personnel actions.</p> <p>Racial slurs, comments, and/or jokes are used in my workplace.</p> <p>Sexist slurs, comments, and/or jokes are used in my workplace.</p>
Unwanted Workplace Experience	<p>STEM: While under your current senior leader within the last 12 months, did someone from your workplace:</p> <p>Repeatedly tell sexual "jokes" that made you uncomfortable, angry, or upset?</p> <p>Embarrass, anger, or upset you by repeatedly suggesting that you do not act like a man/woman is supposed to? For example, if you are a male, being called a "woman," a "fag," or "gay;" if you are a female, being called a "dyke," or "butch."</p>

Factor	Items
	Make repeated sexual comments about your appearance or body that made you uncomfortable, angry, or upset?
	Make attempts to establish an unwanted romantic or sexual relationship with you? These could range from repeatedly asking you out for coffee to asking you for sex or a 'hook-up'.
	Intentionally touch you in a sexual way when you did not want them to? This could include touching your genitals, breasts, buttocks, or touching you with their genitals anywhere on your body.
